



Inver Grove Heights Environmental Commission
Thursday, November 16, 2023 at 7:00 PM
8150 Barbara Avenue, Inver Grove Heights, MN 55077

AGENDA

NOTICE TO RESIDENTS: Individuals may submit written public comments in advance of the meeting by emailing comments to Rebecca Kiernan (rkiernan@ighmn.gov). Comments received prior to 4:00 p.m. on Thursday, November 16, 2023, will be provided to the Council at or before the November 16, 2023 meeting.

1. **Call to Order**
2. **Roll Call**
3. **Presentations**
4. **Approval of Minutes**
 - A. Approval of Minutes from the Thursday, August 24, 2023, Environmental Advisory Commission Meeting
5. **Regular Agenda**
 - A. Robert Curve 4th & 5th Additions Wetland Replacement Plan
 - B. City Comments on Pine Bend Landfill's Environmental Assessment Worksheet and Air Quality Permit for 2022 Request for Major Modification of Permit #SW-45.
 - C. 2024 Environmental Advisory Commission Work Plan
6. **Public Comment**

Public comment provides an opportunity for the public to address the Commission on items that are not on the agenda. Comments will be limited to three (3) minutes per person.
7. **Commissioner and Staff Comments**
8. **Adjourn**

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November 16, 2023 - Environmental Commission Agenda

Inver Grove Heights Environmental Advisory Commission
8150 Barbara Avenue
Thursday, August 24, 2023 at 7:00 p.m.

Meeting Minutes

1. Call to Order

The Environmental Advisory Commission of Inver Grove Heights met in City Council Chambers on Thursday, August 24, 2023. Chair Sara Goodman called the meeting to order at 7:00 p.m.

2. Roll Call

Present: Chair Sara Goodman; Commissioners: Nichole Boehmke, Nick Ruiz, Ted Trenzeluk, George Fell, Marjorie Savage, Kevin Sethre, Brian Barner, Patti Mikulski
Environmental Specialist Ally Sutherland

Also Present: Aaron Janusz, Environmental Manager, Pine Bend Landfill

Absent:

3. Presentations

A. Operational and Gas Migration Updates at Pine Bend Landfill

Aaron Janusz, Environmental Manager, Pine Bend Landfill, provided the following presentation:

Pine Bend Team:

Katie Lindholm, Operation Manager
Ross Ziegenhagen, Operations Supervisor
Megan Goldstein, Environmental Specialist

The landfill has 8 Operators, 1 Mechanic, 3 Scalehouse/Lab/Laborers

Consultants: Ethan Ketelsen and Tom Schuster from Stantec

Landfill History/Development:

- Municipal Solid Waste Landfill (MPCA Permit – SW-45)
- License and Host Agreement with Dakota County
- Agreements with the City of Inver Grove Heights:
 - Conditional Use Permit (CUP)
 - Non-Conditional Use Permit (NCUC)
 - Host Agreement
- Landfill began in September 1971
 - Vertical expansion – 2005 and 2019

Landfill Information:

- 358 acres
- Permitted landfill: 192 acres
- Current footprint: 188.9 acres
- Final cover area: 23 acres
- 1,300 tons of MSW (municipal solid waste) is brought in per day
- 3,000 cubic feet per minute of landfill gas
 - RNG Plant (Renewable Natural Gas)
- 10,000,000 gallons of leachate per year
 - Leachate is water that has made its way down through the landfill to the bottom.
 - Collected and pumped through on-site storage tanks.

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- Hauled out to MCES (Metropolitan Council Environmental Services) Plant in St. Paul for treatment and then out to the Mississippi River once clean.

Landfill Cross Sections:

- Bottom Liner, layer of clay, 60 mil geosynthetic liner, 1 foot of sand, gas wells.
- Groundwater protection (groundwater wells) monitored 3 times a year per MPCA permit.
- Landfills are designed to shed stormwater.

Project Updates:

- Phase 6A Cell Construction - Sideslope Expansion
- Renewable Natural Gas (RNG) Plant - Opal (Formerly Fortistar)
- Vertical Expansion (application was submitted to expand the landfill vertically)
- Gas Migration

Cell Construction Cell 6A:

- Changed the access road. New cell is in the old road footprint. The road was shifted to the west side of the landfill.
- Building slideslope cells
 - 1st step is to strip soil off the top to get to clay
 - GCL is placed on top of the clay (clay substitute, fabric)
 - On top of that 60 mil is placed
 - 2 are being built
 - Construction started in May, close to completion

Renewable Natural Gas (RNG) Plant:

- Opal Fuels is the plant owner/operator. Built in 2022.
- Moved the flare, it should not be running. When the flare is running it means the natural gas plant is not working correctly.
- Cleaning up the gas to make it pipeline quality
- 6.3 million gasoline gallons equivalent of RNG per year
- Saving 44,000 tons of Carbon Monoxide per year

Vertical Expansion:

- Application was submitted to the MPCA on June 2, 2022
 - Copies were provided to the City of IGH and Dakota County
- Expansion is to maximize the existing footprint as much as possible; vertically, about 85 feet higher in the middle of the landfill
- Provides 8.2 million cubic yards of additional airspace, 10-12 years of life
- Draft Environmental Assessment Worksheet was submitted to the MPCA

Commissioner Trenzeluk asked if the 10-12 years of life starts today or the current life.

Mr. Janusz replied the site would be full in 4-5 years if they do not receive the expansion. This would be another 10-12 years on top of that.

Commissioner Sethre asked if this was currently permitted.

Mr. Janusz replied as currently permitted, there is 4-5 years of life left.

Commissioner Fell mentioned the current closing date was going to be 2024. He said it seems they were talking about 20-30 years with the current volume coming in. The volume varies year by year. He said he looked at the MPCA Draft Policy Plan, all 7 County Master Plans have Pine Bend as the landfill they would use. He asked what the date would be assuming they receive the expansion. He questioned

if they take the numbers from the landfill or numbers the state recommends. He noted the four previous expansion timeframes keep moving backwards and forwards. He asked if there was ever going to be an end date.

Mr. Janusz replied the vertical expansion is over the existing liner/footprint. Nothing would be built to put volume in. The expansion allows for flexibility and the ability to manage increases or decreases. Regarding an end date, it would be until there is a true alternative for managing waste.

Mr. Janusz discussed Vertical Expansion:

- An Environmental Review is done by the MPCA consisting of a worksheet addressing:
 - Impacts to air, water, community, traffic.
 - Public comment period out on the EAW (Environmental Assessment Worksheet) by the end of September.
- Permit and Application submitted to the MPCA. Barr Engineering is reviewing.
- Once the EAW is done and approved, the city and county take review of the application.
- City process would begin with two reviews by the EAC, two by the Planning Commission, and three times before the City Council. This process begins at the beginning of the year.
- Three approvals are required (city, county, and the MPCA).
- Certificate of Need (CON). Demonstrate there is a need for the airspace.

Gas Migration: The concentration of any explosive gas must not exceed its lower explosion limit at the property boundary or 25% of its lower explosion limit in and around facility structures or any other on-site monitoring point.

- Do not want to see anything greater than 5% methane at landfill boundaries
 - This is done by having a gas collection system
 - Gas monitoring probes are used to monitor
- Probe Monitoring
 - 39 probes
 - Probes with exceedances are monitored monthly
 - There are historical exceedances on the east, south, and west side of the landfill
 - Unlined area. Narrow buffer area.
 - Working with the MPCA and the city
 - Off-site work has been done. Building monitors are in all on site buildings and at the Recycling Center next door.
- Source Controls (Keeping gas inside of the landfill)
 - 230 collection points (gas wells, horizontals, leachate risers)
 - In 2022 and 2023: putting in additional gas wells, redrilling wells, dewater wells
- Phase 6 Slideslope Expansion
 - Additional liner/cover and gas wells
- IGH CUP (Conditional Use Permit)
 - Complete by January 1, 2025
 - Annual updates to the Environmental Commission
 - Progress reports annually
 - City review and comments on work plans and reports
 - Finalizing the latest work plan and report. Will be finished early next week.
- Timeline:

- 2006 Geoprobe investigation. No detections across the railroad tracks and recycling center
- 2012 Probe evacuation. Apply vacuum to two probes, no decrease in methane concentration
- 2013/2014 Geoprobe investigation. East and west side
- 2015 Geoprobe investigation and work plan. Proposed installation of a passive vent
- 2017 Passive vents and work plan. Turbines installed at MMP17
 - Probes with passive vents
 - Connect passive vents to a vacuum source and mini flare. Recommended use of a radon fan.
- 2022 Passive vent vacuum and geoprobe investigation
 - Installed radon fans on existing passive vents
 - Requires electricity. Only one location has electricity. Will place electrical hookups at all vents.

Not at 100% yet with cleanup. Electricity and additional vents should provide better data.

Commissioner Barner asked if there was a way to flare it.

Mr. Janusz replied there is not enough gas there to sustain a flare; there is no odor.

Mr. Janusz discussed Gas Migration – MMP25 Relocation:

- Moved further west. Everything is fine in this location.

Commissioner Trenzeluk questioned how Mr. Janusz felt with the way things were going.

Mr. Janusz replied they are on the right path. He believes they will have better results if consistently running the fans.

Commissioner Boehmke asked if other industries have been consulted regarding similar patterns.

Mr. Janusz responded that they always speak with the MPCA who have noticed this at other similar type sites. Because those sites are not as large as Pine Bend, it will take more time.

Commissioner Fell stated methane gas coming off the landfill and diverted to the RNG plant has to be viable. The old part was shut down because it was not viable. He mentioned that the business is not a philanthropical company, they are in business to make a profit for shareholders.

Mr. Janusz replied it was not viable due to the price of electricity and two large turbines that were out of its life. He agreed they were in business to make a profit but also to serve the community and provide a safe place for waste to go until there were disincentives to put garbage in the landfill.

Commissioner Sethre stated the landfill generates revenue/income for the city by means of the Host City Fund. He was unsure how much it was. The VMCC has received approximately \$1 million dollars' worth of subsidy.

Commissioner Trenzeluk said if the landfill is closed down it would be a bad thing for all with waste having to be hauled elsewhere, hauling prices will go up. It is in the city's interest for the landfill to succeed.

Mr. Janusz said there are constraints; it is heavily regulated by the MPCA, city, and county.

Commissioner Fell mentioned the city will have that landfill in perpetuity. That is why there is a Host Community Fee, so it's to the benefit of the community. He said every generation coming out of the high school will live here and bring their own children here. It is important to recognize that and all of the requirements that go with it.

Mr. Janusz mentioned once they say they are done at Pine Bend, the cover would be put on and there would be a hill. They have at least a minimum of 30 years as a company to take care of it. At the end of 30 years if gas and leachate are still being collected, their company would still have to maintain it.

Commissioner Sethre questioned if the city would still receive funds once done.

Mr. Janusz replied minimum language is included. There is a per ton charge; a portion would go to the city, county, and state.

Commissioner Fell asked if they were still getting around 10 million gallons of leachate a year.

Mr. Janusz responded this year was higher due to a bad winter with record snow. It would be closer to 12 or 13 million gallons.

Commissioner Barner asked if there were plans for 30 years from now.

Mr. Janusz replied he has noticed former landfills with solar panels in the area.

Commissioner Ruiz asked if there has been any impact from the organics recycling being collected.

Mr. Janusz replied the organics space just opened. In a couple of years there may be less organics in the waste stream. Organics would drive landfill gas, there could be less gas over time.

4. Approval of Minutes

A. Approval of Minutes from the Thursday, July 27, 2023, Environmental Advisory Commission Meeting

Motion by Commissioner Boehmke, seconded by Commissioner Trenzeluk, to approve the minutes from Thursday, July 27, 2023, as submitted.

Ayes: 9

Nays: 0 Motion carried.

5. Regular Agenda

A. 2024 Environmental Advisory Commission Work Plan

Environmental Specialist Ally Sutherland presented on the 2024 Environmental Commission Work Plan. This is the Commission's 2nd Work Plan.

EAC Action Requested:

- Provide feedback on the draft 2024 EAC Work Plan

The 2023 and 2024 Work Plans are based off the duties of the Environmental Commission as defined in the city code. Duties include:

- A. Advise City Council on environmental issues
- B. Review land alteration permits and wetland replacement applications as they come in
- C. To review and advise Council on matters relating to landfills located in the city:

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- a. Pine Bend Landfill
- b. Dawn Way Landfill (active)
- c. SKB Rich Valley Landfill (not active, actively permitted)
- D. Monitor, review, and make recommendations to the Council relative to aircraft noise
- E. Same as Item D. relating to the MSP Airport and aircraft noise
- F. To promote public awareness and understanding of local environmental issues

Background from the 2023 Work Plan Feedback:

- Helpful to City Council and staff to have awareness and general support of the work plan
- Staff from other departments had an opportunity to weigh in
- Align future work plans with the budget process (2025+). This begins around May.
- Assigned an EAC member to each item last year (some items did not need a representative)
- Receive City Council approval prior to the actual year
 - This year it was received in February of 2023
 - Bring before the City Council in November 2023

2023 Environmental Advisory Commission Work Plan:

1. Extend the Partners In Energy Memorandum of Understanding
2. Organics Drop Site (Opened in August)
 - a. Great turnout. Approximately 500 households have signed up since July 1st.
3. Join the SolSmart Program
 - a. Expect to see a city code update, Planning Commission will review
4. Business and Recognition Program (City Council approval was received)
 - a. Program will be opened in Spring 2024
 - b. Deadline for application would be on Earth Day, April 22nd
5. Continue to explore how the city can support Electric Vehicle readiness
 - a. Work with businesses and residents; education
 - b. Update city codes, internal operations

Draft 2024 Work Plan. Defines 2023 Environmental Priorities:

Goals were developed by staff based on:

- 2023 work plan progress
- Regional trends
- Community requests
- Existing city environmental programming
- Achievable by December 2024 with Environmental Specialist, EAC, and technical assistance

Next Steps:

- August 2023: EAC discussion on the 2024 Work Plan
- October 2023: Add additional details to the work plan
- November 2024: City Council agenda for approval and feedback
- January 2024: EAC begins work plan

Items that would be in the Work Plan (Draft):

1. Extending the MOU (done on an annual basis)
2. Sustainable IGH (recognition program)
3. Pollinator lawns and native landscaping
 - a. A state law was passed to allow property owners and occupants to be able to install and maintain managed natural landscapes. Effective July 1, 2023.

- b. Anticipating there to be conflicts with city code weed/lawn ordinance. Need to meet with staff regarding the city code.
 - c. Goal is to have a new ordinance by next spring.
 - d. How to educate residents on this topic.
- 4. Develop and support an annual litter cleanup event
 - a. Begins in 2025
 - b. City wide clean up event. Designated areas for groups to clean up.
 - c. Requires budget support (include in the budget process for next year)
- 5. Electronic Vehicle Readiness
- 6. Items related to the anticipated Pine Bend Landfill expansion request
- 7. Duties relating to the City Code

Commissioner Barner asked if there were any MS4 applications or wetlands coming up.

Specialist Sutherland replied no. There has not been any wetland applications. The only other item coming up would be regarding airport noise (presentation).

Commissioner Sethre referenced surface water handling and stormwater and asked if there have been any discussions.

Specialist Sutherland replied that is handled by the Public Works Engineering Department. She could get information from the department and get back to the Commission or could ask a staff member to present at an upcoming meeting.

Commissioner Sethre mentioned it was a big topic that could impact pavement management.

Specialist Sutherland recommended the Commission make a motion on this request. There could be questions as to how the Environmental Advisory Commission could support this.

Chair Goodman asked if that was something Dakota County Soil and Conservation would do.

Specialist Sutherland replied the Soil and Water Conservation District does public awareness programming. Engineering staff partners with those agencies.

Commissioner Fell mentioned the MPCA recently came out with a new plan geared towards watershed areas. The city watershed is split in two directions, the major portion is the Lower Mississippi watershed. He asked for interface with the Lower Mississippi and Eagan watersheds. He requested this because they have grant money and programs, it is something the city should be aware of and behind. He said there was reference to raingardens and encouraging them. Watershed districts are trying to encourage not having lawns but raingardens and no impervious surfaces for driveways. Grant money is available to encourage this. He requested seeing more input from them that could be passed on to residents. He said this goes to the Planning Commission because that is who developers go to. He suggested the EAC have involvement to let developers know of other things to take into account.

Commissioner Sethre agreed there needs to be education with developers. Developers are required to provide a certain amount of greenspace within the development.

Chair Goodman suggested Item #3 have the following additions: stormwater management, raingarden development, ways to improve the natural landscape, groundwater infiltration in a clean way, and native lawns. She said a part of this could be to bring in different organizations.

Specialist Sutherland suggested going back to the function of this Commission. Education to developers does not come at the Planning Commission level. By the time it gets to the Planning Commission it has had a site review process. There needs to be an understanding of what engineering staff and the Planning Commission are discussing with the applicant during site plan review.

Commissioner Fell mentioned if the Planning Commission was not aware of it, additional homes and businesses would still continue in that manner and follow normal procedures.

Specialist Sutherland replied if the application is per city code the Planning Commission cannot deny for any reason. She asked Commissioner Fell if his request was to update city ordinances to be more progressive in protecting stormwater.

Commissioner Fell asked if there could be dialog to let them know, from an environmental point of view, they would not suggest lawns and concrete driveways.

Specialist Sutherland questioned if Commissioner Fell's request was to update city code to reflect better stormwater practices.

Commissioner Fell's agreed.

Specialist Sutherland shared when an application comes into the city, it goes through a long staff and engineering review based off city code. If wanting to developers to implement better practices would be to update the city code.

Chair Goodman questioned why they would not be involved in major developments if the EAC's job is to review and advise the City Council on environmental issues. Developments should come before the Environmental Commission for a first review.

Specialist Sutherland was unsure what everyone knew about the existing development requirements. She said the northwest area has high stormwater standards.

Commissioner Sethre said when the northwest area was developed, stormwater fees were proposed to be higher than the rest of the city.

Commissioner Trenzeluk liked the Chair's recommendation that this discussion with raingardens and stormwater is included with the plan. He has a raingarden, it was funded by the city/county and is now a part of his deed which is a major turn off factor. He suggested it be explored. He suggests staying away from the ordinance and having this discussion captured in the bullet. He recommends there be an education component before changing ordinances.

Commissioner Sethre agreed.

Specialist Sutherland said she was not just talking about fees, but also development standards that have to be in place. There are higher standards and practices that developers need to follow in the northwest area. Other communities have restrictive or incentive based ordinances. She recommends the Commission become more aware of the stormwater space, learn about what is going on, and understand where the Environmental Commission can become involved and make recommendations. She suggested getting in touch with other boards such as the Lower Mississippi and the Soil and Conservation District.

Commissioner Fell would table the item because he thinks it would be beneficial to have someone in from the Lower Mississippi who would share what they are planning in surface water, surface water

impacts, and stormwater, such as state and federal impacts to the city. That information would allow the Commission to be better educated to make recommendations.

Specialist Sutherland said if a speaker were to come to an Environmental Commission Meeting, the Planning Commission could be invited to attend, or at least be made aware of it.

Chair Goodman suggested having the Parks Commission attend.

Specialist Sutherland agreed that could be another point, becoming more engaged with other Commissioners. She said it does not need to be in the work plan but could be a takeaway presented to the Council when this idea is brought forward.

Commissioner Fell referenced a paragraph stating staff time in the budget has already been established. He said a budget has already been submitted to the Council. He asked what happens if looking at the landfill and advice is needed from the University on emergent chemicals. They receive an honorarium for doing that. He felt it would be critical to have someone of that stature advise the Commission on how they could advise the City Council. He referenced the Non-Conforming Use of the landfill and asked what they could ask the landfill to do as far as additional requirements. He shared for example, that he wrote to the City Council regarding the forever chemical called PFAS. After 2 months he met with Engineering, the City Attorney, and staff members. He said Barr Engineering does an annual review of the landfill that includes a risk analysis of their financial standings. He suggested at that time, that Barr Engineering should be allowed to test for new chemicals coming out of the landfill. He asked if that was ever approved.

Specialist Sutherland replied it was approved.

Commissioner Fell said he would like access to experts when questions are asked of the landfill regarding safeguards in place, PFAS are a big one. He suggested when the Commission makes a request of Specialist Sutherland that it stays within her budget confines.

Specialist Sutherland replied that one portion of her job is to be the staff liaison for this Commission. Research is within her existing duties. She addressed speaker fees stating it could not be included at this time, but something to think about in the 2025 plan and budget process. She recommends instead of a Professor, the city continue to work with their hired consultants at Barr Engineering. Not all speakers require a fee, for example the city could invite other government entities like the county, or the MPCA.

Commissioner Fell said he would give the Commission the documentation he gathered if interested. He stressed the seriousness of forever chemicals as stated by the Minnesota Department of Health and the Pollution Control Agency which asked the legislature for more money to do risk analysis. He mentioned the landfill moved over 1.5 million tons of waste with one complaint. The complaint arrived because the Commission had people come in who specialize in future emissions coming out of the landfill, how they are identified, and how to address them.

Chair Goodman was concerned about new developments and invasive species such as Emerald Ash Trees. She requested having someone come in who looks at grants regarding this to speak about emerald ash borer, urban deforestation, and how the Commission could help. She said there was not much education about how much it would cost to treat the trees.

Specialist Sutherland replied treatment delays the inevitable. The waste industry has been talking about this too. Yard waste facilities were reaching capacity. She said Emerald Ash Borer Education could be added, staff could be invited to come and see how the Commission can help and support.

Commissioner Sethre mentioned that Brian Swoboda is the City Forester. This was a significant part of the Parks Commission because it affected a lot of trees within parks.

Chair Goodman suggested adding review of Right of Way requirements, what planting requirements are, and how that could be shared with residents.

She referenced bike trails and bikability because there is a lot more use of electric bicycles. She mentioned there is not a bike rack outside of City Hall or within the city in general.

Commissioner Boehmke requested information regarding Xcel Energy's MOU and what was achieved in the city last year. For example, if any of the 1 year plans were achieved, if all were longer than 1 year plans, and any rebates. She shared when Xcel Energy works with a city, MOU plans are laid out, if achieving a plan a bonus/rebate comes to the city.

Specialist Sutherland replied what was being referring to was not housed within the MOU. The MOU is more focused on community and business outreach and education. The Partners in Energy program provides the city with biannual data. She would present that information at an upcoming meeting.

Commissioner Fell referenced EV Electric Stations and what could be explored for the future. He asked if staff had any idea what the Commission should be exploring and how to advise/improve residents understanding about what is available within the city.

Specialist Sutherland responded that is a goal. It consists of letting the City Council know that the Environmental Commission is interested in the topic. It is up to staff to determine how the city can be involved. There are grants that can be looked into.

Chair Goodman mentioned annual litter cleanup could be done in the spring around Earth Day, and in the fall, around Inver Grove Heights Days.

Specialist Sutherland replied she would like to research dates to see what other communities have done. Others do it around Earth Day but the weather is always questionable around that time. She suggested looking into a different timeframe for better participation.

Specialist Sutherland summarized the Commission's suggestions:

- Stormwater education
 - Getting speakers to come in to educate the Commission
 - Inviting other Commissions to be a part of those discussions
- Inviting professional speakers (regardless of fee/no fee) to educate on topics
 - Such as landfill contamination, ground water contamination
 - Outside of existing advisors such as Barr Engineering and the state
- EAB (Emerald Ash Borer) Education
 - Park staff providing education to the Commission regarding possible involvement
- Bikeability
 - Bike friendly at City Hall and the VMCC (bike racks)

These items will be brought back to the Commission for final review in October.

B. Comments on Draft Metropolitan Solid Waste Management Policy Plan 2022-2042

Environmental Specialist Sutherland stated action by the EAC is to review and discuss the draft comments and consider recommending City Council approval. Additional comments will be noted as a separate recommendation.

Background:

- MPA prepares a Solid Waste Management Plan every six years
- Encompasses the 7 counties in the metro area
- Provides framework for solid waste management for the next 20 years
- 70 broad regional strategies
 - There are required strategies and optional strategies
 - Counties would develop their own plans incorporating the required/optional strategies
- Public comments are accepted by September 17th
- The city reviewed the MPCA solid waste plan
 - While keeping in mind an anticipated expansion and recent CON
- EAC and City Council reviews and approves
- Dakota County must update the Solid Waste Plan within 9 months
 - Cities will have an opportunity to be involved in stakeholder engagement and be more specific on optional strategies

Comments:

1. Define mandatory preprocessing (required strategy to establish mandatory preprocessing of waste by 2025)

Commissioner Sethre asked if looking for a clarified definition of mandatory preprocessing.

Specialist Sutherland replied landfilling is the least preferred disposal method. This is more focused on re-use and recycling/waste abatement. Due to that, they want to withdraw any useful material from the garbage.

Specialist Sutherland continued with Comments:

2. MPCA develop and require PFAS removal and treatment options at landfills
 - There are over 5,000+ of these human made chemicals
 - Invented in the 1930's
 - "Forever Chemicals"
 - Extremely resistant to degrading in the environment
 - Resistant to destruction in wastewater treatment plants, landfills, and incinerators
 - Bioaccumulation (within bodies, does not degrade, accumulates over time)
 - Still commonly used in the industry for water and grease resistance properties
 - Carpet, waterproof clothing, upholstery, food paper wrapping, fire-fighting foams, cookware
 - Many PFAS are known to be health hazards to humans. Linked to increased risk for cancer, liver disease, and other negative health impacts
 - MN Department of Health (MDH) completed toxicity assessments of many PFAS
 - Determine the negative health impacts that could be caused from exposure
 - What level of exposure is needed to affect health
 - Calculate guidance and regulatory values for drinking water, surface water, fish, and soil
- Stated in the Policy Plan:

- When items are landfilled, PFAS migrate to leachate
- Leachate is treated at the MCES (Metropolitan Council of Environmental Services) water treatment facility
- No removal systems for PFAS are installed at landfills or wastewater plants
- Discharged by the MCES into sludge and surface water
- Waste industry is identifying ways to address the unusual type of chemical

Suggested the MPCA continue to work hard to develop PFAS removal/treatment at landfills.

Incorporate into the permitting process as soon as possible.

- Has been proven to be cost prohibitive to remove at the waste treatment plant
 - Barr Engineering reviewed and focused on where PFAS are concentrated at
 - At the landfill, in leachate
3. MPCA require landfills to address PFAS in their industrial waste management plans
 4. MPCA update the CON review and issuance process so that it is streamlined and consistent year-over-year

EAC Action Requested: Discussion and/or additional items to add or a motion to approve as is.

Commissioner Fell mentioned the industry is looking for the federal government to come up with a new standard regarding an acceptable health level for PFAS. He provided an example of organics composting. Compost after composting has a residual. It is being encouraged to use it in parks. He asked if it still has PFAS, who is liable. Excluding materials would be difficult as it involves carpeting, makeup containers, and toilet paper. A treatment process to remove would cost \$24 billion dollars. He questioned how to stop the materials coming into the landfill that creates the PFAS in the first place. He shared three proposed treatment processes: 1. Incineration. 2. Deep Well Injection. 3. MPCA is testing on ground water from money received from 3M. He questioned if they should tell Pine Bend Landfill when coming for expansion, if they are going to treat the leachate on site, and if they do, up the price, or ignore it and hope the state and feds come in with funding to treat it.

Specialist Sutherland stated staff is looking for additional comments to add to the list of comments that will be submitted on behalf of the city to the state. If there are no additions, a motion would be made to approve the existing comments.

Additional comments can be made on items impacting local government when Dakota County has a stakeholder process.

Chair Goodman referenced Comment #3 stating that the only way to remove PFAS was through leachate. She was unsure how everything could be tested for total content.

Commissioner Fell mentioned his comments were directed to the Draft letter put together referencing comments. It was recommended the MPCA do more research and that there should be treatment. He said the MPCA is already doing that.

Specialist Sutherland agreed and said the MPCA's policy plan states they need to continue their research. The city is stating the need for continued research and encouraging additional funding.

Chair Goodman said that PFAS gets into wastewater through makeup and washing clothes. She did not want this to be left off in the future, it will be an issue that will have to happen at wastewater facilities.

Specialist Sutherland replied when talking with Barr Engineering, the focus was on the landfill because it is in the community.

Motion by Commissioner Mikulski, second by Commissioner Barner, to approve the comments/notes as presented.

Ayes: 8
Nays: 1 (Fell) Motion carried.

Specialist Sutherland said when there is a denial a reason why is specified.

Commissioner Fell responded that he denied because he did not understand. He could not grasp the recommendation as he understands the problem.

Commissioner Sethre mentioned that a public comment period will take place.

Specialist Sutherland replied that anyone can make comments through September 17th. There will be another comment period process when Dakota County updates their plan.

6. Public Comment

7. Commission Comments

Environmental Specialist Sutherland shared that September 6th is the Commission Appreciation Dinner at the Fall Food Fest at the VMCC beginning at 4:30. The public is also invited.

8. Adjourn

Motion by Commissioner Sethre, seconded by Commissioner Barner, to adjourn the meeting at 9:27 p.m.

Ayes: 9
Nays: 0 Motion carried.

Minutes prepared by Recording Secretary Sheri Yourczek

**Environmental Advisory Commission
Staff Report****SUBJECT: Robert Curve 4th & 5th Additions Wetland Replacement Plan****MEETING DATE:** November 16, 2023**ITEM TYPE:** Regular Agenda**CONTACT:** Ally Sutherland, Environmental Specialist, 651.604.8511**PURPOSE/ACTION REQUESTED**

The Environmental Advisory Commission is asked to consider recommending City Council approval of a Wetland Replacement Application for Robert Curve 4th & 5th Additions.

BACKGROUND

The applicant, Trident Development, is proposing to develop a 15.48-acre multifamily development located along South Robert Trail, south of Jefferson Trail West in Inver Grove Heights. The project is split into two sections – the 4th and 5th Additions. The 4th Addition will consist of multiple townhome buildings with associated parking areas and two infiltration basins. The 5th Addition will consist of one townhome and one apartment complex, with associated parking and stormwater features.

The final development plans for the proposed project including the stormwater management plan and grading plan have been reviewed and approved by city staff, the Planning Commission and City Council during the public review process. Because the applicant is proposing to fill an existing regulated wetland, the approved agreements require the applicant to receive approval of a Wetland Replacement Plan prior to beginning any development.

PROPOSED WETLAND REPLACEMENT PLAN

No person may impact a wetland, wholly or partially, (unless eligible for an exemption or no-loss) without first having a Wetland Replacement Plan approved by the local government unit (LGU). Before approval of a Wetland Replacement Plan, the LGU must ensure that the applicant has exhausted all possibilities to avoid and minimize wetland impacts according to sequencing requirements per MN Rule 8420.0520. The overview of wetlands on the site, proposed impacts and proposed mitigation are indicated in the table.

Wetland #	Existing Size	Proposed Impact	Proposed Mitigation
Wetland 1	0.025 acres	0.025 acres	Incidental. Not regulated under WCA and no mitigation is required.
Wetland 2 (WCA regulated)	0.085 acres	0.0694 acres	Proposed purchase and use of 0.1388 acres (2:1 ratio) of Standard Wetland Credit (SWCs) from account #1083 located within Dodge County, Major Watershed #41 (Zumbro) and Bank Service Area 8 (BSA). SWCs are located in the same BSA as the proposed project. No SWCs were available within the same major watershed.
Wetland 3	0.029 acres	0.029 acres	Incidental. Not regulated under WCA and no mitigation is required.

TOTAL (WCA regulated only)	0.085 acres	0.0694 acres	0.1388 acres
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TECHNICAL EVALUATION PANEL (TEP) RECOMMENDATION

The City hired Dakota County Soil and Water Conservation District (SWCD) to complete a technical review of the applicant's Wetland Replacement Plan on behalf of the City. The Technical Evaluation Panel (TEP) made up of the City, SWCD and the State of Minnesota Board of Soil and Water (BWSR) have reviewed the applicant's plan. The TEP determined the proposed plan meets all Wetland Conversation Act (WCA) rules and guidelines defined by MN Rule Chapter 8420, including the following:

- The application demonstrates the purpose of the project can only be reasonably achieved by permanently impacting wetland(s) and replacing them.
- The applicant has shown they have taken reasonable steps to avoid wetland impacts and/or designed the project in a way that minimizes or reduces impacts on remaining wetlands after project implementation.
- Mitigation is proposed for replacement within the same minor, major, or service bank areas for a 2:1 ratio, or at a different ratio required by BWSR.

The TEP supports approval of the revised Wetland Replacement Plan application dated October 23, 2023 to include 0.0694 acre of wetland impact and the use of 0.1388 acre of wetland bank credits from account #1083 located within Dodge County, Minnesota and Bank Service Area 8 as defined under the WCA. Upon approval by City Council, the Notice of Decision form and the wetland bank transaction form will need to be coordinated and processed by the City and SWCD.

FISCAL IMPACT

This item is budget neutral for the City.

RECOMMENDATION

Staff recommend approval of a Wetland Replacement Application for Robert Curve 4th & 5th Additions.

ATTACHMENTS

1. SWCD Memo
2. Wetland Replacement Plan



MEMORANDUM

To: Ally Sutherland, Environmental Specialist

From: David Holmen, Senior Resource Conservationist - Dakota County SWCD

Cc: Allan Hunting, City Planner
Paul Merchlewicz, City Engineer
Brian Watson, District Manager – Dakota County SWCD

Date: November 7, 2023

Subject: Robert Curve 4th & 5th Addition - Wetland Replacement Plan Application

A Wetland Replacement Plan application has been submitted for the Robert Curve 4th and 5th Addition. Under delegated authority from the City of Inver Grove Heights, the Dakota County Soil and Water Conservation District (SWCD) provides administrative tasks and certain decisions pursuant to the Minnesota Wetland Conservation Act (WCA). This delegation authority however does not authorize the SWCD to make decisions on wetland replacement plan applications.

As background, a wetland delineation for the project site was completed and approved by the SWCD on September 20, 2022. The wetland delineation establishes the boundaries and type of wetlands located within the project site. Three wetlands were identified and labeled Wetland 1 thru 3. It was also determined at that time that Wetland 1 and 3 were incidental wetlands and not regulated under the WCA. Incidental wetlands are wetland areas that the applicant can demonstrate were created in non-wetland areas and the purpose was not to create wetlands.

The following administrative tasks have occurred as it relates to the recently submitted Wetland Replacement Plan application:

- September 15, 2023 A complete wetland replacement plan application was submitted by Trident Development proposing to fill 0.0694 acre of wetland. The application included 0.1388 acre (2:1 ratio) of replacement through use of a wetland bank located in Dodge County, Minnesota.
- September 20, 2023 The Wetland Replacement Plan application was noticed as required under Minnesota Rule 8420.0255. Comments were requested by October 13, 2023.
- October 13, 2023 The comment period closed. During the comment period, the Minnesota Board of Water and Soil Resources (BWSR) and the Dakota County SWCD raised concerns about the absence of alternative site design narrative within the application. This "Sequencing Analysis" is a prerequisite for approving Wetland Replacement Plans.

October 17, 2023	A meeting was held with the SWCD, BWSR and the applicant's representative to review the Wetland Replacement Plan application. Concerns about the inadequate Sequencing Analysis narrative within the application were expressed. A revised application was submitted after the meeting and later that day.
October 20, 2023	A meeting was held with the City, SWCD and BWSR to review the revised application submitted October 17, 2023. It was determined the revised application still did not adequately address Sequencing Analysis requirements under the WCA.
October 23, 2023	The SWCD shared the concerns with the applicant and the City also coordinated with the applicant. Additional information on Sequencing Analysis was again requested to fully address WCA requirements.
October 24, 2023	A second revision of the application dated October 23, 2023 was submitted. The SWCD coordinated with the City and BWSR to determine if the revised application met WCA requirements. Based on the additional information provided, it was determined that the Sequencing Analysis narrative was adequate and WCA requirements had been met.
October 30, 2023	Per WCA Rule, the replacement plan application decision was extended for up to 60 days to allow adequate time for the scheduling and consideration of this application by the City's Environmental Advisory Commission and City Council.

Summary/Recommendation

The SWCD supports approval of the revised Wetland Replacement Plan application dated October 23, 2023 to include 0.0694 acre of wetland impact and the use of 0.1388 acre of wetland bank credits from account #1083 located within Dodge County, Minnesota and Bank Service Area 8 as defined under the WCA.

Upon approval by City Council, the Notice of Decision form and the wetland bank transaction form will need to be coordinated and processed by the City and SWCD.

Robert Curve 4th & 5th Additions

Inver Grove Heights, Dakota County, Minnesota

Wetland Permit Application

Prepared for
Trident Development

by
Kjolhaug Environmental Services Company, Inc.
(KES Project No. 2023-123)

Revised October 23, 2023

Robert Curve 4th & 5th Additions
Inver Grove Heights, Dakota County, Minnesota
Wetland Permit Application

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2. Wetland Impacts & Required Replacement – Robert Curve 4th & 5th Additions
3. Wetland Bank and Credit Summary for Robert Curve 4th & 5th Additions

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1. Site Location
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- 3A. Proposed Plan and Wetland Impact – 5th Addition
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Robert Curve 4th & 5th Additions
Inver Grove Heights, Dakota County, Minnesota
Wetland Permit Application

APPENDICES

- A. Joint Application for Activities Affecting Water Resources in Minnesota
- B. 2022 Delineation Approval
- C. 2022 Delineation Approval & Approved Jurisdictional Determination
- D. Avoidance Alternative
- E. Grading Plan
- F. Wetland Banking Documents
- G. FWS Species List
- H. FWS NLEB Consistency/Verification Letter
- I. NLEB Information
- J. FWS ESA Consistency/Verification Letter

Robert Curve 4th & 5th Additions

Inver Grove Heights, Dakota County, Minnesota

Wetland Permit Application

1. PROJECT SUMMARY

Trident Development is proposing to develop a 15.48-acre project area in the City of Inver Grove Heights (**Figure 1**). The project is split into two sections – the 4th and 5th Additions. The 4th Addition will consist of multiple townhome buildings with associated parking areas and two infiltration basins. The 5th Addition will consist of one townhome and one apartment complex, with associated parking and stormwater features.

The Robert Curve 4th & 5th Additions will involve 3,024 sf (0.0694-ac) of wetland impact. Permanent wetland impacts will be replaced at a 2:1 ratio via the purchase of wetland bank credits from a wetland bank located in the same bank service area as the project. It is anticipated that site grading will begin fall of 2023.

The following narrative describes the project, its purpose, site characteristics, wetland sequencing, and the wetland replacement plan. Figures and appendices are attached. The Joint Application Form for Activities Affecting Water Resources in Minnesota is included in **Appendix A**.

2. PROJECT PURPOSE

2.1 Project Purpose and Need

The purpose of the Robert Curve 4th & 5th Additions project is to provide affordable housing opportunities with construction of an apartment building and townhomes to meet the growing demand for this use within the City of Inver Grove Heights.

Per The City of Inver Grove Heights' 2040 Comprehensive plan housing is an integral part of the city's vision, and affordable housing is an important part of the community's vitality. A report completed by the Dakota County Community Development Agency estimated a demand for 2,460 ownership housing units in Inver Grove Heights. This project will help address that demand while fulfilling the city's desire for affordable housing.

The new housing development is conveniently located on South Robert Trail, which is a primary road for transportation in the area providing easy access to main highways such as MN-55 and HWY-494. The site is also less than 2 miles from Eagan High School, providing a good opportunity for families to live near their school.

3. SITE LOCATION & EXISTING CONDITIONS

The project is proposed on 15.48-acres located in Section 19, Township 27N, Range 22W, City of Inver Grove Heights, Dakota County, Minnesota. The site is located just east of the intersection between Diffley Road and Robert Trail South (**Figure 1**). The site boundary corresponds to Dakota County PIDs 206444200010, 206444001010, and 206444000010.

The site is split between the Lower Minnesota (#33) Major Watershed and Bank Service Area 9, and the Mississippi River – Lake Pepin (#38) Major Watershed and Bank Service Area 8.

The majority of the project area consists of open fields, with some wooded areas along the northern border of the site boundary (**Figure 2**). There is an existing automotive shop immediately west of the site boundaries. Other surrounding land uses consist of single-family homes, deciduous forest, and industrial sites.

3.1 Wetland Delineation

The wetlands on the site were originally delineated by Kjolhaug Environmental Services (KES) in June of 2022. Three (3) wetlands were initially delineated on the site. Wetlands 1 and 3 were determined to be incidental. Wetland 2 was located just east of Robert Trail. The Dakota County SWCD (WCA LGU) approved the wetland delineation on September 20, 2022 and the U.S Army Corps of Engineers (USACE) issued delineation concurrence on November 10, 2022 (**Attachment B**).

Previously submitted information discussed the delineation in more detail and included National Wetland Inventory (NWI) and soil survey mapping. Copies of previously submitted information are available upon request.

The delineated wetland boundaries and existing conditions are shown on **Figure 2** and wetland characteristics are summarized in **Table 1 on the following page**.

Table 1. Wetlands delineated on the Robert Curve 4th & 5th Additions project site.

Wetland ID	Wetland Type			WCA Determination
	Circular 39	Cowardin	Eggers and Reed	
1	Type 1	PEM1A	Seasonally flooded depression	Incidental
2	Type 1	PFO1A	Forested seasonally flooded depression.	Regulated as wetland
3	Type 2	PEM1B	Wet meadow	Incidental

With submission of this application an Approved Jurisdictional Determination is requested from USACE for Wetlands 1 and 3 which were created in dry land incidental as a result of previous construction activities.

4. SEQUENCING DISCUSSION/ONSITE ALTERNATIVES

The following discussion addresses wetland avoidance and minimization in compliance with Minnesota Wetland Conservation Act (WCA) and Section 404 requirements. The following alternatives analysis demonstrates that there are no other feasible and prudent alternatives available that would completely avoid or further minimize wetland impacts while achieving project needs and requirements.

4.1 Project Requirements/Site Constraints

The Robert Curve 4th & 5th Additions project must meet all the following requirements to be considered feasible and prudent.

1. The proposed use (mixed density residential) will meet city land use/zoning requirements (mixed-use development). The proposed project is compatible with city land use/zoning and has received both preliminary and final plat from the City of IGH.
2. The 5th Addition (north project area) will provide a 190-unit market rate apartment building and associated parking plus 9 townhome units based on market study results that demonstrate the need for the proposed project (type) and scope (density).
3. Due to an oddly shaped and narrow site boundary with limited access points, the proposed apartment and associated outdoor parking can only be located in the north portion of the site. The project purpose includes an apartment building. Due to odd and narrow site shape, the apartment building can only be built on the east side of the north addition.
4. No building footprint or stormwater ponding area is allowed over existing sewer and water infrastructure. Buildings or stormwater treatment areas are not allowed over existing utilities. Therefore, the apartment must be located east of the sewer/water line, and the stormpond must be located west of the sewer/water line.
5. The project plan will provide a parking ratio of 2 spaces per 1 unit (via combined underground and outside parking spaces). The provided 2:1 ratio is less than the city-required 2.5:1 ratio (obtained by variance). The apartment must provide sufficient parking spaces. The standard space requirement is 2.5 spaces per 1 unit. The applicant has already received a variance allowing for 2 spaces per 1 unit. The apartment parking area cannot be reduced and must be contained within the plat for the apartment building.
6. The project area will be accessed only from existing Diffley Court. Access directly from Robert Trail South or the existing business/parcel to the west of the Diffley Court cul-de-sac is not allowed or feasible, respectively.
7. Bituminous pedestrian trails will be provided behind the apartment building and along the outer edge of the stormpond.
8. The project plan will provide effective drainage for the site while capturing and treating stormwater runoff in a manner consistent with local, state and federal standards. The north addition must include a stormwater treatment area. The stormwater pond location/footprint and elevation are dictated by the need for the basin to be able to

outlet/discharge into an existing road ditch along the northwest site boundary, which is the only discharge location for the north part of the site/5th Addition. Treated stormwater must discharge to the MNDOT ditch at northwest site boundary. There is no other discharge point for the north addition.

9. Unavoidable wetland impacts will be replaced with compensatory mitigation offsite via wetland banking.

4.2 WCA No-Build Alternative (first avoidance alternative)

The No-Build Alternative was considered as a way to eliminate wetland impacts associated with the project. Although the No-Build Alternative would completely avoid wetland impacts, it would not fulfill the project purpose, need, or requirements nor would it be consistent with local land use planning which guides this site for mixed-use development as part of the City's 2040 Comprehensive Plan.

Even if the No-Build Alternative were implemented, development pressure would continue to affect the proposed site. Based on local land use planning, this would likely cause similar development proposals to arise for the property. *For these reasons, the No-Build Alternative was rejected as an approach to completely avoiding wetland impacts.*

In summary, due to land use guidance, similar development projects proposed for this site would likely encounter similar (if not the same) site constraints/engineering/stormwater difficulties.

4.3 WCA Complete Avoidance Alternative (second avoidance alternative)

An alternative that would completely avoid direct impact to Wetland 2 is included in **Appendix D**. This alternative takes into consideration the project purpose/need and project requirements/site constraints (Section 4.1), was prepared by the project engineer, is feasible from an engineering perspective, and represents good faith effort.

In order to avoid impact to Wetland 2 from stormpond side slopes construction, the narrow north finger/pinch point of the stormwater pond must be eliminated. Because pond discharge must still leave the site along the northwest site boundary, elimination of the pinch point requires significant changes to stormwater infrastructure and requires significant grade changes. Specifically, the project area would need to be built up in elevation by ~2 feet. The avoidance plan is not prudent ~~or feasible~~ in that in order to avoid 3,024 sf of wetland impact more than 2,500 truckloads of dirt (40,000 CY) must be sourced and imported to the site. Additional engineering information related to the site stormwater design is included in **Appendix D**.

In summary, the second avoidance alternative was deemed to be *not prudent or able to be reasonably achieved* because it would require the site to be built up ~2 feet in elevation (~40,000 CY). In addition to not being prudent from a development perspective, the second avoidance alternative is not preferable from an environmental/carbon footprint perspective (requiring ~2,500 truckloads of imported material).

Furthermore, although this plan avoids direct impact to the wetland, the wetland's supporting watershed is reduced by 75% from existing conditions which may result in secondary/indirect impacts.

For these reasons, the avoidance alternative was rejected.

4.4 Proposed Alternative

The proposed grading plan for the Robert Curve 4th & 5th Additions project is provided in **Appendix E. Figure 3A** provides an overview of the wetland impact in the 5th Addition. The proposed design meets all of the project requirements as outlined previously in **Section 2.2**.

Complete Avoidance of impact to Wetland 2 was discussed previously in Section 4.3. Site constraints, shape, and stormwater design needs significantly restrict site design/layout possibilities. There is no feasible and prudent alternative that could completely avoid the wetland impact and meet the project purpose & need while meeting design requirements.

An alternative that ***minimizes*** impact to Wetland 2 was considered. The currently proposed slope grade impacting Wetland 2 is 2:1. A slope of 1:1 could minimize impact to Wetland 1 by approximately 50% (~1500 sf); however, an 18-ft high 1:1 slope (or retaining wall) along the edge of a pedestrian trail poses stability and safety concerns. Therefore, the minimization alternative was rejected. Furthermore, although the entirety of Wetland 2 is identified as filled, approximately 747 sf of the basin (25% of the wetland) will not actually be filled (see **Figure 3A**).

The sequencing analysis has satisfactorily demonstrated that there is no alternative without wetland impacts that could reasonably accomplish the project's purpose.

4.5 Wetland Impact Rectification

No temporary impacts to wetlands are proposed. Impact rectification does not apply.

4.6 Wetland Impact Reduction or Elimination Over Time

Implementation of the stormwater management plan will help to reduce or eliminate potential effects of stormwater to offsite water resources including wetlands.

The City of Inver Grove Heights has review jurisdiction over stormwater runoff from proposed development at this site. The MPCA has jurisdiction under the State Construction Stormwater NPDES General Permit.

5. WETLAND REPLACEMENT PLAN

5.1 Required Replacement

Minnesota Rules Part 8420.0117, Subp. 1 applies:

Dakota County is in an area with less than 50% of the presettlement wetlands remaining. Minnesota Rules Part 8420.0522, Subp. 4, states that the minimum replacement ratio for impacts to wetland on nonagricultural land in a less than 50% area is 2:1.

Table 2 below summarizes permanent wetland impact amount, impact type (fill/excavation), and required replacement.

Table 2. Wetland Impacts & Required Replacement – Robert Curve 4th & 5th Additions

Wetland ID	Wetland Type	Impact Type & Duration	Impact Size (sf)	Impact Size (ac)	Replacement @ 2:1 (ac)
Wetland 2 (Watershed #38; BSA 8)	Type 1	Fill/Permanent	3,024 sf	0.0694	0.1388
Total			3,024	0.0694	0.1388

Again, with submission of this application an Approved Jurisdictional Determination is requested from USACE for Wetlands 1 and 3 which were created in dry land incidental to previous construction activities.

To mitigate for permanent wetland impacts, the applicant proposes to ***purchase 0.1388-ac of Standard Wetland Credit (SWC)*** from the Jon Samuelson wetland bank (#1083) located within Major Watershed #41 (Zumbro) and Bank Service Area 8 (BSA 8) (**Table 3 on the following page**), which is the same bank service area as the proposed project. There were no available wetland banks within the same major watershed as the project. Email correspondence with the credit owner and a draft credit withdrawal form are included in **Appendix F**.

Table 3. Wetland Bank and Credit Summary for Robert Curve 4th & 5th Additions.

Bank #	County & Major Watershed	BSA	Credit Subgroup	Credit Type	Credit Amount
1083 (Jon Samuelson)	Dodge/41	8	C	Type 4 – Deep Marsh	0.1388
Total					0.1388

6. RARE & ENDANGERED SPECIES CONSIDERATIONS

6.1 MN Rare Species Considerations

Minnesota Rules Part 8420.0515 specifies that endangered and threatened species must be considered when submitting a wetland replacement plan.

KES reviewed a licensed copy of the Natural Heritage Inventory System (NHIS) to assess if any rare species are known to occur within a 1-mile radius of the project area. No records of threatened or endangered species are cataloged within a 1-mile radius of the project area.

There are no rare natural communities on this site.

6.2 Federal Rare Species Considerations

Review of the USFWS Information for Planning and Consultation (IPaC) website with a polygon encompassing the project area identified the federally-threatened northern long-eared bat (NLEB) for review (**Appendix G**) and provided a letter stating that *“Based upon your IPaC submission and a standing analysis, your project is not reasonably certain to cause incidental take of the northern long-eared bat. Unless the Service advises you within 15 days of the date of this letter that your IPaC-assisted determination was incorrect, this letter verifies that the Action is not likely to result in unauthorized take of the northern long-eared bat”* (**Appendix H**).

The NLEB hibernates in caves during winter and establishes maternity roosting colonies under the loose bark of trees during the summer. There are no known NLEB hibernacula or roosting colonies in the project vicinity (**Appendix I**).

Other species potentially found within the project area are the monarch butterfly, the tricolored bat, the rusty patch bumble bee, the whooping crane, and Higgins Eye. The monarch butterfly is a candidate species but is not yet listed or proposed for listing under the Federal Endangered Species Act. The tricolored bat is a proposed endangered species. Higgins eye and the rusty patch bumblebee are endangered species, while the whooping crane is listed as a experimental population. A “No Effect” determination letter for these species is provided in **Appendix J**.

There are no critical habitats at this location.

7. REQUESTED APPROVALS

The Robert Curve 4th & 5th Addition project will require 0.0694-acres of permanent wetland impact, filling all of Wetland 2, when developed in a manner consistent with the project purpose, need, and requirements.

To mitigate for permanent wetland impacts, the applicant proposes to ***purchase 0.1388-ac of Standard Wetland Credit (SWC)*** from the Jon Samuelson (#1083) wetland bank which is located within Major Watershed #41 (Zumbro) and Bank Service Area 8 (BSA 8). This bank is located in the same Bank Service Area as the proposed project. There were no available wetland banks within the same major watershed as the project.

This application requests:

1. Wetland Replacement Plan approval for permanent impact to Wetland 2 from the WCA LGU (Dakota County SWCD).
2. Authorization under Nationwide Permit 29 (Residential Development) from the USACE for impacts to Wetland 2, and an Approved Jurisdictional Determination for Wetlands 1 and 3 which were created in dry land incidental to previous construction activities.

Robert Curve 4th & 5th Additions, Inver Grove Heights

Wetland Permit Application

FIGURES

1. Site Location
2. Existing Conditions
- 3A. Proposed Plan and Wetland Impact – 5th Addition
- 3B. Proposed Plan and Wetland Impact – 4th Addition

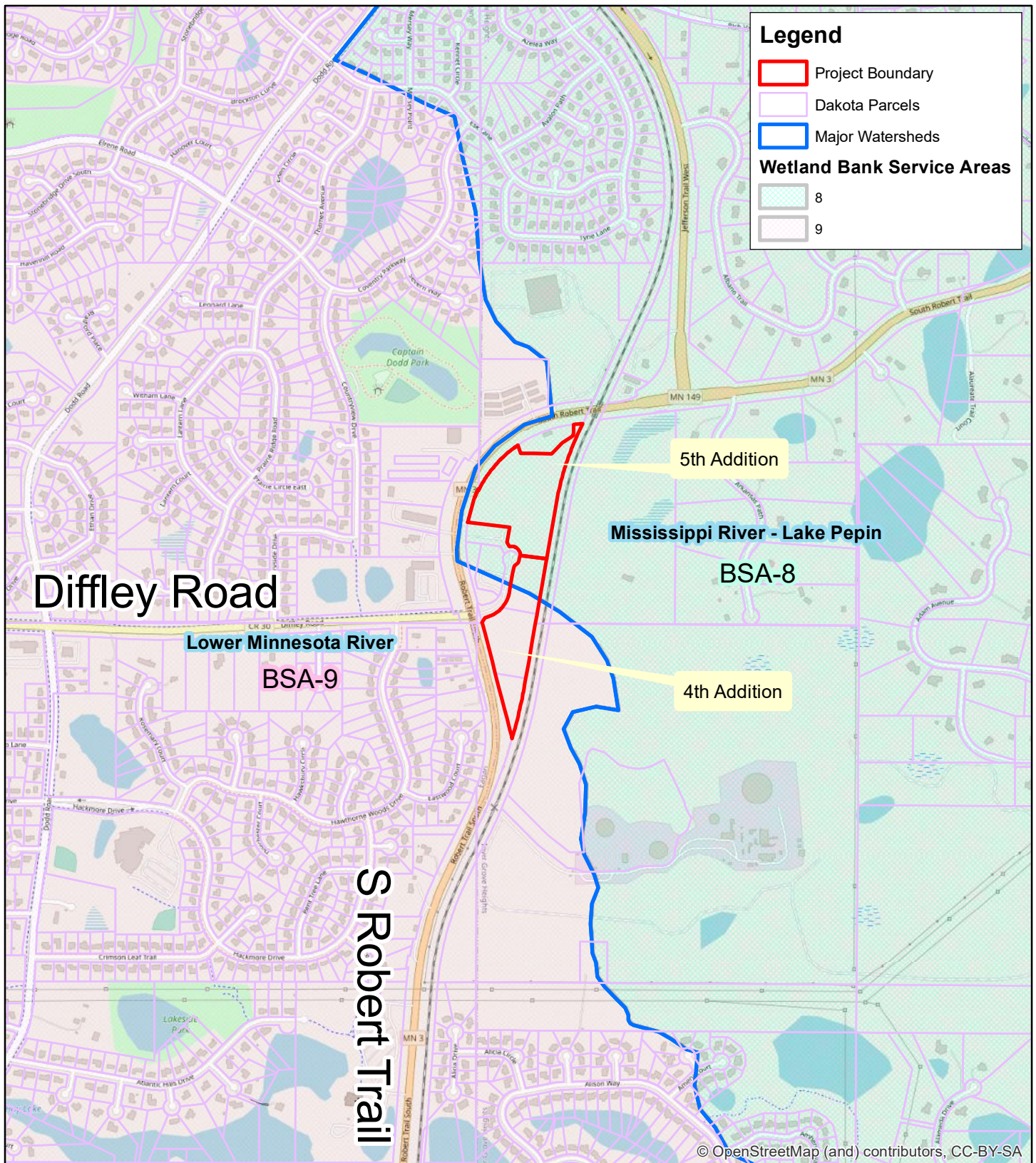


Figure 1 - Site Location



KJØLHAUG ENVIRONMENTAL SERVICES COMPANY
Source: MNGEO Spatial Commons, USFWS

0 1,000 Feet

Robert Curve 4th & 5th Additions (KES 2023-123)
Inver Grove Heights, Minnesota

Note: Boundaries indicated on this figure are approximate and do not constitute an official survey product.

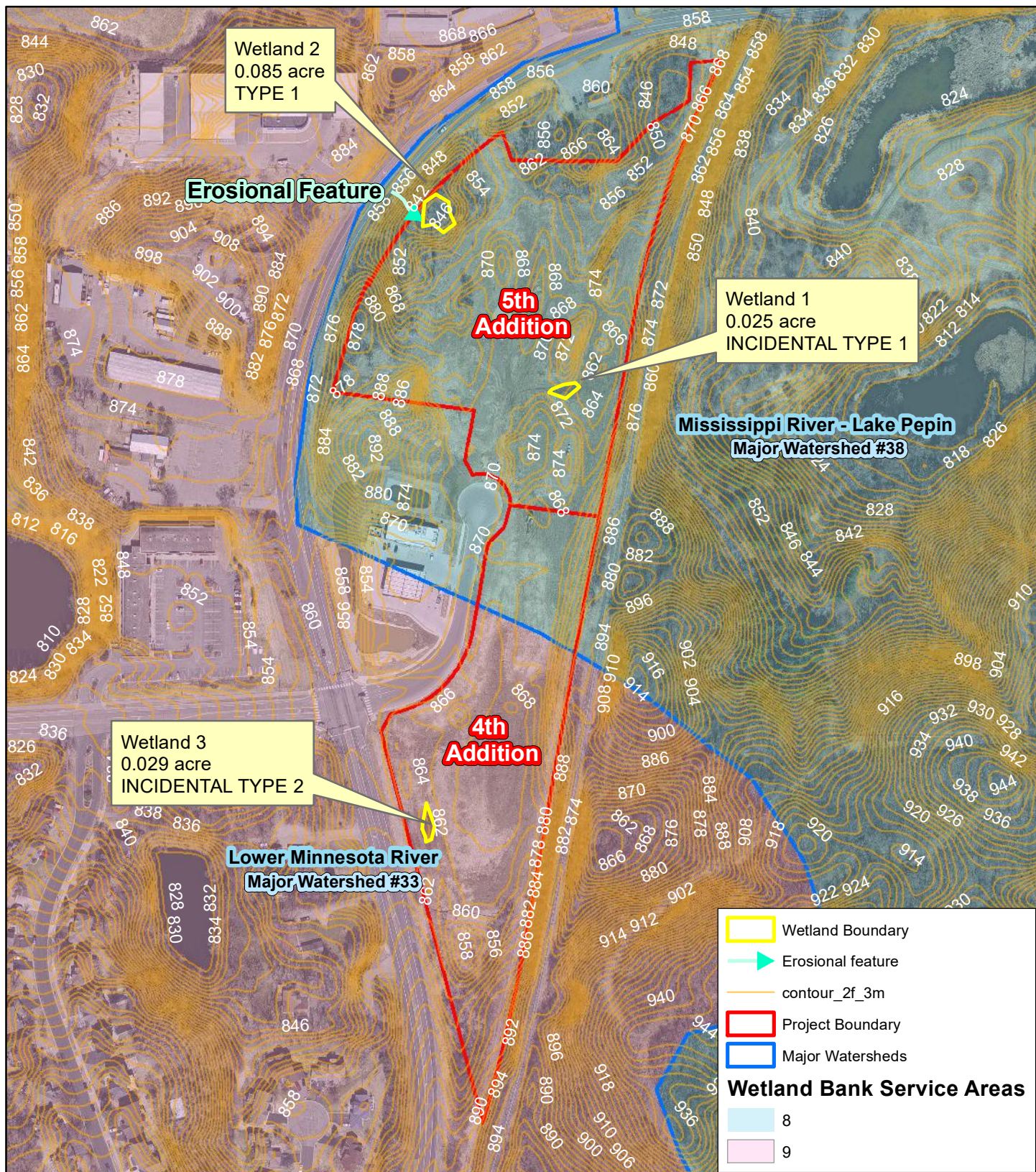


Figure 2 - Existing Conditions (2020 Metro Photo)

Robert Curve 4th & 5th Additions, Inver Grove Heights

Wetland Permit Application

APPENDIX A

Joint Application for Activities Affecting Water Resources in Minnesota

PART ONE: Applicant Information

If applicant is an entity (company, government entity, partnership, etc.), an authorized contact person must be identified. If the applicant is using an agent (consultant, lawyer, or other third party) and has authorized them to act on their behalf, the agent's contact information must also be provided.

Applicant/Landowner Name: Andy Brummer, Trident Development

Mailing Address: 1200 25th Ave S, St. Cloud MN 56301

Phone: 320-293-4200

E-mail Address: andyb@tridentdevelopmentmn.com

Authorized Contact (do not complete if same as above):

Mailing Address:

Phone:

E-mail Address:

Agent Name: Marty Anderson, Kjolhaug Environmental Services

Mailing Address: 2500 Shadywood Road, Suite 130, Orono MN 55331

Phone: 952-201-6830

E-mail Address: marty@kjolhaugenv.com

PART TWO: Site Location Information

County: Dakota

City/Township: Inver Grove Heights

Parcel ID and/or Address: 206444200010; 206444001010; 206444000010

Legal Description (Section, Township, Range): S:19; T:27N; R:22W

Lat/Long (decimal degrees): 44.80, -93.10

Attach a map showing the location of the site in relation to local streets, roads, highways.

Approximate size of site (acres) or if a linear project, length (feet): 15.48-acres

If you know that your proposal will require an individual Permit from the U.S. Army Corps of Engineers, you must provide the names and addresses of all property owners adjacent to the project site. This information may be provided by attaching a list to your application or by using block 25 of the Application for Department of the Army permit which can be obtained at:

http://www.mvp.usace.army.mil/Portals/57/docs/regulatory/RegulatoryDocs/engform_4345_2012oct.pdf

PART THREE: General Project/Site Information

If this application is related to a delineation approval, exemption determination, jurisdictional determination, or other correspondence submitted **prior to** this application then describe that here and provide the Corps of Engineers project number.

Describe the project that is being proposed, the project purpose and need, and schedule for implementation and completion. The project description must fully describe the nature and scope of the proposed activity including a description of all project elements that effect aquatic resources (wetland, lake, tributary, etc.) and must also include plans and cross section or profile drawings showing the location, character, and dimensions of all proposed activities and aquatic resource impacts.

Application is for wetland impacts to Wetland 2. See the attached wetland permit application.

PART FOUR: Aquatic Resource Impact¹ Summary

If your proposed project involves a direct or indirect impact to an aquatic resource (wetland, lake, tributary, etc.) identify each impact in the table below. Include all anticipated impacts, including those expected to be temporary. Attach an overhead view map, aerial photo, and/or drawing showing all of the aquatic resources in the project area and the location(s) of the proposed impacts. Label each aquatic resource on the map with a reference number or letter and identify the impacts in the following table.

Aquatic Resource ID (as noted on overhead view)	Aquatic Resource Type (wetland, lake, tributary etc.)	Type of Impact (fill, excavate, drain, or remove vegetation)	Duration of Impact Permanent (P) or Temporary (T) ¹	Size of Impact ²	Overall Size of Aquatic Resource ³	Existing Plant Community Type(s) in Impact Area ⁴	County, Major Watershed #, and Bank Service Area # of Impact Area ⁵
Wetland 2	Wetland	Fill	P	0.0694-ac	0.0694-ac	Seas fl basin	Dakota, 38, 8

¹If impacts are temporary; enter the duration of the impacts in days next to the "T". For example, a project with a temporary access fill that would be removed after 220 days would be entered "T (220)".

²Impacts less than 0.01 acre should be reported in square feet. Impacts 0.01 acre or greater should be reported as acres and rounded to the nearest 0.01 acre. Tributary impacts must be reported in linear feet of impact and an area of impact by indicating first the linear feet of impact along the flowline of the stream followed by the area impact in parentheses). For example, a project that impacts 50 feet of a stream that is 6 feet wide would be reported as 50 ft (300 square feet).

³This is generally only applicable if you are applying for a de minimis exemption under MN Rules 8420.0420 Subp. 8, otherwise enter "N/A".

⁴Use *Wetland Plants and Plant Community Types of Minnesota and Wisconsin* 3rd Ed. as modified in MN Rules 8420.0405 Subp. 2.

⁵Refer to Major Watershed and Bank Service Area maps in MN Rules 8420.0522 Subp. 7.

If any of the above identified impacts have already occurred, identify which impacts they are and the circumstances associated with each:

PART FIVE: Applicant Signature

☐ Check here if you are requesting a pre-application consultation with the Corps and LGU based on the information you have provided. Regulatory entities will not initiate a formal application review if this box is checked.

By signature below, I attest that the information in this application is complete and accurate. I further attest that I possess the authority to undertake the work described herein.

Signature: Andy Brummer Date: 9-8-2023

I hereby authorize _____ to act on my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this application.

¹ The term "impact" as used in this joint application form is a generic term used for disclosure purposes to identify activities that may require approval from one or more regulatory agencies. For purposes of this form it is not meant to indicate whether or not those activities may require mitigation/replacement.

Attachment A

Request for Delineation Review, Wetland Type Determination, or Jurisdictional Determination

By submission of the enclosed wetland delineation report, I am requesting that the U.S. Army Corps of Engineers, St. Paul District (Corps) and/or the Wetland Conservation Act Local Government Unit (LGU) provide me with the following (check all that apply):

☐ **Wetland Type Confirmation**

☐ **Delineation Concurrence.** Concurrence with a delineation is a written notification from the Corps and a decision from the LGU concurring, not concurring, or commenting on the boundaries of the aquatic resources delineated on the property. Delineation concurrences are generally valid for five years unless site conditions change. Under this request alone, the Corps will not address the jurisdictional status of the aquatic resources on the property, only the boundaries of the resources within the review area (including wetlands, tributaries, lakes, etc.).

☐ **Preliminary Jurisdictional Determination.** A preliminary jurisdictional determination (PJD) is a non-binding written indication from the Corps that waters, including wetlands, identified on a parcel may be waters of the United States. For purposes of computation of impacts and compensatory mitigation requirements, a permit decision made on the basis of a PJD will treat all waters and wetlands in the review area as if they are jurisdictional waters of the U.S. PJDs are advisory in nature and may not be appealed.

☒ **Approved Jurisdictional Determination.** An approved jurisdictional determination (AJD) is an official Corps determination that jurisdictional waters of the United States are either present or absent on the property. AJDs can generally be relied upon by the affected party for five years. An AJD may be appealed through the Corps administrative appeal process.

With submission of this application an Approved Jurisdictional Determination is requested from USACE for Wetlands 1 and 3 which were created in dry land incidental to previous construction activities.

In order for the Corps and LGU to process your request, the wetland delineation must be prepared in accordance with the 1987 Corps of Engineers Wetland Delineation Manual, any approved Regional Supplements to the 1987 Manual, and the *Guidelines for Submitting Wetland Delineations in Minnesota* (2013).

<http://www.mvp.usace.army.mil/Missions/Regulatory/DelineationJDGuidance.aspx>

Attachment C

Avoidance and Minimization

Project Purpose, Need, and Requirements. Clearly state the purpose of your project and need for your project. Also include a description of any specific requirements of the project as they relate to project location, project footprint, water management, and any other applicable requirements. Attach an overhead plan sheet showing all relevant features of the project (buildings, roads, etc.), aquatic resource features (impact areas noted) and construction details (grading plans, storm water management plans, etc.), referencing these as necessary:

See sections 1 and 2 of the attached wetland permit application.

Avoidance. Both the CWA and the WCA require that impacts to aquatic resources be avoided if practicable alternatives exist. Clearly describe all on-site measures considered to avoid impacts to aquatic resources and discuss at least two project alternatives that avoid all impacts to aquatic resources on the site. These alternatives may include alternative site plans, alternate sites, and/or not doing the project. Alternatives should be feasible and prudent (see MN Rules 8420.0520 Subp. 2 C). Applicants are encouraged to attach drawings and plans to support their analysis:

See section 4 of the attached wetland permit application.

Minimization. Both the CWA and the WCA require that all unavoidable impacts to aquatic resources be minimized to the greatest extent practicable. Discuss all features of the proposed project that have been modified to minimize the impacts to water resources (see MN Rules 8420.0520 Subp. 4):

See section 4 of the attached wetland permit application.

Off-Site Alternatives. An off-site alternatives analysis is not required for all permit applications. If you know that your proposal will require an individual permit (standard permit or letter of permission) from the U.S. Army Corps of Engineers, you may be required to provide an off-site alternatives analysis. The alternatives analysis is not required for a complete application but must be provided during the review process in order for the Corps to complete the evaluation of your application and reach a final decision. Applicants with questions about when an off-site alternatives analysis is required should contact their Corps Project Manager.

N/A

Attachment D

Replacement/Compensatory Mitigation

Complete this part **if** your application involves wetland replacement/compensatory mitigation not associated with the local road wetland replacement program. Applicants should consult Corps mitigation guidelines and WCA rules for requirements.

Replacement/Compensatory Mitigation via Wetland Banking. Complete this section if you are proposing to use credits from an existing wetland bank (with an account number in the State wetland banking system) for all or part of your replacement/compensatory mitigation requirements.

Wetland Bank Account #	County	Major Watershed #	Bank Service Area #	Credit Type (if applicable)	Number of Credits
1083	Dodge	41	8	4 – Deep Marsh	0.1388

Applicants should attach documentation indicating that they have contacted the wetland bank account owner and reached at least a tentative agreement to utilize the identified credits for the project. This documentation could be a signed purchase agreement, signed application for withdrawal of credits or some other correspondence indicating an agreement between the applicant and the bank owner. *However, applicants are advised not to enter into a binding agreement to purchase credits until the mitigation plan is approved by the Corps and LGU.*

Project-Specific Replacement/Permittee Responsible Mitigation. Complete this section if you are proposing to pursue actions (restoration, creation, preservation, etc.) to generate wetland replacement/compensatory mitigation credits for this proposed project.

WCA Action Eligible for Credit ¹	Corps Mitigation Compensation Technique ²	Acres	Credit % Requested	Credits Anticipated ³	County	Major Watershed #	Bank Service Area #

¹Refer to the name and subpart number in MN Rule 8420.0526.

²Refer to the technique listed in *St. Paul District Policy for Wetland Compensatory Mitigation in Minnesota*.

³If WCA and Corps crediting differs, then enter both numbers and distinguish which is Corps and which is WCA.

Explain how each proposed action or technique will be completed (e.g. wetland hydrology will be restored by breaking the tile.....) and how the proposal meets the crediting criteria associated with it. Applicants should refer to the Corps mitigation policy language, WCA rule language, and all associated Corps and WCA guidance related to the action or technique:

Attach a site location map, soils map, recent aerial photograph, and any other maps to show the location and other relevant features of each wetland replacement/mitigation site. Discuss in detail existing vegetation, existing landscape features, land use (on and surrounding the site), existing soils, drainage systems (if present), and water sources and movement. Include a topographic map showing key features related to hydrology and water flow (inlets, outlets, ditches, pumps, etc.):

Project Name and/or Number: **Robert Curve 4th & 5th Additions, Inver Grove Heights (KES#2023-123)**

Attach a map of the existing aquatic resources, associated delineation report, and any documentation of regulatory review or approval. Discuss as necessary:

For actions involving construction activities, attach construction plans and specifications with all relevant details. Discuss and provide documentation of a hydrologic and hydraulic analysis of the site to define existing conditions, predict project outcomes, identify specific project performance standards and avoid adverse offsite impacts. Plans and specifications should be prepared by a licensed engineer following standard engineering practices. Discuss anticipated construction sequence and timing:

For projects involving vegetation restoration, provide a vegetation establishment plan that includes information on site preparation, seed mixes and plant materials, seeding/planting plan (attach seeding/planting zone map), planting/seeding methods, vegetation maintenance, and an anticipated schedule of activities:

For projects involving construction or vegetation restoration, identify and discuss goals and specific outcomes that can be determined for credit allocation. Provide a proposed credit allocation table tied to outcomes:

Provide a five-year monitoring plan to address project outcomes and credit allocation:

Discuss and provide evidence of ownership or rights to conduct wetland replacement/mitigation on each site:

Quantify all proposed wetland credits and compare to wetland impacts to identify a proposed wetland replacement ratio. Discuss how this replacement ratio is consistent with Corps and WCA requirements:

By signature below, the applicant attests to the following (only required if application involves project-specific/permittee responsible replacement):

- All proposed replacement wetlands were not:
 - Previously restored or created under a prior approved replacement plan or permit
 - Drained or filled under an exemption during the previous 10 years
 - Restored with financial assistance from public conservation programs
 - Restored using private funds, other than landowner funds, unless the funds are paid back with interest to the individual or organization that funded the restoration and the individual or organization notifies the local government unit in writing that the restored wetland may be considered for replacement.
- The wetland will be replaced before or concurrent with the actual draining or filling of a wetland.
- An irrevocable bank letter of credit, performance bond, or other acceptable security will be provided to guarantee successful completion of the wetland replacement.
- Within 30 days of either receiving approval of this application or beginning work on the project, I will record the Declaration of Restrictions and Covenants on the deed for the property on which the replacement wetland(s) will be located and submit proof of such recording to the LGU and the Corps.

Applicant or Representative:

Title:

Signature: _____

Date:

Robert Curve 4th & 5th Additions, Inver Grove Heights

Wetland Permit Application

APPENDIX B

2022 WCA Delineation Approval

Minnesota Wetland Conservation Act Notice of Decision

Local Government Unit: Inver Grove Heights	County: Dakota
Applicant Name: IGH Partners, LLC, Roger Fink	
Applicant Representative: Kjolhaug Environmental, Will Effertz	
Project Name: South Robert Trail	LGU Project No. (if any): SWCD # 22-IGH-138
Date Complete Application Received by LGU: 08/15/22	
Date of LGU Decision: 09/20/22	
Date this Notice was Sent: 09/20/22	

WCA Decision Type - check all that apply

☒ Wetland Boundary/Type	☐ Sequencing	☐ Replacement Plan	☐ Bank Plan (not credit purchase)
☒ No-Loss (8420.0415)	☐ Exemption (8420.0420)		
Part: ☒ A ☐ B ☐ C ☐ D ☐ E ☐ F ☐ G ☐ H		Subpart: ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9	

Replacement Plan Impacts (replacement plan decisions only)

Total WCA Wetland Impact Area:
Wetland Replacement Type: ☐ Project Specific Credits: ☐ Bank Credits:
Bank Account Number(s):

Technical Evaluation Panel Findings and Recommendations (attach if any)

☐ Approve ☐ Approve w/Conditions ☐ Deny ☒ No TEP Recommendation
--

LGU Decision

☐ Approved with Conditions (specify below) ¹ List Conditions:	☒ Approved ¹	☐ Denied
Decision-Maker for this Application: ☒ Staff ☐ Governing Board/Council ☐ Other:		
Decision is valid for: ☒ 5 years (default) ☐ Other (specify):		

¹ *Wetland Replacement Plan approval is not valid until BWSR confirms the withdrawal of any required wetland bank credits. For project-specific replacement a financial assurance per MN Rule 8420.0522, Subp. 9 and evidence that all required forms have been recorded on the title of the property on which the replacement wetland is located must be provided to the LGU for the approval to be valid.*

LGU Findings – Attach document(s) and/or insert narrative providing the basis for the LGU decision¹.

☐ Attachment(s) (specify): ☒ Summary: The Notice of Application was sent out August 18, 2022 and the comment period ended on September 09, 2022. The SWCD and BWSR conducted a field review of the project area on September 13, 2022 and verified Wetlands 1-3 in the project area. Wetlands 1 and 3 were determined incidental under no-loss Subpart A. Wetland 4 was determined non-wetland.

¹ Findings must consider any TEP recommendations.

Attached Project Documents

☒ Site Location Map ☐ Project Plan(s)/Descriptions/Reports (specify):
--

Appeals of LGU Decisions

If you wish to appeal this decision, you must provide a written request within 30 calendar days of the date you received the notice. All appeals must be submitted to the Board of Water and Soil Resources Executive Director along with a check payable to BWSR for \$500 *unless* the LGU has adopted a local appeal process as identified below. The check must be sent by mail and the written request to appeal can be submitted by mail or e-mail. The appeal should include a copy of this notice, name and contact information of appellant(s) and their representatives (if applicable), a statement clarifying the intent to appeal and supporting information as to why the decision is in error. Send to:

Appeals & Regulatory Compliance Coordinator
Minnesota Board of Water & Soils Resources
520 Lafayette Road North
St. Paul, MN 55155
travis.germundson@state.mn.us

Does the LGU have a local appeal process applicable to this decision?

☒ Yes¹ ☐ No

¹If yes, all appeals must first be considered via the local appeals process.

Local Appeals Submittal Requirements (LGU must describe how to appeal, submittal requirements, fees, etc. as applicable)

Send petition within 30 calendar days of date receive notice and \$TBD fee to: City of Inver Grove Heights, 8150 Barbara Avenue, Inver Grove Heights, MN 55077

Notice Distribution (include name)

Required on all notices:

☒ SWCD TEP Member: David Holmen	☒ BWSR TEP Member: Jed Chesnut
☒ LGU TEP Member (if different than LGU contact): Ally Sutherland	
☒ DNR Representative: Tim Pharis	
☒ Watershed District or Watershed Mgmt. Org.: Joe Barten, Lower Mississippi River WMO Administrator	
☒ Applicant (notice only): Roger Fink, IGH Partners, LLC	
☒ Agent/Consultant (notice only): Will Effertz, Kjolhaug Environmental	

Optional or As Applicable:

☒ Corps of Engineers: usace_requests_mn@usace.army.mil	
☐ BWSR Wetland Mitigation Coordinator (required for bank plan applications only):	
☐ Members of the Public (notice only):	☐ Other:

Signature: 	Date: 09/20/22
---	--------------------------

This notice and accompanying application materials may be sent electronically or by mail. The LGU may opt to send a summary of the application to members of the public upon request per 8420.0255, Subp. 3.

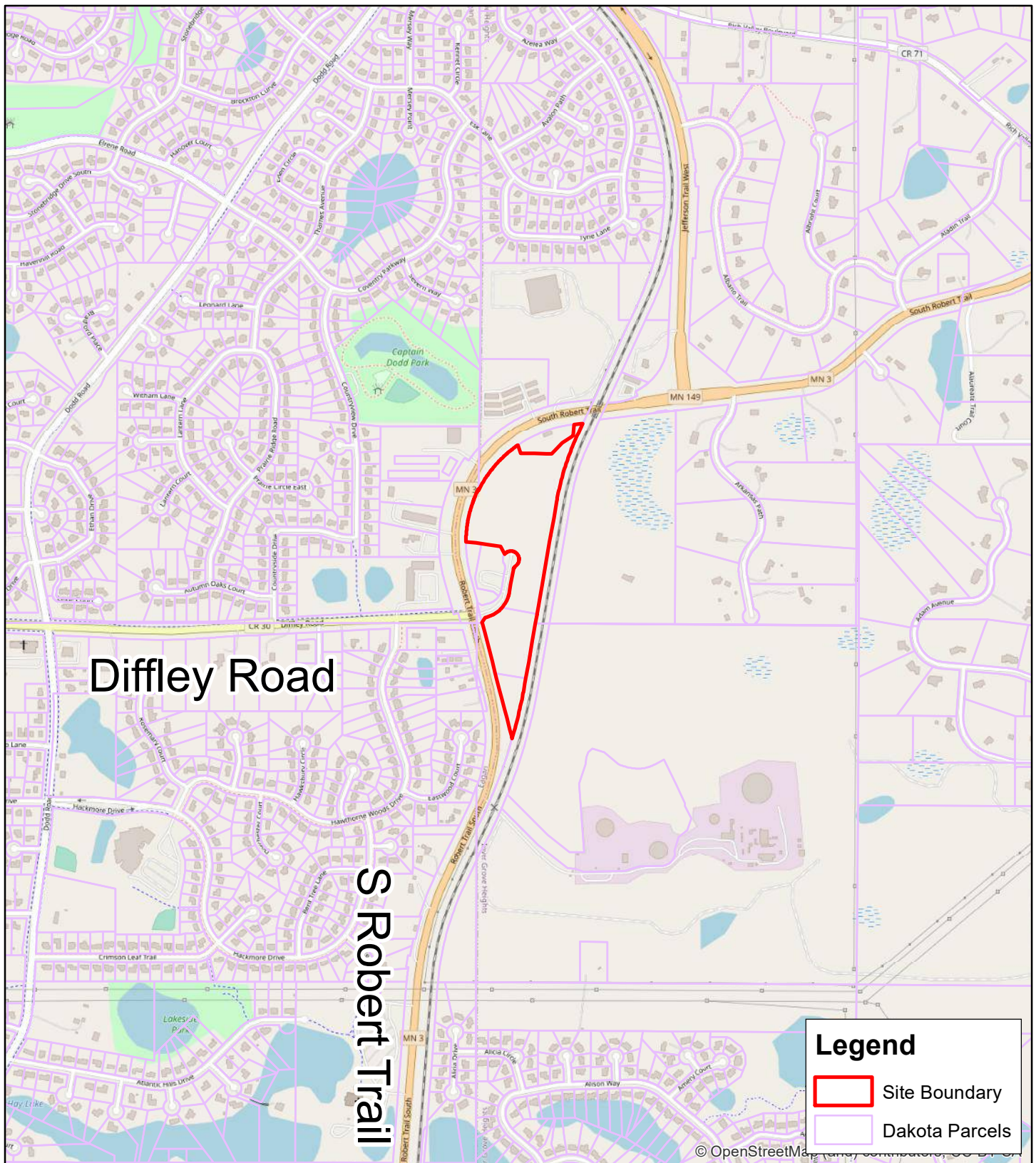


Figure 1 - Site Location



N



0 1,000 Feet



South Robert Trail Addition (KES 2022-101)
Inver Grove Heights, Minnesota

Note: Boundaries indicated on this figure are approximate and do not constitute an official survey product.

KJOLHAUG ENVIRONMENTAL SERVICES COMPANY

Source: MNGEO Spatial Commons, USFWS

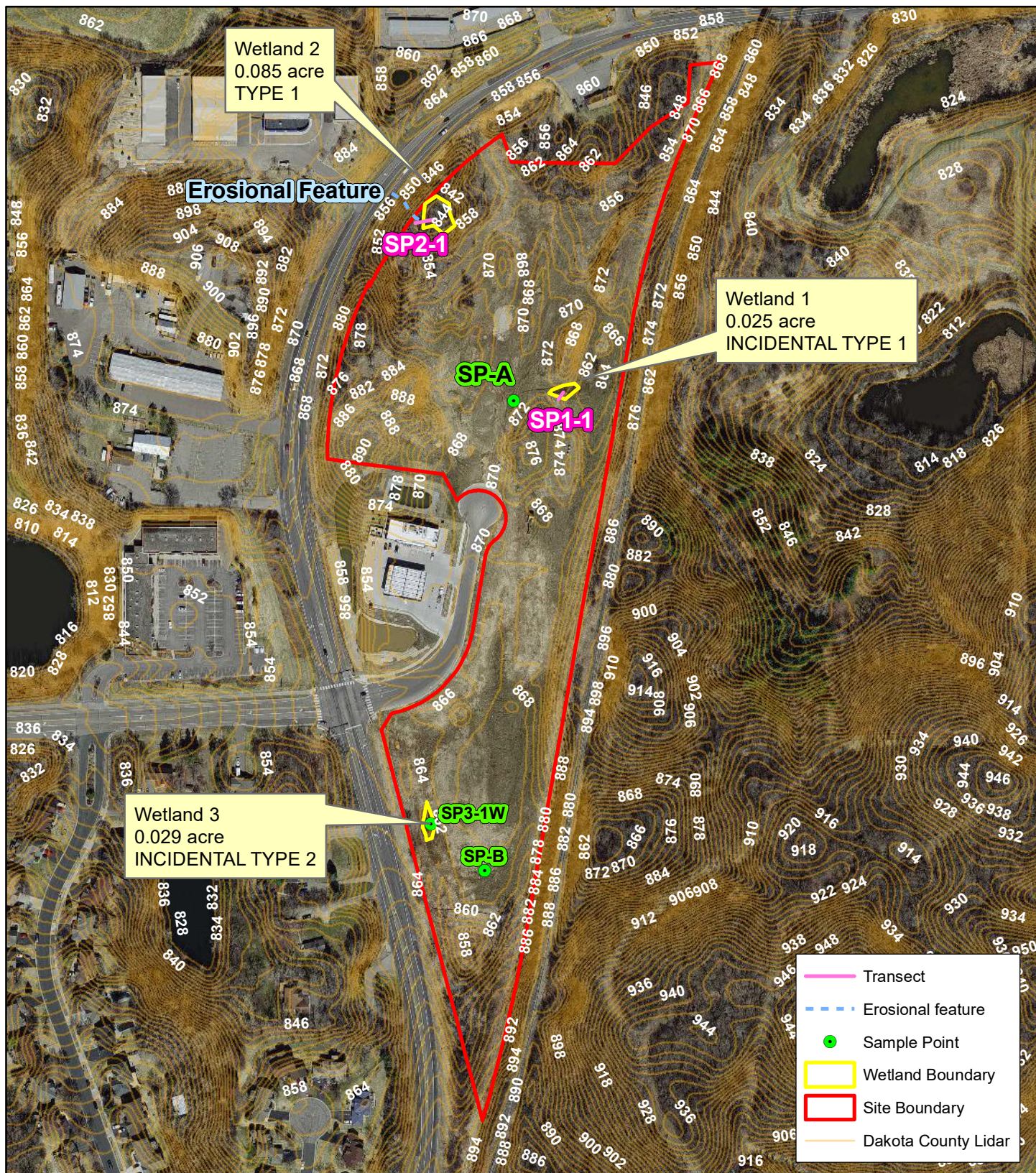


Figure 2 - Existing Conditions (TEP Revised 9/13/22)

Robert Curve 4th & 5th Additions, Inver Grove Heights

Wetland Permit Application

APPENDIX C

2022 Delineation Concurrence (U.S Army Corps of Engineers)



DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, ST. PAUL DISTRICT
332 MINNESOTA STREET, SUITE E1500
ST. PAUL, MN 55101-1323

November 10, 2022

Regulatory File No. MVP-2022-01214-RMH

GH Partners LLC
c/o: Roger Fink
rogerf@tridentdevelopmentmn.com

Dear Roger Fink:

We are responding to your request, submitted by Will Effertz of Kjolhaug Environmental, on your behalf, for Corps of Engineers (Corps) concurrence with the delineation of aquatic resources completed on the approximately 10.92-acre South Robert Trail site. The project site is in Section 19, Township 27 North, Range 22 West, Dakota County, Minnesota.

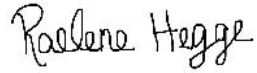
We have conducted a preliminary review of the wetland delineation report, dated August 9, 2022, and generally concur that the review area shown on the enclosed figures labeled MVP-2022-01214-RMH Page 1 of 2 through 2 of 2 depicts a reasonable approximation of the location and boundaries of aquatic resources on the property. This delineation can be used for planning and will generally be sufficient for permitting purposes. It may be necessary to review this determination in response to changing site conditions or new information. If a state or local agency conducts a site visit and requires revisions to the delineation, submit the updated delineation report.

No jurisdictional determination was prepared for this project, nor is one required to support a permit application. If you submit a permit application, we will assist you in identifying aquatic resources that are not subject to Corps regulation to exclude those resources from the permit evaluation. A permit application should include this delineation, any subsequent revisions, and any state or local delineation approvals. You are advised that receipt of a permit or exemption from a state or local agency does not satisfy the requirement to obtain a Corps permit where one is needed.

Please note that the Corps has issued Nationwide General Permits and Regional General Permits that provide authorization for many minor activities. Many of those general permits require a pre-construction notification and Corps verification prior to starting work. However, several general permits also have "self-certifying" provisions that eliminate the need to provide notice to the Corps, provided the permittee complies with the terms and conditions of the general permit. Current general permit terms and conditions can be found at: <https://www.mvp.usace.army.mil/Missions/Regulatory/Permitting-Process-Procedures/>.

If you have any questions, please contact me in our St. Paul office at (651) 290-5355 or Raelene.hegge@usace.army.mil. In any correspondence or inquiries, please refer to the Regulatory file number shown above.

Sincerely,

A handwritten signature in black ink that reads "Raelene Hegge". The script is cursive and fluid, with the first name and last name clearly distinguishable.

Raelene Hegge
Regulatory Specialist

cc:

Will Effertz, Agent (will@kjolhaugenv.com)

David Holmen, LGU (david.holmen@co.dakota.mn.us)

Jed Chesnut, BWSR (jed.chesnut@state.mn.us)

Tim Pharis, MN DNR (tim.pharis@state.mn.us)

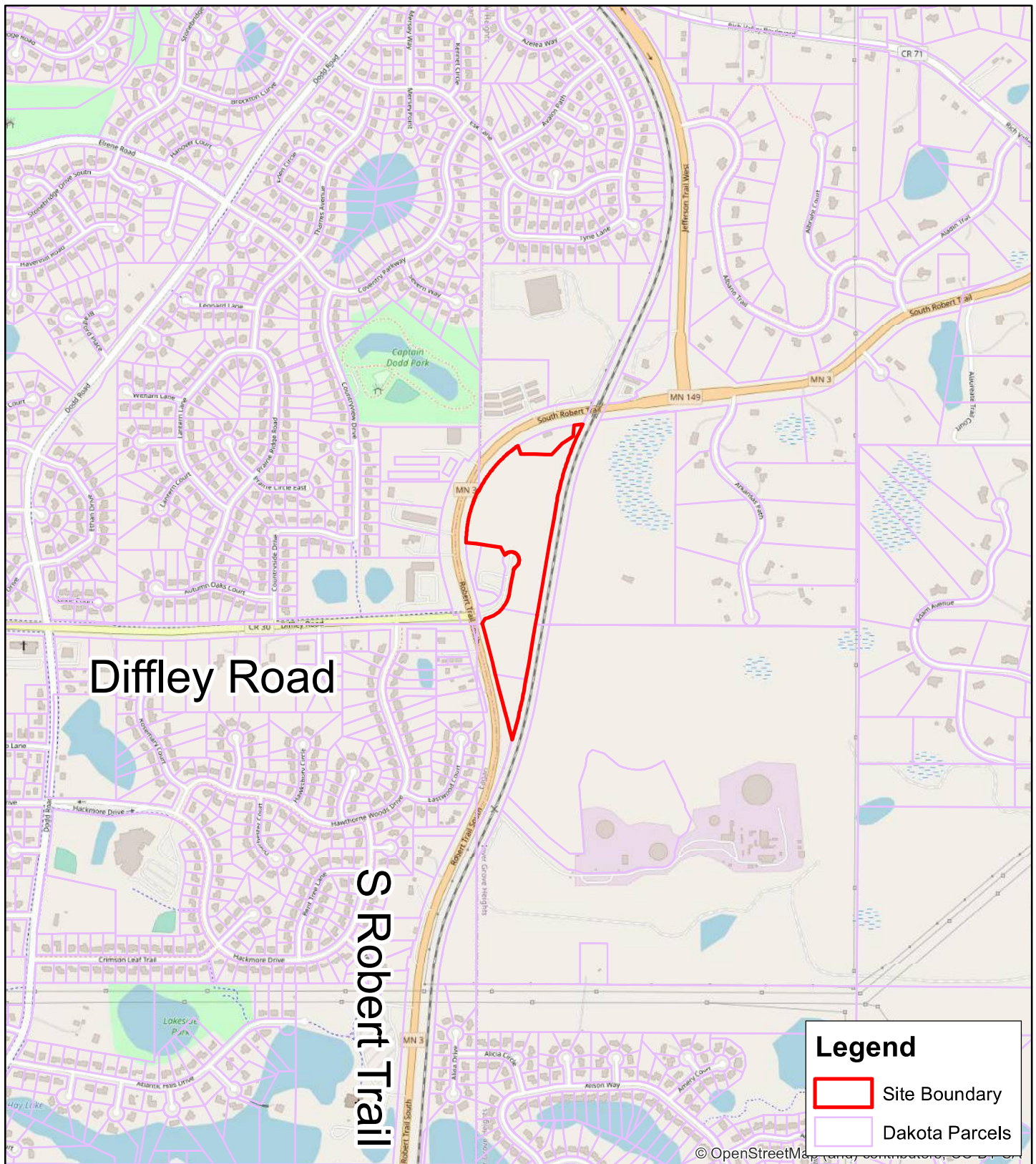


Figure 1 - Site Location



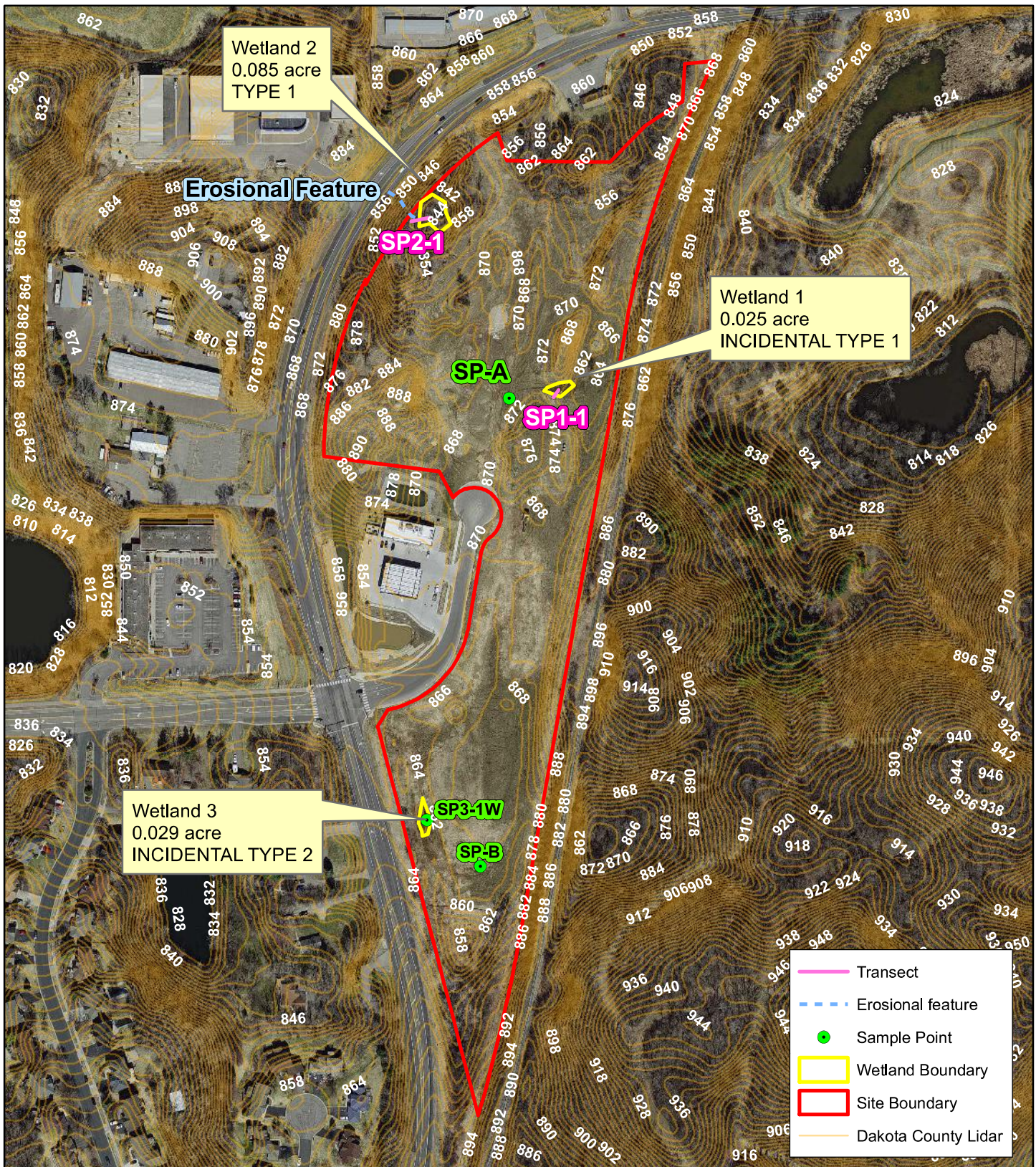


Figure 2 - Existing Conditions (TEP Revised 9/13/22)



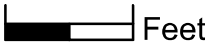
KJOLHAUG ENVIRONMENTAL SERVICES COMPANY

Source: MNGEO Spatial Commons

N



0 200 Feet



South Robert Trail Addition (KES 2022-101)
Inver Grove Heights, Minnesota

Note: Boundaries indicated on this figure are approximate and do not constitute an official survey product.

Robert Curve 4th & 5th Additions, Inver Grove Heights

Wetland Permit Application

APPENDIX D

Avoidance Alternative

Melissa Barrett

From: Dan Wilke <dwilke@carlsonmccain.com>
Sent: Tuesday, October 17, 2023 3:55 PM
To: Melissa Barrett
Subject: Robert Curve Wetland Alternative Options
Attachments: Robert Curve Wetland Avoidance Option.pdf

Melissa,

I got a call from Justin today saying that the TEP wants alternative options explored for removing this tiny wetland... Here is what I have for you.

1. In order to avoid the wetland, the portion of Basin 10 that is west of the wetland must be removed. Doing this requires the following adjustments.
 - a. The Basin outlet pipe would need to be extended east to the new edge of the pond.
 - b. The stormwater inlet pipe, currently entering the basin just north of the wetland, would need to be extended to the east end of the basin. This is required to keep the inflow from "short circuiting" straight to the outlet pipe, preventing the water from being infiltrated.
 - i. This pipe extension would require the site to be raised about 2' in order to make the cover on the upstream stormwater pipes within specification. This raising of the site results in approximately 40,000 CY of additional dirt that would need to be hauled onto the site to construct, which equates to an additional \$400,000 for the project.
2. The drainage area to the wetland would be reduced by 75% from existing conditions, seriously risking the loss of the wetland anyway due to a lack of water.

Let me know if this is enough or if you need more.

Thanks,

Dan Wilke, PE

Project Engineer



15650 36TH AVE N, SUITE 110 \ PLYMOUTH, MN 55446
TEL 952-346-3864 \ CELL 651-226-2935 \ FAX 952-346-3901
CARLSONMCCAIN.COM

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Melissa Barrett

From: Dan Wilke <dwilke@carlsonmccain.com>
Sent: Monday, October 23, 2023 3:01 PM
To: Melissa Barrett
Subject: RE: Robert Curve

Melissa,
See my answers in red below.
Thanks,

Dan Wilke, PE
Project Engineer



15650 36TH AVE N, SUITE 110 \ PLYMOUTH, MN 55446
TEL 952-346-3864 \ CELL 651-226-2935 \ FAX 952-346-3901
CARLSONMCCAIN.COM

This message is intended for the individual or entity named above. If you are not the intended recipient, please do not read, copy or disclose this communication to others. Thank you.

From: Melissa Barrett <melissa@kjolhaugenv.com>
Sent: Monday, October 23, 2023 2:07 PM
To: Dan Wilke <dwilke@carlsonmccain.com>
Subject: Robert Curve

Dan,
Can you please provide information for the following questions. Thank you.

Can the stormpond be reconfigured or moved to the south to avoid impacting wetland 2?

Moving the pond south also requires moving CBMH 101 to the south to allow for the inlet pipe to enter the pond. This would require extending the current storm sewer, which increases the rise in the pipe system from the inlet to the end at CBMH 111. The system, as it is currently designed, already has minimal cover on the pipe at CBMH 102 and CBMH 103 (minimum cover on pipe means that the pipe is already at the highest elevation possible to allow for a structure to be built over it). By extending the pipe length from CBMH 101 to CBMH 102, there will not be enough cover on the pipe to construct CBMH 102 and CBMH 103. To correct for this, the site would have to be raised, as discussed in our prior response. The farther the pond is moved south, the bigger this problem becomes and the more the site would have to be raised.

Can the townhomes in the north addition be removed to avoid impact to wetland 2?

Removing the townhomes will not affect the issue of having to extend the pipe from CBMH 101 to CBMH 102, as discuss in the comment above.

Can stormwater treatment requirements be met by using alternative treatment methods or several smaller ponds located throughout the site?

All drainage from this site discharges to a MNDOT ditch. MNDOT does not allow for any development to increase rates to its ditches. Therefore, on a site this large, ponding is the only effective means to control rates to the requirement of MNDOT standards.

The storm sewer at issue here is all of the storm sewer located on the north end of the property. The only location on the north end of the property where grades would allow for the construction of a smaller pond would be in a location that would end up disturbing the wetland. Smaller ponds in the south end of the property would still have to drain to the north to the current outlet of Basin 10. In order for small ponds to have the impact that is requested, the outlets of these ponds would have to bypass the system for Basin 10. If the pipes didn't bypass Basin 10, then all of the water would have to flow into Basin 10, thus requiring it to stay the size that it is already designed at. This would most likely require that these outlets be run along the western edge of Basin 10 and around the wetland to avoid any pipe crossing conflicts. No matter how many small ponds are added, there will need to be some kind of basin in the area of Basin 10 to capture the apartment parking lot drainage and outlet to the current outlet point. The current outlet point must remain to meet MNDOT drainage standards.

What are the stormwater treatment requirements for the site?

The MPCA and City of Inver Grove Heights require sites to provide a water quality volume of one inch of runoff from newly created impervious surfaces. Where feasible, the water quality volume is to be provided with volume reduction BMPs. The City of Inver Grove Heights also requires a TSS and TP reduction of 85% and 55%, respectively. While not a treatment requirement, MNDOT also requires that the flow rate to any of its ditches must be equal or less than existing rates. The entire site flows to a MNDOT ditch, so this is an essential component of the design.

Can the stormwater be directed to the south into the existing stormponds in the 4th addition (Basin 2 and Basin 20)?

Stormwater cannot be directed to the south basins. The current design maintains the flow rate, exactly, to the MNDOT culvert under Diffley Court. Directing any more stormwater to the south would increase flow rates to the culvert to greater than existing, which would not be in compliance with MNDOT standards. There is also the issue of needing to run storm sewer that distance. Preliminary calculations to do this show that the 5th Addition site would have to be raised 8-10 feet to provide enough cover for the storm sewer. Raising the site that much would create serious grading conflicts around the site and would not be feasible.

Melissa Barrett

Kjolhaug Environmental Services

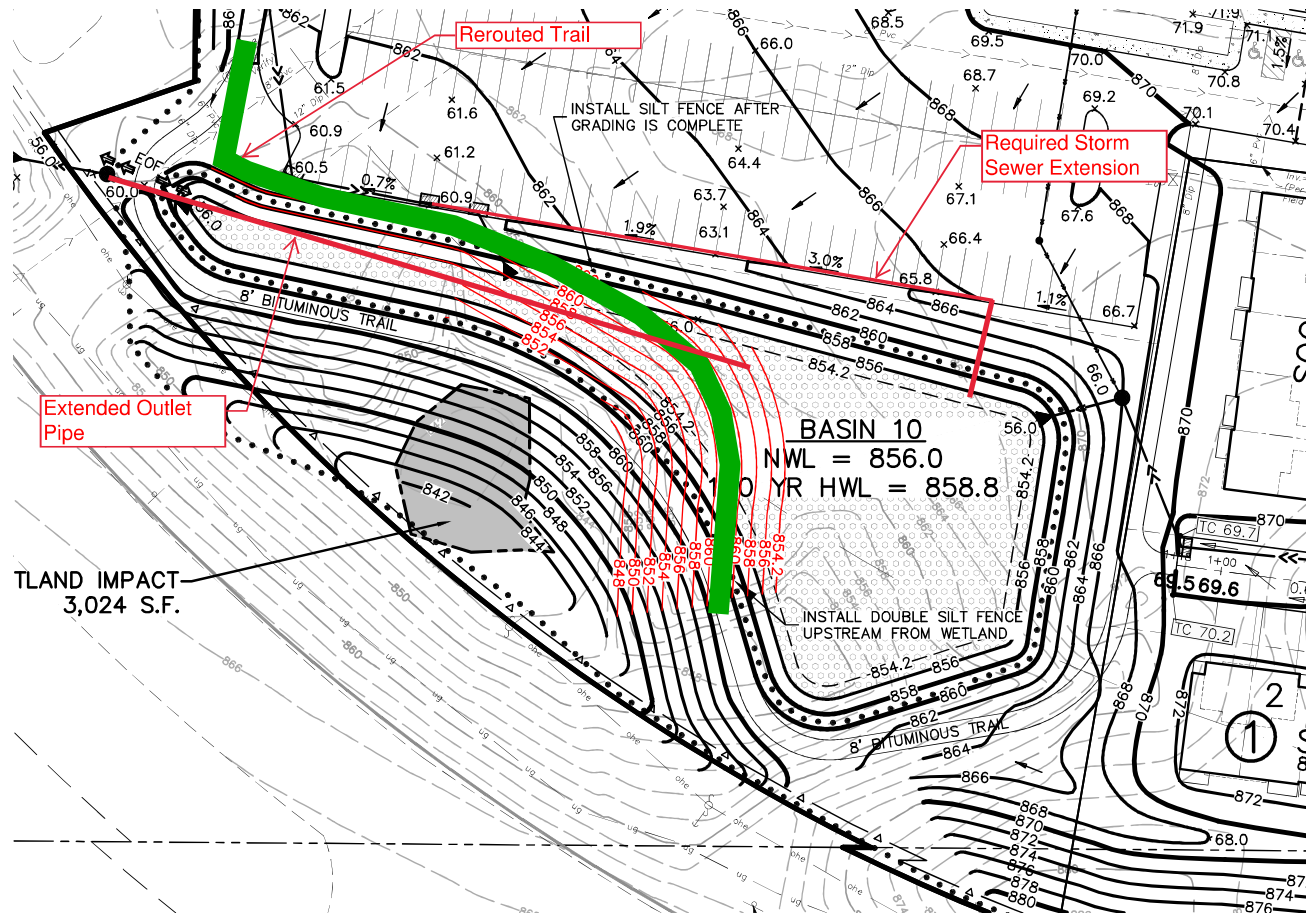
2500 Shadywood Road, Suite 130

Orono, MN 55331

Phone: 952-388-3752

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This plan shows complete avoidance of Wetland 2 and meets stormwater requirements. This avoidance alternative was deemed to be not prudent because it would require the site to be built up ~2 feet in elevation (~40,000 CY). In addition to not being prudent from a development perspective, this avoidance alternative is not preferable from an environmental/carbon footprint perspective (requiring ~2,500 truckloads of imported material). Shifting the pond further to the south (eliminating townhomes) does not resolve the stormwater pipe or outlet issue. The farther the pond is moved south, the more the site would have to be raised.

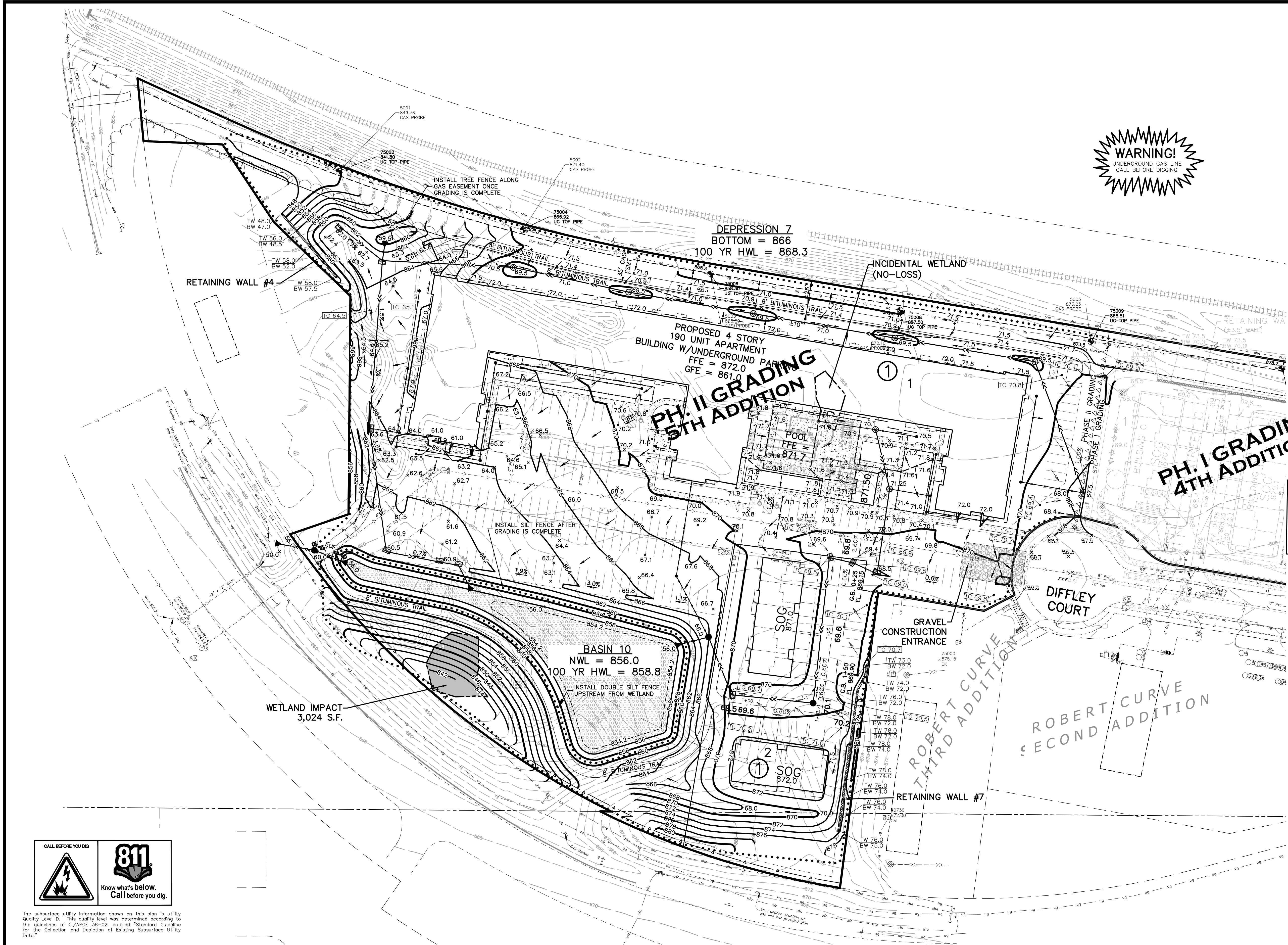


Robert Curve 4th & 5th Additions, Inver Grove Heights

Wetland Permit Application

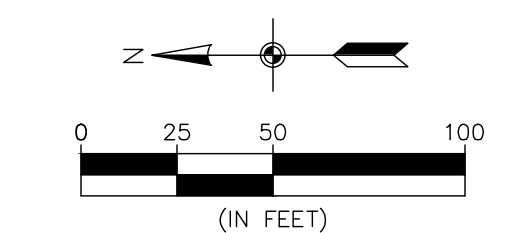
APPENDIX E

Grading Plan



	EXISTING	PROPOSED
PROPERTY LINE	---	---
EASEMENT LINE	---	---
CURB LINE	---	---
BITUMINOUS	---	---
CONCRETE	---	---
SANITARY SEWER	---	---
STORM SEWER	---	---
WATER MAIN	---	---
OVERHEAD UTILITY	---	---
UNDERGROUND ELECTRIC	---	---
UNDERGROUND GAS	---	---
UNDERGROUND FIBER OPTIC	---	---
STORM CATCH BASIN	---	---
STORM MANHOLE	---	---
SANITARY MANHOLE	---	---
MISC. MANHOLE	---	---
HYDRANT	---	---
GATE VALVE	---	---
TELEVISION BOX	---	---
TELEPHONE BOX	---	---
UTILITY POLE	---	---
HANDHOLE	---	---
GAS METER	---	---
SEMAPHORE	---	---
MAILBOX	---	---
SIGN	---	---
RETAINING WALL	---	---
FENCE	---	---
10' CONTOUR	---	---
2' CONTOUR	---	---
SPOT ELEVATION	---	---
EMERGENCY OVERFLOW	---	---
SILT FENCE	---	---
TREE FENCE	---	---
TREELINE	---	---
SOIL BORING	---	---
GRADING LIMITS	---	---

- INFILTRATION BASIN 10 NOTES**
1. INFILTRATION AREA SHALL BE EXCAVATED TO THE TOP OF THE POORLY GRADED SAND LAYER AS SHOWN ON BORINGS SB-11, FROM THE SOIL INVESTIGATION PERFORMED BY INDEPENDENT TESTING TECHNOLOGIES, INC. ON JUNE 27, 2022.
 2. INFILTRATION RATES SHALL BE MEASURED FOR THE POORLY GRADED SAND LAYER PRIOR TO PLACING BACKFILL.
 3. BACKFILL MATERIALS SHALL BE OF A SIMILAR CONSISTENCY AS THE POORLY GRADED SAND LAYER.
 4. INFILTRATION RATES FOR BACKFILL MATERIALS SHALL BE MEASURED PRIOR TO PLACEMENT.



BENCHMARK
1. MnDot Geodetic GSID Station No. 101772 (MnDot Name 1916 A) - Elevation 863.71 ft. (NAVD88)
2. MnDot Geodetic GSID Station No. 103185 (MnDot Name 1921 W) - Elevation 923.60 ft. (NAVD88)

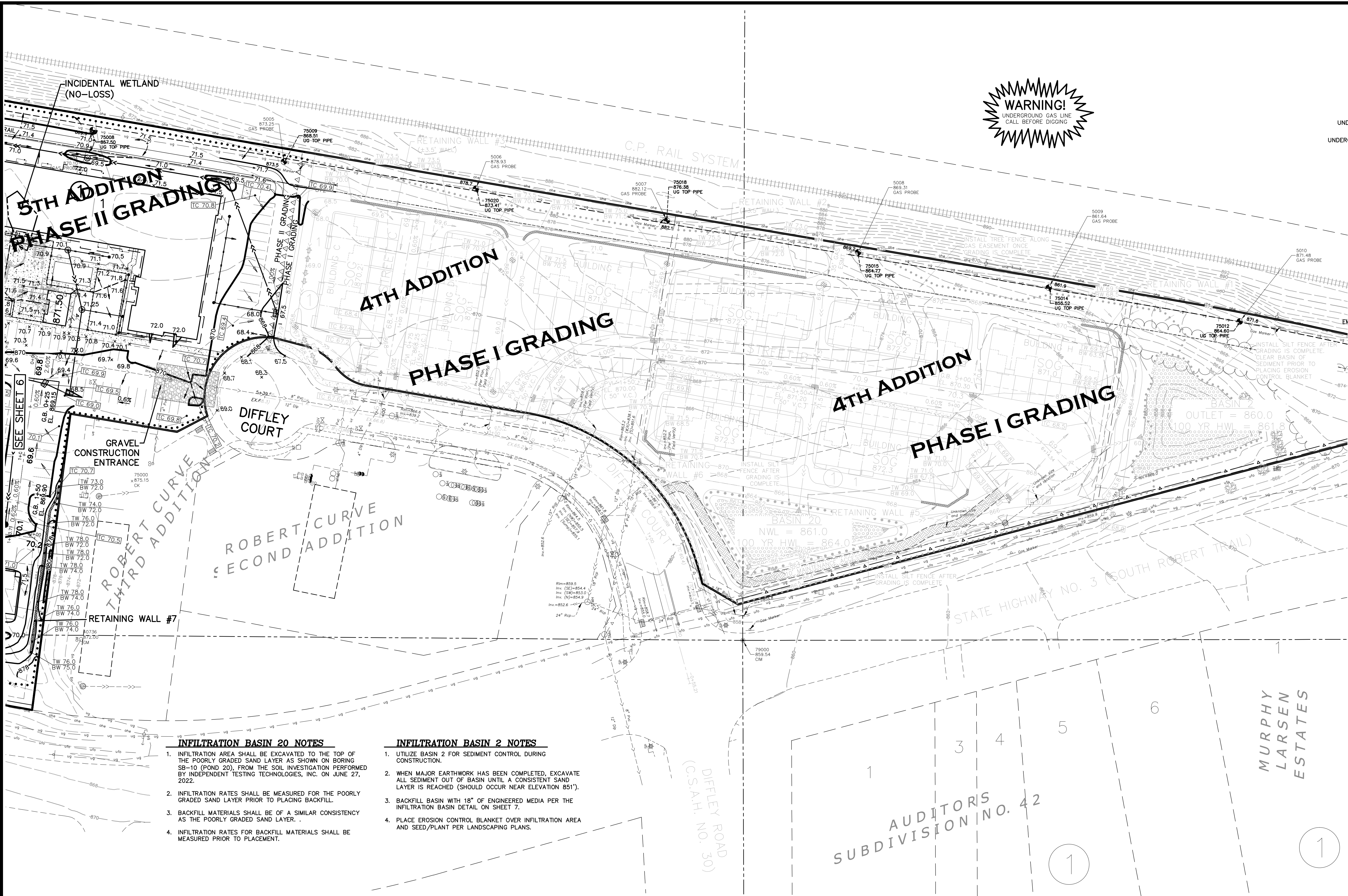
WETLAND SUMMARY

WETLAND IMPACT: **AREA**
3,024 S.F.



The subsurface utility information shown on this plan is utility Quality Level D. This quality level was determined according to the guidelines of C/ASCE 38-02, entitled "Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data."

	CARLSON MCCAIN ENGINEERING SURVEYING ENVIRONMENTAL 3890 PHEASANT RIDGE DR NE SUITE 100 BLAINE, MN 55449 TEL 763.489.7900 FAX 763.489.7959 CARLSONMCCAIN.COM	I hereby certify that this plan, specification or report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota		Print Name: Daniel J. Wilke Signature: Date: 7/28/23 License #: 53182	Drawn: NJP Designed: DJW Date: 7/28/23	Revisions:	IGH PARTNERS, LLC 3601 - 18th Street S, Suite 103 St. Cloud, MN 56301	ROBERT CURVE FIFTH ADDITION Inver Grove Heights, MN	GRADING, DEVELOPMENT & EROSION CONTROL PLAN	6 of 28
		#9823								



LEGEND

	EXISTING	PROPOSED
PROPERTY LINE	---	---
EASEMENT LINE	---	---
CURB LINE	---	---
BITUMINOUS	---	---
CONCRETE	---	---
SANITARY SEWER	---	---
STORM SEWER	---	---
WATER MAIN	---	---
OVERHEAD UTILITY	---	---
UNDERGROUND ELECTRIC	---	---
UNDERGROUND GAS	---	---
UNDERGROUND FIBER OPTIC	---	---
STORM CATCH BASIN	---	---
STORM MANHOLE	---	---
SANITARY MANHOLE	---	---
MISC. MANHOLE	---	---
HYDRANT	---	---
GATE VALVE	---	---
TELEVISION BOX	---	---
TELEPHONE BOX	---	---
UTILITY POLE	---	---
HANDHOLE	---	---
GAS METER	---	---
SEMAPHORE	---	---
MAILBOX	---	---
SIGN	---	---
RETAINING WALL	---	---
FENCE	---	---
10' CONTOUR	---	---
2' CONTOUR	---	---
SPOT ELEVATION	---	---
EMERGENCY OVERFLOW	---	---
SILT FENCE	---	---
TREE FENCE	---	---
TREELINE	---	---
SOIL BORING	---	---
GRADING LIMITS	---	---

- GOVERNING SPECIFICATIONS**
- THE LATEST EDITION OF THE MINNESOTA DEPARTMENT OF TRANSPORTATION "STANDARD SPECIFICATIONS FOR CONSTRUCTION" AND THE CITY OF INVER GROVE HEIGHTS SPECIFICATIONS.
 - THE LATEST EDITION OF THE MINNESOTA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (MMUTCD).
 - THE LATEST EDITION OF THE CITY ENGINEERS ASSOCIATION OF MINNESOTA (CEAM) STANDARD SPECIFICATIONS.
- GRADING NOTES**
- ROCK CONSTRUCTION ENTRANCE, SILT FENCE, AND EXISTING CATCH BASIN INLET PROTECTION SHALL BE INSTALLED PRIOR TO GRADING CONSTRUCTION, AND SHALL BE MAINTAINED UNTIL THE SITE HAS BEEN STABILIZED.
 - CONTRACTOR SHALL FIELD VERIFY THE LOCATIONS AND ELEVATIONS OF EXISTING UTILITIES PRIOR TO THE START OF GRADING CONSTRUCTION. THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY OF DISCREPANCIES OR VARIATIONS FROM THE PLAN.
 - CONTRACTOR SHALL STRIP, STOCKPILE AND RESPREAD SUFFICIENT TOPSOIL TO PROVIDE A MINIMUM OF 6" OF TOPSOIL OVER ALL DISTURBED AREAS THAT WILL BE SODDED, SEED OR LANDSCAPED.
 - ALL DISTURBED AREAS MUST BE STABILIZED WITHIN 7 CALENDARS DAYS AFTER LAND-DISTURBING WORK HAS TEMPORARILY OR PERMANENTLY CEASED.
 - ALL SLOPES STEEPER THAN 3:1 SHALL HAVE MNDOT CAT.1 EROSION CONTROL BLANKET AND SEED, OR APPROVED EQUAL.
 - UPON COMPLETION OF THE SITE GRADING, A CERTIFICATION LETTER AND AS-BUILT SURVEY, FROM A REGISTERED ENGINEER OR LAND SURVEYOR SHALL BE PROVIDED TO THE CITY CERTIFYING THAT THE SITE GRADES ARE SHOWN.
 - ALL RETAINING WALLS 4 FEET AND HIGHER, OR SUPPORTING A SURCHARGE, REQUIRE A SEPARATE BUILDING PERMIT (STRUCTURAL ENGINEER (PE) REQUIRED).
 - ALL RETAINING WALLS SHOWN ON THE GRADING PLAN SHALL BE CONSTRUCTED DURING THE GRADING PHASE.

0 25 50 100
(IN FEET)

BENCHMARK
1. MnDot Geodetic GSD Station No. 101772
(MnDot Name 1916 A) - Elevation 863.71 ft.
(NAVD88)
2. MnDot Geodetic GSD Station No. 103185
(MnDot Name 1921 W) - Elevation 923.60 ft.
(NAVD88)

CALL BEFORE YOU DIG

Know what's below.
Call before you dig.

The subsurface utility information shown on this plan is utility Quality Level D. This quality level was determined according to the guidelines of C/ASCE 38-02, entitled "Standard Guideline for the Collection and Depiction of Existing Subsurface Utility Data."

Robert Curve 4th & 5th Additions, Inver Grove Heights

Wetland Permit Application

APPENDIX F

Wetland Banking Documents

**PURCHASE AGREEMENT
FOR
WETLAND BANKING CREDITS**

*As a Samuelson
I hold the*

THIS AGREEMENT is made this 5th day of September, 2023 between Jon Samuelson (Acct. No. 1083), (Seller) and Andy Brummer, Trident Development, (Buyer).

1. Seller agrees to sell to Buyer, and Buyer agrees to buy from Seller, the wetland banking credits (Credits) listed below:

Credits to be Sold							
Credit Subgroup	Wetland Type/Plant Community Type			Cost per Credit		Credit Amounts	
C	Type 4 – Deep Marsh			\$55,000		0.1388	
Per Credit Withdrawal Fee by BSA				Total Cost:	\$7,634.00	Total Credits:	0.1388
Enter the Withdrawal Fee for the BSA of the account:				(Withdrawal Fee x total credits)			
BSA 1 \$520	BSA 6 \$1,083	\$2,577		Withdrawal Fee:		\$357.69	
BSA 2 \$371	BSA 7 \$1,992	Easement Stewardship Fee:		(Easement Stewardship fee x total credits)			
BSA 3 \$725	BSA 8 \$2,577	\$302 per credit		Stewardship Fee:		\$41.92	
BSA 4 \$1,412	BSA 9 \$2,628	Total Fees:		\$399.61			
BSA 5 \$685	BSA 10 \$3,099						
BWSR fee policy: http://www.bwsr.state.mn.us/wetlands/wetlandbanking/fee and sales data/Wetland Banking Fee Policy Effective June1 2017.pdf							

2. Seller represents and warrants as follows:
- The Credits are deposited in an account in the Minnesota Wetland Bank administered by the Minnesota Board of Water and Soil Resources (BWSR) pursuant to Minn. Rules Chapter 8420.0700-.0760.
 - Seller owns the Credits and has the right to sell the Credits to Buyer.
3. Buyer will pay Seller a total of \$7,634.00 for the Credits, as follows:
- \$0 as earnest money, and
 - The total balance of \$7,634.00 to be paid on the Closing Date listed below.

4. ☒ Buyer, ☐ Seller agrees to pay to a **Withdrawal Fee** of **\$357.69** to the State of Minnesota based on the per credit fee of \$2,577 x 0.1388 acres for Bank Service Area 8 and a **Stewardship Fee** of **\$41.92** based on the per credit fee of \$302 x 0.1388 acres. At the Closing Date, ☒ Buyer, ☐ Seller will execute a check made out for the combined amount of **\$399.61**, payable to the **Board of Water and Soil Resources**. (Fees are subject to change in the event BWSR changes its fee-rates or Buyer seeks to modify its intended amount of credits shown on Section 1. above.)

5. The closing of the purchase and sale shall occur not later than **November 1, 2023** (Closing Date) at a location to be determined between Buyer and Seller. The Closing Date and location may be changed by written consent of both parties. Upon payment of the balance of the purchase price, Seller will sign a fully executed Transaction Form to Withdraw Credits provided by BWSR, provide a copy of the Transaction Form to Withdraw Credits to the Buyer and forward the same to the BWSR along with the check for the Withdrawal Fee and Stewardship Fee. Buyer and Seller acknowledge and agree that the Types and amounts of Wetland Credits described in Section 1. above is subject to change, which could change in the event of final Corps or LGU approval of the project. Fees payable to BWSR defined in Section 4. would also change proportionately.

6. Buyer has applied to and received approval from **Dakota County SWCD** (the Local Government Unit (LGU) and the Corps of Engineers for approval of a replacement plan utilizing the Credits as the means of replacing impacted wetlands. If the LGU or Corps (or MNR DNR if applicable) has not approved the Buyer's application for a replacement plan utilizing the Credits by the Closing Date, or for any other reason is unable to purchase the wetland credits from Seller on or before the Closing Date agreed to by Buyer and Seller as defined in Section 5. above, this Purchase Agreement is Cancelled, and neither Buyer nor Seller shall have any further obligations under this Agreement.

SELLER:
Jon Samuelson

Samuelson Industries

Jon L. Sul 9-5-23
(Signature of Seller) (Date)

BUYER:

Andy Brummer, Trident Development

Andy Brummer 9-13-23
(Signature of Buyer) (Date)



Standard Credit Withdrawal Form

Minnesota Wetland Bank Program

(Incomplete forms may be returned unprocessed)

1. Credit User		This space for BWSR use only.
Name: Andy Brummer	Organization/Company (if any): Trident Development	
Address: 1200 25 th Ave S, St. Cloud MN	Phone: 320-293-4200	
	E-mail: andyb@tridentdevelopmentmn.com	
If others should receive withdrawal verification email, please include their email below (e.g., Consultants, partners, etc.): melissa@kjolhaugenv.com		

2. Wetland Impact Information			
Project Name: Robert Curve 4 th & 5 th Additions		Project Type: Other	ACRES of Impact: 15.48-acres
City (if applicable): Inver Grove Heights	County: Dakota	Sec/Twp/Range: (Project Center) Sec. 19 T. 27N R. 22W	Major Watershed No./Bank Service Area (BSA): 38 / 8
WCA LGU Name: Dakota County SWCD		Majority Impact Wetland Type: 1 - Seasonally Flooded Basin	Majority HGM Class: Depression
Corps of Engineers Letter/Email Received? ☒ Yes ☐ No		If Yes, Corps File No.: (e.g. 2021-00101-ABC) MVP-2022-01214-RMH	If Yes, is Corps Replacement Required? ☐ Yes ☐ No ☒ Unknown
Comments:			

3. Credits to be Withdrawn					
Bank Account No./Name: 1083/Jon Samuelson		Bank County: Dodge		Bank BSA: 8	
Credit Subgroup	Wetland Type/Plant Community Type		Federally Approved?	Cost per Credit	Credit Amounts
C	4 - Deep Marsh		Yes	\$55000	0.1388
---Select---	---Select---		---Select---	\$	
---Select---	---Select---		---Select---	\$	
---Select---	---Select---		---Select---	\$	
---Select---	---Select---		---Select---	\$	
Per Credit Withdrawal Fee by BSA			Enter Bank Account's BSA		Total Credits: 0.1388
BSA 1 \$520	BSA 6 \$1,083	Withdrawal Fee and hit Tab key:		(Withdrawal Fee X total credits)	
BSA 2 \$371	BSA 7 \$1,992	\$2,577.00		Withdrawal Fee:	\$357.69
BSA 3 \$725	BSA 8 \$2,577	Easement Stewardship Fee:		(Easement Stewardship fee x total credits)	
BSA 4 \$1,412	BSA 9 \$2,628	\$302		Stewardship Fee:	\$41.92
BSA 5 \$685	BSA 10 \$3,099			Total Fees:	\$399.61

Please make checks payable to the Minnesota Board of Water and Soil Resources. BWSR does not accept cash.

Project Name: Robert Curve 4th & 5th Additions

After completing all necessary fields, select "Request Signatures" option in the Home tab of your toolbar to convert your agreement to a PDF version and add your digital signature. See these [instructions](#) if you do not know how to create a digital signature.

4. WCA Authorization *(Must include representative's name and email address)*

By signing below, the identified Wetland Conservation Act Local Government Unit (LGU) representative attests that the LGU has approved the use of the credits in Box 3 for wetland replacement/mitigation.

WCA LGU:

Representative's Name:

Email Address:

Signature:

Date:

5. Other Agency/Program Authorization *(Must include representative's name and email address)*

By signing below, the identified agency representative attests that the agency has approved the use of the credits in Box 3 for wetland replacement/mitigation.

Agency:

Representative's Name:

Email Address:

Signature:

Date:

6. Credit User Signature

By signing below the credit user attests that they have secured use of the credits in Box 3 from the account holder for wetland replacement/mitigation.

Signature:

Date:

7. Account Holder Signature *(Must include seller/manager name and email address)*

By signing below the account holder authorizes BWSR to withdraw the credits identified in Box 3 from their account to satisfy wetland replacement/mitigation requirements for the credit user indicated in Box 1. The account holder attests that the identified credits have not been sold or used by a different credit user.

Seller/Manager:

Email Address:

Signature:

Date:

SEND COMPLETED FORM AND FEE PAYMENT TO:

Wetland Bank Administration
Minnesota Board of Water and Soil Resources
520 Lafayette Road North
Saint Paul, MN 55155

Robert Curve 4th & 5th Additions, Inver Grove Heights

Wetland Permit Application

APPENDIX G

FWS Species List



United States Department of the Interior

FISH AND WILDLIFE SERVICE
Minnesota-Wisconsin Ecological Services Field Office
3815 American Blvd East
Bloomington, MN 55425-1659
Phone: (952) 858-0793 Fax: (952) 646-2873



In Reply Refer To:
Project Code: 2023-0125307
Project Name: Robert Trail 4th & 5th Addition

September 08, 2023

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

This response has been generated by the Information, Planning, and Conservation (IPaC) system to provide information on natural resources that could be affected by your project. The U.S. Fish and Wildlife Service (Service) provides this response under the authority of the Endangered Species Act of 1973 (16 U.S.C. 1531-1543), the Bald and Golden Eagle Protection Act (16 U.S.C. 668-668d), the Migratory Bird Treaty Act (16 U.S.C. 703-712), and the Fish and Wildlife Coordination Act (16 U.S.C. 661 *et seq.*).

Threatened and Endangered Species

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and may be affected by your proposed project. The species list fulfills the requirement for obtaining a Technical Assistance Letter from the U.S. Fish and Wildlife Service under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. The Service recommends that verification be completed by visiting the IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the IPaC system by completing the same process used to receive the enclosed list.

Consultation Technical Assistance

Please refer to our [Section 7 website](#) for guidance and technical assistance, including [step-by-step instructions](#) for making effects determinations for each species that might be present and for specific guidance on the following types of projects: projects in developed areas, HUD, CDBG, EDA, USDA Rural Development projects, pipelines, buried utilities, telecommunications, and requests for a Conditional Letter of Map Revision (CLOMR) from FEMA.

We recommend running the project (if it qualifies) through our **Minnesota-Wisconsin Federal Endangered Species Determination Key (Minnesota-Wisconsin ("D-key"))**. A [demonstration video](#) showing how-to access and use the determination key is available. Please note that the Minnesota-Wisconsin D-key is the third option of 3 available d-keys. D-keys are tools to help Federal agencies and other project proponents determine if their proposed action has the potential to adversely affect federally listed species and designated critical habitat. The Minnesota-Wisconsin D-key includes a structured set of questions that assists a project proponent in determining whether a proposed project qualifies for a certain predetermined consultation outcome for all federally listed species found in Minnesota and Wisconsin (except for the northern long-eared bat- see below), which includes determinations of "no effect" or "may affect, not likely to adversely affect." In each case, the Service has compiled and analyzed the best available information on the species' biology and the impacts of certain activities to support these determinations.

If your completed d-key output letter shows a "No Effect" (NE) determination for all listed species, print your IPaC output letter for your files to document your compliance with the Endangered Species Act.

For Federal projects with a "Not Likely to Adversely Affect" (NLAA) determination, our concurrence becomes valid if you do not hear otherwise from us after a 30-day review period, as indicated in your letter.

If your d-key output letter indicates additional coordination with the Minnesota-Wisconsin Ecological Services Field Office is necessary (i.e., you get a "May Affect" determination), you will be provided additional guidance on contacting the Service to continue ESA coordination outside of the key; ESA compliance cannot be concluded using the key for "May Affect" determinations unless otherwise indicated in your output letter.

Note: Once you obtain your official species list, you are not required to continue in IPaC with d-keys, although in most cases these tools should expedite your review. If you choose to make an effects determination on your own, you may do so. If the project is a Federal Action, you may want to review our section 7 step-by-step instructions before making your determinations.

Using the IPaC Official Species List to Make No Effect and May Affect Determinations for Listed Species

1. If IPaC returns a result of "There are no listed species found within the vicinity of the project," then project proponents can conclude the proposed activities will have **no effect** on any federally listed species under Service jurisdiction. Concurrence from the Service is not required for **no effect** determinations. No further consultation or coordination is required. Attach this letter to the dated IPaC species list report for your records.
 2. If IPaC returns one or more federally listed, proposed, or candidate species as potentially present in the action area of the proposed project – other than bats (see below) – then project proponents must determine if proposed activities will have **no effect** on or **may affect** those species. For assistance in determining if suitable habitat for listed, candidate, or proposed species occurs within your project area or if species may be affected by project activities, you can obtain [Life History Information for Listed and Candidate Species](#) on our office website. If no impacts will occur to a species on the IPaC species list (e.g., there is no habitat present in the project area), the appropriate determination is **no effect**. No further consultation or coordination is required. Attach this letter to the dated IPaC species list report for your records.
-

3. Should you determine that project activities **may affect** any federally listed, please contact our office for further coordination. Letters with requests for consultation or correspondence about your project should include the Consultation Tracking Number in the header. Electronic submission is preferred.

Northern Long-Eared Bats

Northern long-eared bats occur throughout Minnesota and Wisconsin and the information below may help in determining if your project may affect these species.

This species hibernates in caves or mines only during the winter. In Minnesota and Wisconsin, the hibernation season is considered to be November 1 to March 31. During the active season (April 1 to October 31) they roost in forest and woodland habitats. Suitable summer habitat for northern long-eared bats consists of a wide variety of forested/wooded habitats where they roost, forage, and travel and may also include some adjacent and interspersed non-forested habitats such as emergent wetlands and adjacent edges of agricultural fields, old fields and pastures. This includes forests and woodlots containing potential roosts (i.e., live trees and/or snags ≥ 3 inches dbh for northern long-eared bat that have exfoliating bark, cracks, crevices, and/or hollows), as well as linear features such as fencerows, riparian forests, and other wooded corridors. These wooded areas may be dense or loose aggregates of trees with variable amounts of canopy closure. Individual trees may be considered suitable habitat when they exhibit the characteristics of a potential roost tree and are located within 1,000 feet (305 meters) of forested/wooded habitat. Northern long-eared bats have also been observed roosting in human-made structures, such as buildings, barns, bridges, and bat houses; therefore, these structures should also be considered potential summer habitat and evaluated for use by bats. If your project will impact caves or mines or will involve clearing forest or woodland habitat containing suitable roosting habitat, northern long-eared bats could be affected.

Examples of unsuitable habitat include:

- Individual trees that are greater than 1,000 feet from forested or wooded areas,
- Trees found in highly developed urban areas (e.g., street trees, downtown areas),
- A pure stand of less than 3-inch dbh trees that are not mixed with larger trees, and
- A monoculture stand of shrubby vegetation with no potential roost trees.

If IPaC returns a result that northern long-eared bats are potentially present in the action area of the proposed project, project proponents can conclude the proposed activities **may affect** this species **IF** one or more of the following activities are proposed:

- Clearing or disturbing suitable roosting habitat, as defined above, at any time of year,
- Any activity in or near the entrance to a cave or mine,
- Mining, deep excavation, or underground work within 0.25 miles of a cave or mine,
- Construction of one or more wind turbines, or
- Demolition or reconstruction of human-made structures that are known to be used by bats based on observations of roosting bats, bats emerging at dusk, or guano deposits or stains.

If none of the above activities are proposed, project proponents can conclude the proposed activities will have **no effect** on the northern long-eared bat. Concurrence from the Service is not required for **No**

Effect determinations. No further consultation or coordination is required. Attach this letter to the dated IPaC species list report for your records.

If any of the above activities are proposed, and the northern long-eared bat appears on the user's species list, the federal project user will be directed to either the range-wide northern long-eared bat D-key or the Federal Highways Administration, Federal Railways Administration, and Federal Transit Administration Indiana bat/ Northern long-eared bat D-key, depending on the type of project and federal agency involvement. Similar to the Minnesota-Wisconsin D-key, these d-keys help to determine if prohibited take might occur and, if not, will generate an automated verification letter.

Please note: On November 30, 2022, the Service published a proposal final rule to reclassify the northern long-eared bat as endangered under the Endangered Species Act. On January 26, 2023, the Service published a 60-day extension for the final reclassification rule in the Federal Register, moving the effective listing date from January 30, 2023, to March 31, 2023. This extension will provide stakeholders and the public time to preview interim guidance and consultation tools before the rule becomes effective. When available, the tools will be available on the Service's northern long-eared bat website (<https://www.fws.gov/species/northern-long-eared-bat-myotis-septentrionalis>). Once the final rule goes into effect on March 31, 2023, the 4(d) D-key will no longer be available (4(d) rules are not available for federally endangered species) and will be replaced with a new Range-wide NLEB D-key (range-wide d-key). For projects not completed by March 31, 2023, that were previously reviewed under the 4(d) d-key, there may be a need for reinitiation of consultation. For these ongoing projects previously reviewed under the 4(d) d-key that may result in incidental take of the northern long-eared bat, we recommend you review your project using the new range-wide d-key once available. If your project does not comply with the range-wide d-key, it may be eligible for use of the Interim (formal) Consultation framework (framework). The framework is intended to facilitate the transition from the 4(d) rule to typical Section 7 consultation procedures for federally endangered species and will be available only until spring 2024. Again, when available, these tools (new range-wide d-key and framework) will be available on the Service's [northern long-eared bat website](#).

Whooping Crane

Whooping crane is designated as a non-essential experimental population in Wisconsin and consultation under Section 7(a)(2) of the Endangered Species Act is only required if project activities will occur within a National Wildlife Refuge or National Park. If project activities are proposed on lands outside of a National Wildlife Refuge or National Park, then you are not required to consult. For additional information on this designation and consultation requirements, please review "[Establishment of a Nonessential Experimental Population of Whooping Cranes in the Eastern United States](#)."

Other Trust Resources and Activities

Bald and Golden Eagles - Although the bald eagle has been removed from the endangered species list, this species and the golden eagle are protected by the Bald and Golden Eagle Act and the Migratory Bird Treaty Act. Should bald or golden eagles occur within or near the project area please contact our office for further coordination. For communication and wind energy projects, please refer to additional guidelines below.

Migratory Birds - The Migratory Bird Treaty Act (MBTA) prohibits the taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests, except when specifically authorized by the Service. The Service has the responsibility under the MBTA to proactively prevent the

mortality of migratory birds whenever possible and we encourage implementation of [recommendations that minimize potential impacts to migratory birds](#). Such measures include clearing forested habitat outside the nesting season (generally March 1 to August 31) or conducting nest surveys prior to clearing to avoid injury to eggs or nestlings.

Communication Towers - Construction of new communications towers (including radio, television, cellular, and microwave) creates a potentially significant impact on migratory birds, especially some 350 species of night-migrating birds. However, the Service has developed [voluntary guidelines for minimizing impacts](#).

Transmission Lines - Migratory birds, especially large species with long wingspans, heavy bodies, and poor maneuverability can also collide with power lines. In addition, mortality can occur when birds, particularly hawks, eagles, kites, falcons, and owls, attempt to perch on uninsulated or unguarded power poles. To minimize these risks, please refer to [guidelines](#) developed by the Avian Power Line Interaction Committee and the Service. Implementation of these measures is especially important along sections of lines adjacent to wetlands or other areas that support large numbers of raptors and migratory birds.

Wind Energy - To minimize impacts to migratory birds and bats, wind energy projects should follow the Service's [Wind Energy Guidelines](#). In addition, please refer to the Service's [Eagle Conservation Plan Guidance](#), which provides guidance for conserving bald and golden eagles in the course of siting, constructing, and operating wind energy facilities.

State Department of Natural Resources Coordination

While it is not required for your Federal section 7 consultation, please note that additional state endangered or threatened species may also have the potential to be impacted. Please contact the Minnesota or Wisconsin Department of Natural Resources for information on state listed species that may be present in your proposed project area.

Minnesota

[Minnesota Department of Natural Resources - Endangered Resources Review Homepage](#)

Email: Review.NHIS@state.mn.us

Wisconsin

[Wisconsin Department of Natural Resources - Endangered Resources Review Homepage](#)

Email: DNRERReview@wi.gov

We appreciate your concern for threatened and endangered species. Please feel free to contact our office with questions or for additional information.

Attachment(s):

- Official Species List
 - USFWS National Wildlife Refuges and Fish Hatcheries
 - Migratory Birds
 - Wetlands
-

OFFICIAL SPECIES LIST

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Minnesota-Wisconsin Ecological Services Field Office

3815 American Blvd East

Bloomington, MN 55425-1659

(952) 858-0793

PROJECT SUMMARY

Project Code: 2023-0125307
Project Name: Robert Trail 4th & 5th Addition
Project Type: Residential Construction
Project Description: Previously disturbed site, ~16 ac, proposed apartment and townhome development, fall 2023.

Project Location:

The approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/@44.805496899999994,-93.10474140137896,14z>



Counties: Dakota County, Minnesota

ENDANGERED SPECIES ACT SPECIES

There is a total of 6 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries¹, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

-
1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

MAMMALS

NAME	STATUS
Northern Long-eared Bat <i>Myotis septentrionalis</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9045	Endangered
Tricolored Bat <i>Perimyotis subflavus</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/10515	Proposed Endangered

BIRDS

NAME	STATUS
Whooping Crane <i>Grus americana</i> Population: U.S.A. (AL, AR, CO, FL, GA, ID, IL, IN, IA, KY, LA, MI, MN, MS, MO, NC, NM, OH, SC, TN, UT, VA, WI, WV, western half of WY) No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/758	Experimental Population, Non- Essential

CLAMS

NAME	STATUS
Higgins Eye (pearlymussel) <i>Lampsilis higginsii</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/5428	Endangered

INSECTS

NAME	STATUS
Monarch Butterfly <i>Danaus plexippus</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9743	Candidate
Rusty Patched Bumble Bee <i>Bombus affinis</i> No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/9383 General project design guidelines: https://ipac.ecosphere.fws.gov/project/53FHEM6T7FETXEV2RDQXSGR7H4/documents/generated/5967.pdf	Endangered

CRITICAL HABITATS

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

YOU ARE STILL REQUIRED TO DETERMINE IF YOUR PROJECT(S) MAY HAVE EFFECTS ON ALL ABOVE LISTED SPECIES.

USFWS NATIONAL WILDLIFE REFUGE LANDS AND FISH HATCHERIES

Any activity proposed on lands managed by the [National Wildlife Refuge](#) system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

MIGRATORY BIRDS

Certain birds are protected under the Migratory Bird Treaty Act¹ and the Bald and Golden Eagle Protection Act².

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described [below](#).

-
1. The [Migratory Birds Treaty Act](#) of 1918.
 2. The [Bald and Golden Eagle Protection Act](#) of 1940.
 3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

The birds listed below are birds of particular concern either because they occur on the [USFWS Birds of Conservation Concern](#) (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this

list is generated, see the FAQ [below](#). This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the [E-bird data mapping tool](#) (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found [below](#).

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle <i>Haliaeetus leucocephalus</i> This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds Dec 1 to Aug 31
Black-billed Cuckoo <i>Coccyzus erythrophthalmus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9399	Breeds May 15 to Oct 10
Bobolink <i>Dolichonyx oryzivorus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 20 to Jul 31
Canada Warbler <i>Cardellina canadensis</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 20 to Aug 10
Chimney Swift <i>Chaetura pelagica</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Mar 15 to Aug 25
Golden Eagle <i>Aquila chrysaetos</i> This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1680	Breeds elsewhere
Golden-winged Warbler <i>Vermivora chrysoptera</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/8745	Breeds May 1 to Jul 20

NAME	BREEDING SEASON
Henslow's Sparrow <i>Ammodramus henslowii</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3941	Breeds May 1 to Aug 31
Lesser Yellowlegs <i>Tringa flavipes</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9679	Breeds elsewhere
Red-headed Woodpecker <i>Melanerpes erythrocephalus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Sep 10
Rusty Blackbird <i>Euphagus carolinus</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA	Breeds elsewhere
Wood Thrush <i>Hylocichla mustelina</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 10 to Aug 31

PROBABILITY OF PRESENCE SUMMARY

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence

in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is $0.25/0.25 = 1$; at week 20 it is $0.05/0.25 = 0.2$.

3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

Breeding Season (■)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)

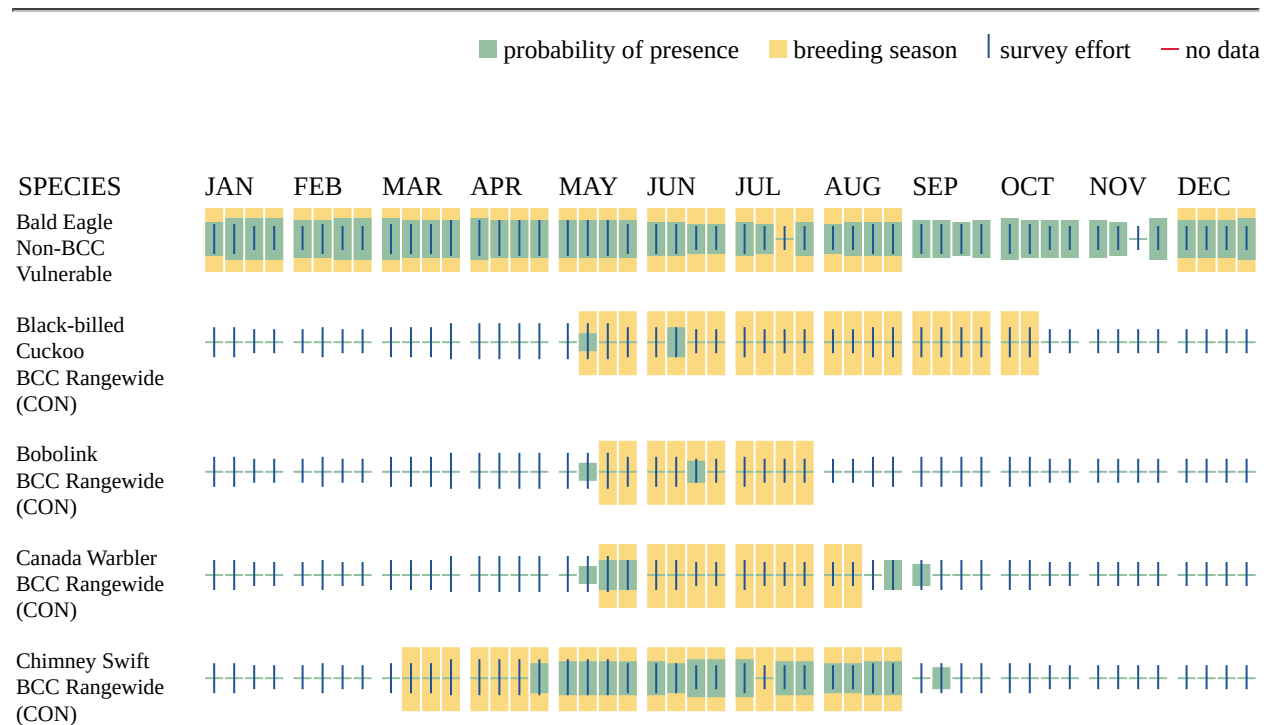
Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

No Data (—)

A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.





Additional information can be found using the following links:

- Birds of Conservation Concern <https://www.fws.gov/program/migratory-birds/species>
- Measures for avoiding and minimizing impacts to birds <https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds>
- Nationwide conservation measures for birds <https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf>

MIGRATORY BIRDS FAQ

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

[Nationwide Conservation Measures](#) describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. [Additional measures](#) or [permits](#) may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of USFWS [Birds of Conservation Concern \(BCC\)](#) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle ([Eagle Act](#) requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the [Rapid Avian Information Locator \(RAIL\) Tool](#).

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the [Avian Knowledge Network \(AKN\)](#). This data is derived from a growing collection of [survey, banding, and citizen science datasets](#).

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the [RAIL Tool](#) and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are [Birds of Conservation Concern](#) (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
 2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
 3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the [Eagle Act](#) requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).
-

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the [Northeast Ocean Data Portal](#). The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the [NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf](#) project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the [Diving Bird Study](#) and the [nanotag studies](#) or contact [Caleb Spiegel](#) or [Pam Loring](#).

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to [obtain a permit](#) to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

WETLANDS

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

THERE ARE NO WETLANDS WITHIN YOUR PROJECT AREA.

IPAC USER CONTACT INFORMATION

Agency: Private Entity
Name: Melissa Barrett
Address: 2500 Shadywood Road
City: Orono
State: MN
Zip: 55331
Email: mlauter62@gmail.com
Phone: 9523883752

Robert Curve 4th & 5th Additions, Inver Grove Heights

Wetland Permit Application

APPENDIX H

FWS NLEB Consistency/Verification Letter



United States Department of the Interior

FISH AND WILDLIFE SERVICE
Minnesota-Wisconsin Ecological Services Field Office
3815 American Blvd East
Bloomington, MN 55425-1659
Phone: (952) 858-0793 Fax: (952) 646-2873



In Reply Refer To:
Project code: 2023-0125307
Project Name: Robert Trail 4th & 5th Addition

September 08, 2023

Federal Nexus: no
Federal Action Agency (if applicable):

Subject: Technical assistance for 'Robert Trail 4th & 5th Addition'

Dear Melissa Barrett:

This letter records your determination using the Information for Planning and Consultation (IPaC) system provided to the U.S. Fish and Wildlife Service (Service) on September 08, 2023, for 'Robert Trail 4th & 5th Addition' (here forward, Project). This project has been assigned Project Code 2023-0125307 and all future correspondence should clearly reference this number. **Please carefully review this letter. Your Endangered Species Act (Act) requirements are not complete.**

Ensuring Accurate Determinations When Using IPaC

The Service developed the IPaC system and associated species' determination keys in accordance with the Endangered Species Act of 1973 (ESA; 87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.) and based on a standing analysis. All information submitted by the Project proponent into IPaC must accurately represent the full scope and details of the Project.

Failure to accurately represent or implement the Project as detailed in IPaC or the Northern Long-eared Bat Rangewide Determination Key (Dkey), invalidates this letter. ***Answers to certain questions in the DKey commit the project proponent to implementation of conservation measures that must be followed for the ESA determination to remain valid.***

Determination for the Northern Long-Eared Bat

Based upon your IPaC submission and a standing analysis, your project is not reasonably certain to cause incidental take of the northern long-eared bat. Unless the Service advises you within 15 days of the date of this letter that your IPaC-assisted determination was incorrect, this letter verifies that the Action is not likely to result in unauthorized take of the northern long-eared bat.

Other Species and Critical Habitat that May be Present in the Action Area

The IPaC-assisted determination for the northern long-eared bat does not apply to the following ESA-protected species and/or critical habitat that also may occur in your Action area:

- Higgins Eye (pearlymussel) *Lampsilis higginsii* Endangered
- Monarch Butterfly *Danaus plexippus* Candidate
- Rusty Patched Bumble Bee *Bombus affinis* Endangered
- Tricolored Bat *Perimyotis subflavus* Proposed Endangered
- Whooping Crane *Grus americana* Experimental Population, Non-Essential

You may coordinate with our Office to determine whether the Action may cause prohibited take of the animal species and/or critical habitat listed above. Note that if a new species is listed that may be affected by the identified action before it is complete, additional review is recommended to ensure compliance with the Endangered Species Act.

Next Steps

Coordination with the Service is complete. This letter serves as technical assistance. All conservation measures should be implemented as proposed. Thank you for considering federally listed species during your project planning.

We are uncertain where the northern long-eared bat occurs on the landscape outside of known locations. Because of the steep declines in the species and vast amount of available and suitable forest habitat, the presence of suitable forest habitat alone is a far less reliable predictor of their presence. Based on the best available information, most suitable habitat is now expected to be unoccupied. During the interim period, while we are working on potential methods to address this uncertainty, we conclude take is not reasonably certain to occur in areas of suitable habitat where presence has not been documented.

If no changes occur with the Project or there are no updates on listed species, no further consultation/coordination for this project is required for the northern long-eared bat. However, the Service recommends that project proponents re-evaluate the Project in IPaC if: 1) the scope, timing, duration, or location of the Project changes (includes any project changes or amendments); 2) new information reveals the Project may impact (positively or negatively) federally listed species or designated critical habitat; or 3) a new species is listed, or critical habitat designated. If any of the above conditions occurs, additional coordination with the Service should take place before project implements any changes which are final or commits additional resources.

If you have any questions regarding this letter or need further assistance, please contact the Minnesota-Wisconsin Ecological Services Field Office and reference Project Code 2023-0125307 associated with this Project.

Action Description

You provided to IPaC the following name and description for the subject Action.

1. Name

Robert Trail 4th & 5th Addition

2. Description

The following description was provided for the project 'Robert Trail 4th & 5th Addition':

Previously disturbed site, ~16 ac, proposed apartment and townhome development, fall 2023.

The approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/@44.805496899999994,-93.10474140137896,14z>



DETERMINATION KEY RESULT

Based on the answers provided, the proposed Action is consistent with a determination of “may affect, but not likely to adversely affect” for the Endangered northern long-eared bat (*Myotis septentrionalis*).

QUALIFICATION INTERVIEW

1. Does the proposed project include, or is it reasonably certain to cause, intentional take of the northern long-eared bat or any other listed species?

Note: Intentional take is defined as take that is the intended result of a project. Intentional take could refer to research, direct species management, surveys, and/or studies that include intentional handling/encountering, harassment, collection, or capturing of any individual of a federally listed threatened, endangered or proposed species?

No

2. Do you have post-white nose syndrome occurrence data that indicates that northern long-eared bats (NLEB) are likely to be present in the action area?

Bat occurrence data may include identification of NLEBs in hibernacula, capture of NLEBs, tracking of NLEBs to roost trees, or confirmed acoustic detections. With this question, we are looking for data that, for some reason, may have not yet been made available to U.S. Fish and Wildlife Service.

No

3. Does any component of the action involve construction or operation of wind turbines?

Note: For federal actions, answer ‘yes’ if the construction or operation of wind power facilities is either (1) part of the federal action or (2) would not occur but for a federal agency action (federal permit, funding, etc.).

No

4. Is the proposed action authorized, permitted, licensed, funded, or being carried out by a Federal agency in whole or in part?

No

PROJECT QUESTIONNAIRE

IPAC USER CONTACT INFORMATION

Agency: Private Entity
Name: Melissa Barrett
Address: 2500 Shadywood Road
City: Orono
State: MN
Zip: 55331
Email: mlauter62@gmail.com
Phone: 9523883752

Robert Curve 4th & 5th Additions, Inver Grove Heights

Wetland Permit Application

APPENDIX I

NLEB Information

TOWNSHIPS CONTAINING DOCUMENTED NORTHERN LONG-EARED BAT (NLEB) MATERNITY ROOST TREES AND/OR HIBERNACULA ENTRANCES IN MINNESOTA

Minnesota DNR/U.S. Fish and Wildlife Service June 7, 2021

- The **federal 4(d) Rule for conserving the northern long-eared bat (*Myotis septentrionalis*; NLEB)** is administered by the U.S. Fish and Wildlife Service (FWS) and **may regulate tree removal or other activities if they are conducted:**
 - **within ¼ mile of an entrance to a known NLEB hibernaculum** (a cave, mine, or other feature in which NLEBs have been documented to overwinter)
 - **within 150 feet of a known NLEB maternity roost tree** (a tree in which a female NLEB has been documented to roost)
- **Learn more about NLEBs, NLEB conservation, the NLEB 4(d) Rule, and how you may be affected by this regulation on the FWS website at <http://www.fws.gov/midwest/endangered/mammals/nleb/4drule.html>.**
- On the FWS website, see especially the “[Instructions for Northern Long-Eared Bat Online 4\(d\) Rule Determination Key](#)”. Use the Online 4(d) Rule Determination Key to determine if your activity is regulated by the 4(d) Rule.
- **If your tree removal or other activity is within a township listed on the following pages, you can determine more precisely where in the township the 4(d) Rule restrictions apply** by requesting from the DNR a data printout or a data license to access additional details on the location of the feature within the township. Find more information on these options at <http://www.dnr.state.mn.us/nhnrp/nhis.html#datarequest>.
- As of June 7, 2021, there are 415 known NLEB maternity roost trees and 28 known entrances to NLEB hibernacula in Minnesota.
- These data are current as of June 7, 2021. An update of this information will be released annually on April 1.
- This document should not be used to determine the distribution of the NLEB in Minnesota, since NLEB surveys in Minnesota are incomplete, and not all known locations of the NLEB were included in preparing the list and map.
- A township that lies within more than one county is listed under every county in which the township lies.

For more information, contact:

Jill Utrup, Fish and Wildlife Biologist
U.S. Fish and Wildlife Service
Twin Cities Ecological Services Field Office
4101 American Blvd E., Bloomington, MN 55425
Jill_Utrup@fws.gov
952-252-0092, e•t. 207

Bridget Henning-Randa, Endangered Species Consultant
Minnesota Department of Natural Resources
Division of Ecological and Water Resources
500 Lafayette Rd., St. Paul, MN 55155
Bridget.Henning-Randa@state.mn.us
651-259-5073

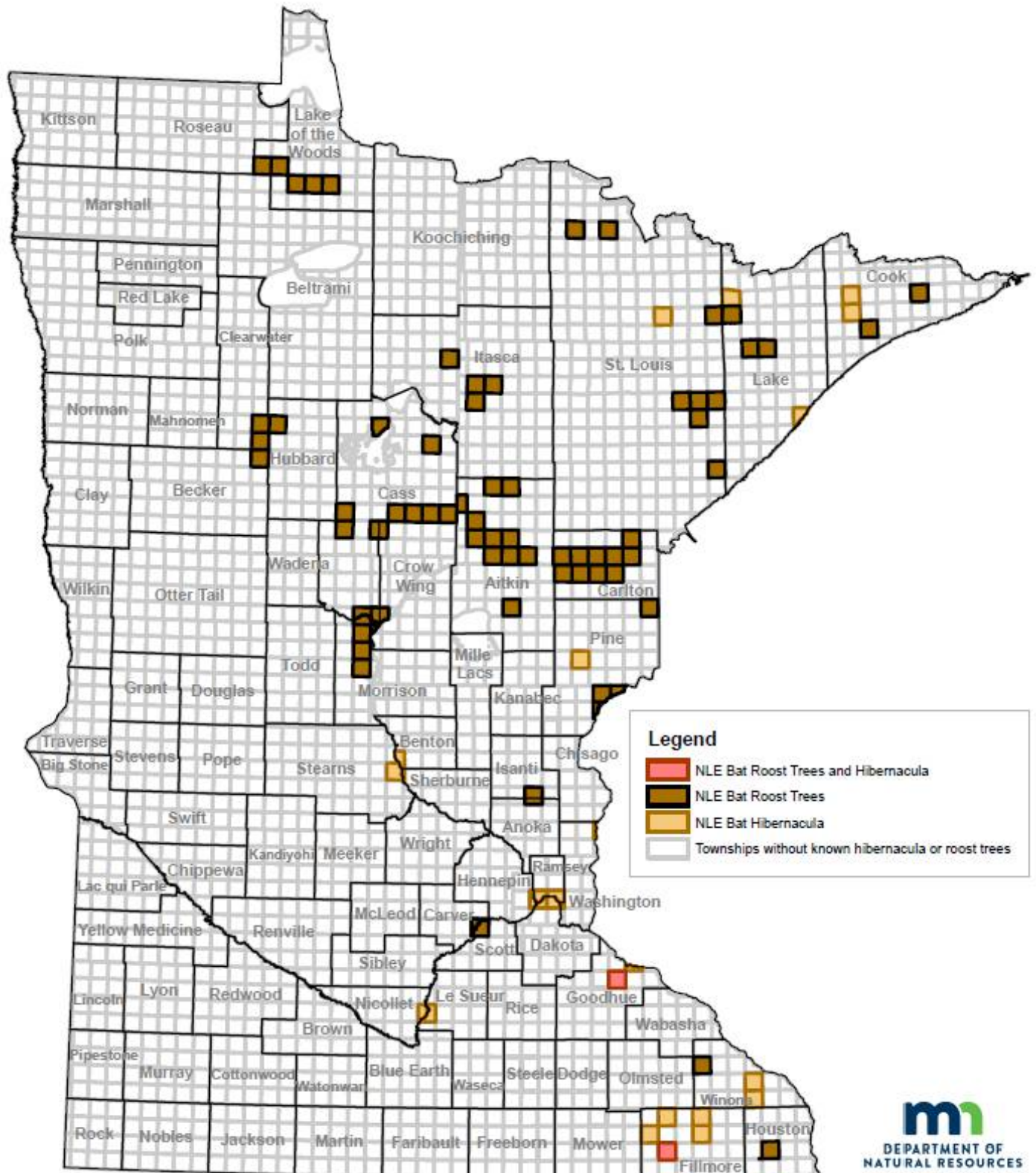
Townships containing documented northern long-eared bat (NLEB) maternity roost trees and/or hibernacula entrances in Minnesota.

County	PLSS Township	Civil Township Name(s) Found	Contains Hibernaculum	Contains Roost Tree
Aitkin	T45N R24W			•
Aitkin	T48N R23W	McGregor		•
Aitkin	T48N R24W	Jevne		•
Aitkin	T48N R25W	Fleming		•
Aitkin	T49N R24W	Workman		•
Aitkin	T49N R25W	Logan		•
Aitkin	T49N R26W	Waukenabo		•
Aitkin	T50N R26W			•
Aitkin	T51N R27W			•
Aitkin	T52N R24W			•
Aitkin	T52N R25W			•
Anoka	T34N R23W	Athens		•
Becker	T142N R36W	Savannah		•
Benton	T36N R31W	Sauk Rapids	•	
Carlton	T47N R18W	Barnum/Mahtowa		•
Carlton	T47N R19W	Skelton		•
Carlton	T47N R20W	Kalevala		•
Carlton	T47N R21W	Automba		•
Carlton	T48N R17W	Twin Lakes		•
Carlton	T48N R18W	Atkinson		•
Carlton	T48N R19W			•
Carlton	T48N R20W	Eagle		•
Carlton	T48N R21W	Lakeview		•
Carlton	T49N R17W			•
Carver	T115N R23W	Jackson/Louisville		•
Cass	T132N R29W	Scandia Valley		•
Cass	T133N R29W	Sylvan/Rosing		•
Cass	T133N R30W	Sylvan/Rosing		•
Cass	T138N R29W	Barclay/Gail Lake		•
Cass	T138N R31W	Bull Moose		•
Cass	T139N R25W	Beulah		•
Cass	T139N R26W	Crooked Lake		•
Cass	T139N R27W	Trelipe		•
Cass	T139N R28W	Blind Lake		•
Cass	T139N R31W	Deerfield		•
Cass	T143N R26W	Salem		•
Cass	T144N R29W	Otter Tail Peninsula		•
Clearwater	T143N R36W			•
Clearwater	T144N R36W	Itasca		•
Cook	T61N R3W	Lutsen		•
Cook	T62N R4W	Tofte	•	
Cook	T63N R1E			•
Cook	T63N R4W		•	
Crow Wing	T133N R29W	Sylvan/Rosing		•
Crow Wing	T138N R29W	Barclay/Gail Lake		•

County	PLSS Township	Civil Township Name(s) Found	Contains Hibernaculum	Contains Roost Tree
Dakota	T28N R22W		•	
Dakota	T28N R23W		•	
Fillmore	T102N R12W	Forestville	•	•
Fillmore	T103N R10W	Carrolton	•	
Fillmore	T103N R13W	Spring Valley	•	
Fillmore	T104N R10W	Pilot Mound	•	
Fillmore	T104N R12W	Jordan	•	
Fillmore	T105N R7W	Wiscoy	•	
Goodhue	T112N R15W	Featherstone	•	•
Goodhue	T113N R14W	Wacouta	•	
Hennepin	T28N R23W		•	
Houston	T102N R6W	Caledonia		•
Hubbard	T144N R35W	Lake Hattie		•
Isanti	T34N R23W	Athens		•
Itasca	T148N R25W	Lake Jessie		•
Itasca	T57N R26W			•
Itasca	T58N R25W	Balsam		•
Itasca	T58N R26W			•
Lake	T56N R7W	Beaver Bay	•	
Lake	T60N R10W	Stony River		•
Lake	T60N R9W	Stony River		•
Lake	T62N R11W	Fall Lake		•
Lake	T63N R11W	Fall Lake	•	
Lake of the Woods	T158N R32W			•
Lake of the Woods	T158N R33W			•
Lake of the Woods	T158N R34W			•
Lake of the Woods	T159N R35W			•
Lake of the Woods	T159N R36W			•
Le Sueur	T110N R26W	Kasota/Oshawa/Traverse	•	
Morrison	T130N R30W	Darling		•
Morrison	T131N R30W	Cushing		•
Morrison	T132N R29W	Scandia Valley		•
Morrison	T132N R30W	Scandia Valley		•
Morrison	T133N R29W	Sylvan/Rosing		•
Morrison	T133N R30W	Sylvan/Rosing		•
Nicollet	T110N R26W	Kasota/Oshawa/Traverse	•	
Pine	T39N R19W	Chengwatana		•
Pine	T40N R18W	Crosby		•
Pine	T40N R19W	Crosby/Munch		•
Pine	T42N R20W	Dell Grove/Sandstone	•	
Pine	T45N R16W	Nickerson		•
Ramsey	T28N R22W		•	
Ramsey	T28N R23W		•	
Scott	T115N R23W	Jackson/Louisville		•
Sherburne	T35N R31W		•	
Stearns	T124N R28W		•	
St. Louis	T53N R12W	Alden		•
St. Louis	T56N R13W	Fairbanks		•
St. Louis	T57N R12W	Bassett		•

County	PLSS Township	Civil Township Name(s) Found	Contains Hibernaculum	Contains Roost Tree
St. Louis	T57N R13W	Bassett		•
St. Louis	T57N R14W			•
St. Louis	T62N R12W	Morse		•
St. Louis	T62N R15W	Breitung	•	
St. Louis	T67N R18W			•
St. Louis	T67N R20W			•
Washington	T28N R22W		•	
Washington	T32N R19W		•	
Winona	T106N R7W	Wilson	•	
Winona	T107N R10W	Elba		•

TOWNSHIPS CONTAINING DOCUMENTED NORTHERN LONG-EARED BAT MATERNITY ROOST TREES AND/OR HIBERNACULA ENTRANCES



Robert Curve 4th & 5th Additions, Inver Grove Heights

Wetland Permit Application

APPENDIX J

FWS ESA Consistency/Verification Letter



United States Department of the Interior

FISH AND WILDLIFE SERVICE
Minnesota-Wisconsin Ecological Services Field Office
3815 American Blvd East
Bloomington, MN 55425-1659
Phone: (952) 858-0793 Fax: (952) 646-2873



In Reply Refer To:
Project code: 2023-0125307
Project Name: Robert Trail 4th & 5th Addition

September 08, 2023

Subject: Consistency letter for 'Robert Trail 4th & 5th Addition' for specified threatened and endangered species that may occur in your proposed project location consistent with the Minnesota-Wisconsin Endangered Species Determination Key (Minnesota-Wisconsin DKey).

Dear Melissa Barrett:

The U.S. Fish and Wildlife Service (Service) received on **September 08, 2023** your effect determination(s) for the 'Robert Trail 4th & 5th Addition' (Action) using the Minnesota-Wisconsin DKey within the Information for Planning and Consultation (IPaC) system. You have submitted this key to satisfy requirements under Section 7(a)(2). The Service developed this system in accordance of with the Endangered Species Act of 1973 (ESA) (87 Stat. 884, as amended; 16 U.S.C 1531 et seq.).

Based on your answers and the assistance of the Service's Minnesota-Wisconsin DKey, you made the following effect determination(s) for the proposed Action:

Species	Listing Status	Determination
Higgins Eye (pearlymussel) (<i>Lampsilis higginsii</i>)	Endangered	No effect
Monarch Butterfly (<i>Danaus plexippus</i>)	Candidate	No effect
Rusty Patched Bumble Bee (<i>Bombus affinis</i>)	Endangered	No effect
Tricolored Bat (<i>Perimyotis subflavus</i>)	Proposed	No effect
	Endangered	
Whooping Crane (<i>Grus americana</i>)	Experimental	No effect
	Population, Non-Essential	

Determination Information

Thank you for informing the Service of your "No Effect" determination(s). No further coordination is necessary for the species you determined will not be affected by the Action.

Additional Information

Sufficient project details: Please provide sufficient project details on your project homepage in IPaC (Define Project, Project Description) to support your conclusions. Failure to disclose important aspects of your project that would influence the outcome of your effects determinations may negate your determinations and invalidate this letter. If you have site-specific information that leads you to believe a different determination is more appropriate for your project than what the Dkey concludes, you can and should proceed based on the best available information.

Future project changes: The Service recommends that you contact the Minnesota-Wisconsin Ecological Services Field Office or re-evaluate the project in IPaC if: 1) the scope or location of the proposed Action is changed; 2) new information reveals that the action may affect listed species or designated critical habitat in a manner or to an extent not previously considered; 3) the Action is modified in a manner that causes effects to listed species or designated critical habitat; or 4) a new species is listed or critical habitat designated. If any of the above conditions occurs, additional consultation with the Service should take place before project changes are final or resources committed.

Species-specific information

Freshwater Mussels: Freshwater mussels are one of the most critically imperiled groups of organisms in the world. In North America, 65% of the remaining 300 species are vulnerable to extinction (Haag and Williams 2014). Implementing measures to conserve and restore freshwater mussel populations directly improves water quality in lakes, rivers, and streams throughout Minnesota and Wisconsin. An adult freshwater mussel filters anywhere from 1 to 38 gallons of water per day (Baker and Levinton 2003, Barnhart pers. comm. 2019). A 2015 survey found that in some areas, mussels can reduce the bacterial populations by more than 85% (Othman et al. 2015 in Vaughn 2017). Mussels are also considered to be ecosystem engineers by stabilizing substrate and providing habitat for other aquatic organisms (Vaughn 2017). In addition to ecosystem services, mussels play an important role in the food web, contributing critical nutrients to both terrestrial and aquatic habitats, including those that support sport fish (Vaughn 2017). Taking proactive measures to conserve and restore freshwater mussels will improve water quality, which has the potential to positively impact human health and recreation in the States of Minnesota and Wisconsin.

You have indicated that your Action will have no effect (NE) on Federally listed mussel species. However, state-listed mussels may occur in your Action area. Contact the Minnesota or Wisconsin Department of Natural Resources to determine effects to state-listed mussels.

Bald and Golden Eagles: Bald eagles, golden eagles, and their nests are protected under the Bald and Golden Eagle Protection Act (54 Stat. 250, as amended, 16 U.S.C. 668a-d) (Eagle Act). The Eagle Act prohibits, except when authorized by an Eagle Act permit, the “taking” of bald and golden eagles and defines “take” as “pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, molest or disturb.” The Eagle Act’s implementing regulations define disturb as “... to agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the best scientific information available, (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior.”

If you observe a bald eagle nest in the vicinity of your proposed project, you should follow the National Bald Eagle Management Guidelines (May 2007). For more information on eagles and conducting activities in the vicinity of an eagle nest, please visit our regional eagle website or contact Margaret at Margaret_Rheude@fws.gov. **If the Action may affect bald or golden eagles, additional coordination with the Service under the Eagle Act may be required.**

The following species and/or critical habitats may also occur in your project area and **are not** covered by this conclusion:

- Northern Long-eared Bat *Myotis septentrionalis* Endangered

Coordination with the Service is not complete if additional coordination is advised above for any species.

QUALIFICATION INTERVIEW

1. This determination key is intended to assist the user in evaluating the effects of their actions on Federally listed species in Minnesota and Wisconsin. It does not cover other prohibited activities under the Endangered Species Act (e.g., for wildlife: import/export, Interstate or foreign commerce, possession of illegally taken wildlife, etc.; for plants: import/export, reduce to possession, malicious destruction on Federal lands, commercial sale, etc.) or other statutes. Additionally, this key DOES NOT cover wind development, purposeful take (e.g., for research or surveys), communication towers that have guy wires or are over 450 feet in height, aerial or other large-scale application of any chemical (such as insecticide or herbicide), and approval of long-term permits or plans (e.g., FERC licenses, HCP's).

Click **YES** to acknowledge that you must consider other prohibitions of the ESA or other statutes outside of this determination key.

Yes

2. Is the action being funded, authorized, or carried out by a Federal agency?

No

3. Are you the Federal agency or designated non-federal representative?

Yes

4. Does the action involve the installation or operation of wind turbines?

No

5. Does the action involve purposeful take of a listed animal?

No

6. Does the action involve a new communications tower?

No

7. Does the activity involve aerial or other large-scale application of ANY chemical, including pesticides (insecticide, herbicide, fungicide, rodenticide, etc)?

No

8. Does the action occur near a bald eagle nest?

Note: Contact the Minnesota or Wisconsin Department of Natural Resources for an up-to-date list of known bald eagle nests.

No

9. Will your action permanently affect local hydrology?

No

10. Will your action temporarily affect local hydrology?

No

11. Will your project have any direct impacts to a stream or river (e.g., Horizontal Directional Drilling (HDD), hydrostatic testing, stream/road crossings, new stormwater outfall discharge, dams, other in-stream work, etc.)?

No

12. Does your project have the potential to impact the riparian zone or indirectly impact a stream/river (e.g., cut and fill; horizontal directional drilling; construction; vegetation removal; pesticide or fertilizer application; discharge; runoff of sediment or pollutants; increase in erosion, etc.)?

Note: Consider all potential effects of the action, including those that may happen later in time and outside and downstream of the immediate area involved in the action.

Endangered Species Act regulation defines "effects of the action" to include all consequences to listed species or critical habitat that are caused by the proposed action, including the consequences of other activities that are caused by the proposed action. A consequence is caused by the proposed action if it would not occur but for the proposed action and it is reasonably certain to occur. Effects of the action may occur later in time and may include consequences occurring outside the immediate area involved in the action. (50 CFR 402.02).

No

13. Will your action disturb the ground or existing vegetation?

Note: This includes any off-road vehicle access, soil compaction (enough to collapse a rodent burrow), digging, seismic survey, directional drilling, heavy equipment, grading, trenching, placement of fill, pesticide application (herbicide, fungicide), vegetation management (including removal or maintenance using equipment or prescribed fire), cultivation, development, etc.

Yes

14. Will your action include spraying insecticides?

No

15. Does your action area occur entirely within an already developed area?

Note: Already developed areas are already paved, covered by existing structures, manicured lawns, industrial sites, or cultivated cropland, AND do not contain trees that could be roosting habitat. Be aware that listed species may occur in areas with natural, or semi-natural, vegetation immediately adjacent to existing utilities (e.g. roadways, railways) or within utility rights-of-way such as overhead transmission line corridors, and can utilize suitable trees, bridges, or culverts for roosting even in urban dominated landscapes (so these are not considered "already developed areas" for the purposes of this question). If unsure, select NO..

Yes

16. Does the action have potential indirect effects to listed species or the habitats they depend on (e.g., water discharge into adjacent habitat or waterbody, changes in groundwater elevation, introduction of an exotic plant species)?

No

17. [Hidden Semantic] Does the action area intersect the monarch butterfly species list area?

Automatically answered

Yes

18. [Hidden semantic] Does the action intersect the Tricolored bat species list area?

Automatically answered

Yes

IPAC USER CONTACT INFORMATION

Agency: Private Entity
Name: Melissa Barrett
Address: 2500 Shadywood Road
City: Orono
State: MN
Zip: 55331
Email: mlauter62@gmail.com
Phone: 9523883752



Environmental Advisory Commission Staff Report

SUBJECT: **City Comments on Pine Bend Landfill's Environmental Assessment Worksheet and Air Quality Permit for 2022 Request for Major Modification of Permit #SW-45.**

MEETING DATE: November 16, 2023

ITEM TYPE: Regular Agenda

CONTACT: Ally Sutherland, Environmental Specialist, 651.604.8511

PURPOSE/ACTION REQUESTED

The Environmental Advisory Commission is asked to consider recommending City Council approval of submission of the City's comments on Pine Bend Landfill's Environmental Assessment Worksheet and Air Quality Permit for 2022 Request for Major Modification of Permit #SW-45.

BACKGROUND

Pine Bend Landfill (PBL), operated by BFI Waste Systems of North America LLC (BFI), is a Municipal Solid Waste (MSW) landfill located at 2495 117th St E in Inver Grove Heights. Pine Bend Landfill remains one of the largest mixed municipal solid waste landfills within the Twin Cities Metro Area (TCMA), resulting in disposal of several hundred thousand tons of regional waste in Inver Grove Heights annually. Although landfilling is designated as the State of Minnesota's least favorable solid waste disposal method, the [draft Metropolitan Solid Waste Policy Plan 2022–2042](#) confirms that landfilling will remain a necessary form of disposal for TCMA waste through 2042. In 2021, Pine Bend Landfill received [the largest allocation of preliminary TCMA certificate of need \(CON\)](#) from the State of Minnesota Pollution Control Agency (MPCA) in the amount of 2.39 million tons for additional MSW disposal capacity. Acceptance of this additional waste would require the landfill to vertically expand and extend the approved duration to operate.

The landfill is currently operating under existing permits and approvals issued by the MPCA, Metropolitan Council Environmental Services (MCES), Dakota County and the City of Inver Grove Heights. In 2022, BFI submitted a Request for Major Modification of Permit #SW-45 for Pine Bend Landfill to the MPCA. This request details a vertical expansion proposed to raise the permitted peak elevation of the landfill. The landfill is currently permitted by the MPCA for 33.93 million cubic yards of airspace and is now requesting an additional 8.2 million cubic yards. This additional airspace would raise the height of the landfill by 85 feet at the highest point and extend the life of the landfill to approximately 2042, which is approximately 12 years past the City's existing agreements with BFI.

Requesting a proposed vertical expansion requires BFI to complete a number of tasks. The tasks and public meetings related to the proposed expansion are summarized with their current status in the table below. This agenda item is related to Tasks 3 and 4 bolded in the table below.

Task	Status
1. PBL submits a Request for Major Modification of Permit #SW-45 to the MPCA.	Completed
2. City Public Meetings: Environmental Advisory Commission (EAC) & City Council meetings to consider submittal of the City's comments's on PBL's 2022 Request for Major Modification of Permit #SW-45 to the MPCA.	Oct. 26 (EAC) & Nov. 13 (CC).
3. State of Minnesota's Environmental Quality Board publishes a 45-day public notice and request for comment on PBL's 2022 Environmental Assessment Worksheet (EAW) application and Air Quality Permit (AQP).	Opened Oct. 31. Ends Dec.15, 2023.
4. City Public Meeting: EAC & City Council meetings to consider submittal of the City's comments on PBL's 2022 EAW and AQP applications to the MPCA	Nov. 16 (EAC) & Nov. 27 (CC)
5.. MPCA Public Meeting: MPCA Public meeting for PBL's EAW & AQP applications.	Nov. 30, 5:30-7 p.m., at Woodcrest Church, 525 Cliff Road, Eagan
6. PBL receives determination for EAW and AQP permit applications.	Not initiated.
7. PBL submits expansion request to the City including a Zoning Code Amendment, Conditional Use Permit Amendment, Non-Conforming Use Certificate Amendment, and Host Community Agreement Amendment.	Not initiated.
8. City Public Meetings: Will be held to review proposed PBL applications submitted to the City.	Not initiated.
9. PBL receives determination for City agreement amendments.	Not initiated.
10. PBL submits expansion request to Dakota County to amend existing County agreements.	Not initiated.
11. PBL receives determination for County agreement amendments.	Not initiated.
12. State of Minnesota's Environmental Quality Board publishes a public notice and request for comments on PBL's 2022 Request for Major Modification of Permit #SW-45 to the MPCA.	Not initiated.
13. PBL receives determination on the Request for Major Modification of Permit Number SW-45 for Pine Bend Landfill from the MPCA.	Not Initiated.

The City has hired Barr Engineering Co. (Barr) to review Pine Bend Landfill's Environmental Assessment Worksheet and Air Quality Permit for the 2022 Request for Major Modification of Permit #SW-45. The EAW is a brief document designed to lay out the basic facts of a project necessary to determine if an Environmental Impact Statement (EIS) is required for the proposed project. The EAW also provides permit information, informs the public about the project, and helps identify ways to protect the environment. The EAW is not meant to approve or deny a project, but instead act as a source of information to guide other approvals and permitting decisions. The EAW process involves four major steps:

- Step 1. The project proposer supplies all necessary data to the Responsible Governmental Unit (RGU). For this project, the MPCA is the RGU.
- Step 2. The RGU prepares the EAW
- Step 3. The EAW is distributed with public notice of its availability for review and public comment.
- Step 4. The RGU responds to the comments received and makes a decision on the need for an EIS. The RGU and other units of government may require modifications to the project as part of their permits to mitigate environmental impacts as disclosed through the EAW process.

Barr has completed a technical review of the EAW and AQP. The review includes requests to fix discrepancies or errors, provide clarification or supplemental documentation, and revise or complete additional technical analysis. The City's comments will be submitted to the MPCA upon City Council approval.

Per the table above, the City anticipates receiving an expansion request application from BFI for amendments to the Conditional Use Permit, Non-Conforming Use Certificate, Zoning Ordinance, and Host Community Agreement for this proposed project. It is the City's understanding that the MPCA will not reissue the solid waste permit until both City and County approvals are received.

FISCAL IMPACT

This item is budget neutral for the City.

RECOMMENDATION

Staff recommend approving submission of the City's comments Pine Bend Landfill's Environmental Assessment Worksheet and Air Quality Permit for 2022 Request for Major Modification of Permit #SW-45.

ATTACHMENTS

1. EAW Comments
2. AQP Comments
3. EAW
4. AQP

November XX, 2023

Ms. Megen Kabele
Planner Principal
Resource Management and Assistance Division
Minnesota Pollution Control Agency
520 Lafayette Road North
St Paul, MN 55155

Re: Pine Bend Landfill Phase 7 Vertical Expansion Project - Review of Environmental Assessment Worksheet (EAW)

Dear Ms. Kabele:

This letter provides the City of Inver Grove Heights' comments on the EAW for the Pine Bend Landfill (PBL) Phase 7 Vertical Expansion Project (Project) that was published for public review on October 31, 2023 in the Environmental Quality Board Monitor. The Project proposes an airspace capacity expansion over the existing landfill footprint by raising the permitted peak elevation and extending the existing 3:1 (horizontal : vertical) side slopes. This vertical expansion is designated as Phase 7.

These comments were developed by Barr Engineering Co. (Barr). The City requests that the MPCA consider incorporation of these recommendations into the final EAW. These recommendations will also be shared with Pine Bend Landfill and Dakota County.

The City requests that the MPCA respond to this letter and address the comments detailed below. The City also recommends that PBL identify and provide environmental benefits to offset potential negative environmental impacts from the proposed expansion.

As detailed in comments #20-#22 below, it should be noted that PBL will need to obtain approvals from the City of Inver Grove Heights to allow the proposed expansion in the form of amendments to the Conditional Use Permit, Non-Conforming Use Certificate, Zoning Ordinance, and a Host Community Agreement. The EAW should be clear that the proposed expansion is not currently approved by the City of Inver Grove Heights. It is the City's understanding is that the MPCA will not reissue the solid waste permit until these City approvals are complete.

The City believes the following are the most significant potential environmental impacts relating to the existing landfill and proposed expansion. Please address the following:

1. **Subsurface gas migration near or beyond the property line:** While the EAW discusses existing subsurface gas migration, it does not address how the proposed expansion

would affect that. The EAW should address if and how the proposed expansion would affect subsurface gas migration.

2. **Groundwater contamination, including concentrations exceeding some Intervention Limits listed in the MPCA's Solid Waste Permit.** These include some metals, VOCs, and PFAS. While the EAW addresses existing groundwater contamination, it does not address how the proposed expansion would affect that. The EAW should describe if and how the proposed expansion would affect groundwater contamination.
3. **Expansion Visual, Page 58:** Because PBL is currently visible from some of the nearby residences and PBL is proposing to significantly increase the landfill height (85 feet), we believe that 3D visualization modeling figures are imperative to show the existing, currently permitted, and proposed conditions from various locations near PBL (including the residential area to the north) to fully evaluate the visual effects of the proposed expansion. Please provide.
4. **Wildlife impacts:** Although the footprint will not change, will birds be more attracted to the proposed increased landfill height? If so, how will wildlife be deterred from the site? Please address this issue.
5. **Public nuisance:** The effects on odor, litter, dust, and noise expected from the proposed increased height of the landfill should be evaluated in the EAW. Will odor, dust, and noise carry further than is occurring with the existing landfill? Please evaluate this.

The City has additional technical recommendations on the EAW. Please address the following:

6. Page 6, Table 1 Historical Leachate Collection Data. Years 2017 through 2020 do not match the number of gallons of leachate found in PBL's annual reports. Please correct or explain.
7. Page 6, Final Cover Design. The third sentence indicates that "This design provides for increased capacity without increasing site footprint or elevations..." This is incorrect, elevation will be increased. Please correct.
8. Page 7, Peak Run-off. The last sentence referring to the 100-year high water level appears to be referring to the stormwater ponds. Please clarify this sentence.
9. Page 8, Bend and Drainage Swale Design. The last sentence, "Runoff contained during..." is not a complete sentence. What is intended here? Please correct.
10. Page 8, Junction Vaults. The paragraph indicates that downslope piping is on the northeast corner of the permitted design, but the last word indicates it is on the northwest. Please correct or explain.
11. Page 9, Landfill Gas Management. PBL has done significant work to try to resolve the migration of subsurface gas near or beyond the property boundary. Please include a summary of this work.
12. Page 9, Landfill Gas Management, Background. Second paragraph, last sentence reads, "The Facility has an MPCA-approved gas collection and monitoring system to meet regulatory standard and to address concerns with migration of combustible gas."

Although PBL has been trying to resolve this problem for years, this sentence is misleading because subsurface landfill gas is migrating near or beyond the property boundary at concentrations above the LEL, so the regulatory standard is not being met. Please correct.

13. Page 9, Landfill Gas Management, Existing and Future Extraction Wells. The middle of the first paragraph indicates that the annular space between the outer pipe and the well casing will be sealed. However, the gas well design (Appendix B, Sheet 14) does not appear to have inner and outer pipes. Please correct or explain.
14. Page 10, Landfill Gas Management, Renewable Natural Gas Pipeline and RNG Facility. The first paragraph, second to last sentence indicates that the facility is "preliminary", but we understand that the RNG facility is in operation. Please correct or explain.
15. Page 10, Landfill Gas Management, Renewable Natural Gas Pipeline and RNG Facility. The first paragraph, last sentence reads "The meter station in the northwest portion of the site will be the start of the pipeline that is the subject of this Application." What "Application" is being referred to here. Please correct or explain.
16. Page 11, Phased Closures, the second sentence reads "Prior to final closure and installing the final cover system, I waste fill surface..." What is meant by this sentence. Please correct or explain.
17. Page 11, Phased Closures, Significant demolition, removal, or remodeling of existing structures. It is stated that there will be no demolition, removal, or remodeling of existing structures, however, we understand that the administration building, scale, and related structures will need to be relocated prior to constructing Cell F-2. Please explain or correct.
18. Pages 18 and 19 indicate that the U.S. EPA's Climate Resilience Evaluation and Awareness Tool (CREAT) was reviewed to evaluate storm intensification for the local area. The evaluation indicated that the "Stormy" scenario, the highest intensity model, projects the 100-year storm to increase 13.7 percent in 2035 and 26.6 percent in 2060 for the local area. We understand that the stormwater management infrastructure is based on the NOAA Atlas 14, 100-year, 24-hour storm event of 7.43 inches but it appears that the design should be based on a larger storm event as predicted by CREAT. Please explain.
19. Page 36, first paragraph and table 7 indicate that the Project will convert 89 acres from "Other (active landfill)" to "Lawn/landscaping, Final cover will be vegetated". Although this is accurate, please clarify that this conversion of cover types will occur with or without the proposed vertical expansion Project. Also clarify that this Project will delay when this cover conversion takes place.
20. Page 37, Table 10 Permits and Approvals. The table indicates that a Conditional Use Permi application is required to be submitted to the City of Inver Grove Heights, however, the applicant will also be required to submit an application for amendments to the Non-Conforming Use Certificate, Zoning Ordinance, and Host Community Agreement. Please add these to the table.

21. Page 39, Section 10.b. first paragraph. The third sentence is incorrect, PBL will have to request a City zoning ordinance amendment. Please correct.
22. Page 39, Section 10.b, second paragraph, second sentences reads, "Therefore, the Project is allowable through a Conditional Use Permit ("CUP"). However, the Project is not currently "allowable", and the EAW should made clear that the City of Inver Grove Heights would need to go through a public process prior to any approvals. Please correct.
23. Page 44, Section ii, Groundwater, fourth sentence reads in part, "If the Proposer observes groundwater quality impacts during monitoring, they will closely coordinate with the MPCA to develop appropriate actions..." The use of the word "If" is misleading because there are decades of groundwater data indicating that PBL has negatively impacted downgradient groundwater quality. Please explain or correct.
24. Page 44, Section ii, Groundwater, does not include the Minnesota Department of Health Special Well Construction Area ([Inver Grove Heights \(Pine Bend Area\) Special Well and Boring Construction Area - MN Dept. of Health \(state.mn.us\)](#)) located east (downgradient) from PBL. Please include a description and figure of this area or explain.
25. Page 44, Groundwater, Onsite and/or nearby wells. The second sentence indicates that the majority of public supply wells are east of the Project Area. However, it appears that only one public supply well is shown on Figure 10. Please add a figure showing a larger area where more public supply wells may be present or explain.
26. Page 44, Groundwater, Table 13 MDH Wells within Pine Bend Landfill. Not all of PBL's monitoring wells are listed in this table including wells 11A, 15, 23, and others. Please correct or explain.
27. Page 44, Groundwater, Table 13. Some wells are listed as "Monitoring Well", and some are listed as "Test Well". Please add a definition of what these designations mean.
28. Page 46, Perfluoroalkyl substance analysis. The first sentence indicates that the July 2022 sampling event analysis is in Appendix D. It does not appear that these analyses are in Appendix D. Please correct or explain.
29. Page 46, Perfluoroalkyl substance analysis. The second paragraph references the PFASs that have limits listed in the May 31, 2019 Solid Waste Permit. However, perfluorohexane sulfonate has an intervention limit of 0.01175 µg/L in the Solid Waste Permit but this is not included in the paragraph. Please correct or explain.
30. Page 46, Perfluoroalkyl substance analysis. The second paragraph indicates that PFASs were detected above the limits in the May 31, 2019 Solid Waste Permit in 12 wells. However, the 2022 Annual Report indicates PFAS intervention limits were exceeded in 15 wells. Please correct or explain.
31. Page 51, Section 14, see comment #4, requesting affects on wildlife.
32. Page 51, Section 14. The harm to bald eagles that occurred in Inver Grove Heights in 2022 is still under investigation. If the investigation concludes that the harm was caused by the eagles having access to waste in Pine Bend Landfill, what will Pine Bend Landfill do to deter wildlife access to the waste? This should be addressed in the EAW.

33. Page 58, Visual. This section refers to the "Rich Valley Landfill", but for clarification and in accordance with Figure 11 this facility should be referred to as the "SKB Rich Valley Landfill". Please correct.
34. Page 58 Visual. See comment #3, requesting 3D visualization modeling.
35. Page 61 Air. Vehicle emissions. The EAW states that the facility "currently accepts approximately 160 refuse trucks per day". However, the MPCA's workbooks supporting the RNG minor amendment project and the Title V permit reissuance both report 131 vehicles/day. We suspect that the workbooks may be in error and that the 131 vehicles/day may actually be 131 vehicle miles traveled/day because the workbooks report 47,815 vehicle miles traveled/year which is 365 times 131. Please correct or explain.
36. Pages 62 and 63, Greenhouse Gas (GHG) Emission/Carbon Footprint. The GHG emissions reported in Tables 16 and 17 of the EAW match those in Appendix A of the GHG Assessment Report (attached as Appendix H to the EAW). However, we suspect that the units of the values reported in the tables should be tons/yr, not Mtons/yr. Appendix A, in turn, references the calculations in Appendix B of the GHG Assessment Report. However, the CO₂e emissions reported in Appendix B do not match those in Appendix A. Please correct or explain.
37. Page 66, Conformance to State Noise Standards - Construction Noise. The discussion notes that the city construction ordinance prohibits construction activity 10pm to 7am weekdays, and then notes the construction will follow a 6am to 4pm operations schedule. This appears to indicate that construction will not comply with the city construction ordinance. Please correct or explain.
38. Page 66, Quality of Life. Text notes "No construction or operation hours would occur during nighttime hours" Nighttime in noise regulation runs from 10pm to 7am. This is inconsistent with the proposed construction and operating hours of 6am to 4pm indicated in the preceding paragraph. Please correct or explain.
39. Page 69, Water Resources, Groundwater. First paragraph, fifth sentence reads in part, "If groundwater impacts are identified..." The use of the word "If" is misleading because there are decades of groundwater data indicating that PBL has negatively impacted downgradient groundwater quality. Please explain or correct.
40. Appendix B. Drawings 3, 4, and 5 are missing from the EAW published to the EQB monitor compared to the EAW published on the MPCA website. Please include or explain.
41. Appendix B through Appendix H. The flow of supplemental natural gas to the thermal oxidizer is reported as 160 scfm pre-project and 180 scfm post-project while the GHG emissions are reported to be identical for both pre- and post-project. We believe 160 scfm is correct. Please correct or explain.

Thank you for the opportunity to provide comments and recommendations on the EAW. The City appreciates your consideration of the recommendations and looks forward to your reply.

If the MPCA has any questions, please contact City of Inver Grove Heights Environmental Specialist Ally Sutherland at 651-604-8511 or asutherland@ighmn.gov.

Sincerely,

CITY OF INVER GROVE HEIGHTS

c: Ally Sutherland, City of Inver Grove Heights
Abdi Hassan, MPCA
Tyler Kraft, Republic Services
Aaron Janusz, Republic Services
Tom Shustarich, Stantec Consulting Services Inc.
Erin Sejkora, Stantec Consulting Services Inc.
Terry Muller, Dakota County
Dave Magnuson, Dakota County
Jeff Ubl, Barr Engineering Co.
Bryan Pitterle, Barr Engineering Co.
Paul Taylor, Barr Engineering Co.

November XX, 2023

Ms. Joy Wiecks
Air Permits Section
Industrial Division
Minnesota Pollution Control Agency
525 Lake Ave S., Suite 400
Duluth, MN 55802

Re: City of Inver Grove Heights' Review of Pine Bend Landfill's Draft Air Quality Permit 03700138-101

Dear Ms. Wiecks:

This letter provides the City of Inver Grove Heights' comments resulting from a review of the Draft Air Quality Permit for Pine Bend Landfill (PBL) that was placed on public notice on October 31, 2023, as permit number 03700138-101.

The draft permit is for a Part 70 permit reissuance and incorporates three minor amendments and one administrative amendment. One minor amendment was for installation of a diesel fired tipper on the working face of the landfill to assist in unloading waste that arrives in large semi-trucks. The second minor amendment allowed installation of the RNG treatment system, along with a thermal oxidizer and open flare. The third minor amendment increased the landfill's capacity. The administrative amendment requested that the facility's name be changed from Pine Bend Energy, LLC to Pine Bend RNG, LLC.

These comments were developed by Barr Engineering Co. (Barr). The City requests that the MPCA consider incorporation of these recommendations into the MPCA air quality permit process. These recommendations will also be shared with Pine Bend Landfill and Dakota County. In addition to the October 31, 2023 draft air quality permit, other information used as part of the City's review included:

- The "Technical Support Document for Draft Air Emission Permit No. 03700138-101" (TSD) prepared by the MPCA and placed on public notice along with the draft permit.
- Workbooks "RNG Post Modification PTE.xlsx", "MPCA landfill expansion calcs.xlsx" and "Title 5 calcs.xlsx", provided by you on November 2, 2023.

The City has the following technical comments. Please address the following:

1. The Facility Description (Section 3 of the draft permit and Section 1.2 of the TSD) states that the Pine Bend Landfill (PBL) is owned and operated by BFI Waste Systems of North America, while the RNG Plant is owned and operated by Pine Bend RNG, LLC (PBR). As such, we would expect one of these entities to be listed as the Permittee and the other as

the Co-permittee on page 1 of the draft permit. Instead, Pine Bend RNG, LLC is listed as both.

2. The administrative amendment, received by the MPCA on December 15, 2020, requested that the facility's name be changed from Pine Bend Energy, LLC to Pine Bend RNG, LLC. However, page 1 of the draft permit lists the Facility name as Pine Bend Landfill.
3. In Section 4 of the draft permit:
 - 3.1 It appears that EQUI 26 (Combustion temp sensor) has been assigned to both TREA 6 (Open Flare) and TREA 7 (Low-BTU Gas Flare). Since these are likely to be two separate sensors, we would expect a different EQUI number to be assigned to the Combustion temp sensor for TREA 7.
 - 3.2 TREA 7 (Low-BTU Gas Flare) is listed as being monitored by EQUIs 24, 26 and 28, but we suspect that this should be EQUI 25 and the new EQUI that corresponds to the second occurrence of EQUI 26 discussed in 3.1 above.
 - 3.3 EQUI 19 (Waste gas flow and combustion temp recorder) is listed as receiving from EQUIs 25 and 26, but we suspect that this should be EQUI 25 and the new EQUI that corresponds to the second occurrence of EQUI 26 discussed in 3.1 above.
 - 3.4 TREA 7 (Low-BTU Gas Flare) is listed as sending to EQUI 21, but we suspect it should be listed as sending to EQUI 19.
 - 3.5 EQUI 20 (LFG and combustion temp recorder) is not listed as being related to anything, but we suspect it should be listed as "receives from EQUI 26 (Combustion temp sensor)".
 - 3.6 What is the distinction between EQUI 22 (LFG flow meter) and EQUI 27 (LFG flow meter) and what other subject items is EQUI 27 related to?
4. In Section 5 of the draft permit:
 - 4.1 Requirement 5.2.1 lists 40 CFR 60.762(b)(1) as an applicable requirement but this only applies if the calculated NMOC emission rate is less than 34 Mg/yr, which is not the case for PBL.
 - 4.2 Requirement 5.2.1 lists 40 CFR 60.764(d) as an applicable requirement but this only applies for a performance test required in 60.762(b)(2)(iii)(B), which does not apply because PBL does not have an enclosed combustion device to control LFG.
 - 4.3 Requirement 5.2.1 lists 40 CFR 60.767(a)(1) as an applicable requirement but this requires the submittal of an initial design capacity report which we suspect has already been submitted by PBL.
 - 4.4 Requirement 5.2.1 lists 40 CFR 60.767(a)(3) as an applicable requirement, requiring the submittal of an amended design capacity report providing notification of an

increase in the design capacity of the landfill above 2.5 million Mg and 2.5 million cubic meters, but we believe PBL had already exceeded this capacity in their initial design capacity report.

- 4.5 Requirement 5.2.1 does not list 40 CFR 60.767(h) as an applicable requirement, but we believe that this requirement does apply given that PBL must conduct an initial performance test of TREA 6 under §60.762(b)(2)(iii)(C), unless the MPCA believes that PBL has already satisfied this requirement by submitting the required information with an earlier performance test report.
- 4.6 Requirement 5.2.1 does not list 40 CFR 60.768(c)(4) as an applicable requirement, but we believe that this requirement does apply given that PBL seeking to comply with the provisions of this subpart by use of a non-enclosed flare (TREA 6).
- 4.7 Requirement 5.2.1 lists 40 CFR 60.768(g) as an applicable requirement, but we believe that this requirement does not apply given that PBL is not seeking to demonstrate that site-specific surface methane emissions are below 500 ppm by conducting surface emission monitoring under the Tier 4 procedure.
- 4.8 Requirement 5.2.1 lists 40 CFR 60.768(h) as an applicable requirement, but we believe that this requirement does not apply given that PBL must comply with §63.1961 in lieu of §60.766.
- 4.9 Requirement 5.2.1 lists 40 CFR 60.768(j) as an applicable requirement, but we believe that this requirement does not apply given that PBL has not employed leachate recirculation or added liquids based on a Research, Development, and Demonstration permit (issued through Resource Conservation and Recovery Act, subtitle D, part 258) within the last 10 years under §60.767(k).
- 4.10 Requirement 5.2.3 lists 40 CFR 63.1959(a) and (b)(1) as applicable requirements, but we believe that these requirements are moot given that PBL has already established that the NMOC mass emission rate is greater than 50 Mg/yr.
- 4.11 Requirement 5.2.3 lists 40 CFR 63.1959(d) as an applicable requirement, but this only applies for a performance test required in 60.1959(b)(2)(iii)(B), which does not apply because PBL does not have an enclosed combustion device to control LFG.
- 4.12 Requirement 5.2.3 lists 40 CFR 63.1961(d) as an applicable requirement, but this only applies if PBL were to use a device other than a non-enclosed flare or an enclosed combustor or a treatment system, which is not the case.
- 4.13 Requirement 5.2.3 lists 40 CFR 63.1983(b)(3) and (c)(3) as applicable requirements, but these only apply if PBL were to use a boiler or process heater, which is not the case.

5. In Section 6 of the draft permit:
 - 5.1 Requirement 6.2.1 requires the submittal of an initial design capacity report which we suspect has already been submitted by PBL.
 - 5.2 Requirement 6.2.2 requires the submittal of a collection and control system design plan after the NMOC emission rate exceeds 34 Mg/yr, but we believe such a design plan has already been submitted by PBL.
 - 5.3 Requirements 6.2.3 and 6.2.10 are essentially the same, both requiring the submittal of an amended design plan citing §60.767(d) and §63.1981(e). We suggest that they be combined into a single requirement.
6. In Appendix A of the draft permit (and Section 3.4 of the TSD, Table 14), the "General applicable emission limit" column cites Minn. R. 7011.0515 (standards of performance for new indirect heating equipment) for the space heaters in the first row. We suspect that Minn. R. 7011.0610 (standards of performance for fossil-fuel-burning direct heating equipment) is more appropriate.
7. In Appendix A of the draft permit (and Section 3.4 of the TSD, Table 14), the "General applicable emission limit" column cites Minn. R. 7011.0515 (standards of performance for new indirect heating equipment) for the aggregate handling and storage piles in the fourth row. We suspect that there are no emission limits in Minnesota Rules that apply to these fugitive sources although the MPCA could cite Minn. R. 7011.0150 (preventing particulate matter from becoming airborne).
8. In Section 1.5 of the TSD, Table 3, the total facility limited potential emissions of CO₂e are reported to be 250,790 tons/yr but the underlying workbook ("Title 5 calcs.xlsx") reports 250,808 tons/yr. The workbook is correct. The error in the TSD appears to be because the CH₄ and N₂O from TREA 7 reported on page 55 of the TSD pdf only includes the emissions from the combustion of the supplemental natural gas and not those from the combustion of the waste gas.
9. In Section 2.3 of the TSD, second paragraph, "40 CFR 32 subpart OOO", should be "40 CFR 62 subpart OOO".
10. In Section 2.6 of the TSD, Table 11, first row, third column, the last bullet item could be edited to read "Must comply with ..." rather than "Will comply with ..." because complying with the provisions of 40 CFR §§ 60.763, 60.765, and 60.766 instead of 40 CFR §§ 63.1958, 63.1960, and 63.1961 was no longer an option after September 27, 2021.
11. In Attachment 1 of the TSD, page 54 of the pdf:
 - 11.1 The emissions changes for the landfill expansion project (0.058 lb/hr and 0.252 tons/yr) are based on the uncollected, fugitive emissions only (i.e., from FUGI 2) assuming this is 15% of the LFG generated by the landfill. This neglects the emissions resulting from the combustion of the collected (non-fugitive) LFG which, assuming 85% collection efficiency and 98% destruction efficiency in TREA 6 (the

open flare), would increase the emissions change for the project by 11.3% ($85\% \times (1 - 98\%) / 15\%$) to 0.065 lb/hr and 0.281 tons/yr.

- 11.2 The non-Title I emissions change for the landfill expansion project of 0.058 lb/hr of VOC is calculated as the "Post-Modification PTE Unlimited (lb/hr)" minus the "Pre-Modification PTE Unlimited (lb/hr)". The calculations assume 4,120 scfm of LFG post-project and 4,000 scfm LFG pre-project, both referencing "Landfill gas generation rate based on USEPA LandGEM model, Version 3.02". Since the LandGEM calculations are not provided, it is unclear how these LFG generation rates were derived.

Minn. R. 7007.1200, Subp. 3, requires the non-Title I emissions change to be calculated by "comparing the hourly emission rate of the stationary source, at maximum physical capacity, before and after the proposed physical or operational change." From workbook "RNG Post Modification PTE.xlsx", we understand the pre-expansion project PTE to be 2.17 lb/hr, calculated as 1.92 lb/hr of VOC from FUGI 2 (assuming 4,000 cfm LFG generated by the landfill) plus 0.25 lb/hr of VOC from TREA 6 (assuming the open flare has a design capacity of 4,000 cfm and a destruction efficiency of 98%). It's unclear how the 4,000 cfm LFG assumed for the landfill's maximum generation rate was derived. According to the accompanying EAW, LandGEM predicts a pre-project maximum generation rate of 3,799 cfm LFG. Regardless, we believe the post-project PTE would be identical to the pre-project PTE because LandGEM predicts the same 3,799 cfm LFG maximum generation rate and the design capacity of the open flare will also remain unchanged at 4,000 cfm. Based on this analysis, we would expect the non-Title I emissions change to be zero lb/hr of VOC.

- 11.3 The Title I emissions change for the landfill expansion project of 0.252 tons/yr of VOC is calculated as the "Post-Modification PTE Unlimited (tpy)" minus the "Pre-Modification PTE Unlimited (tpy)". The calculations assume 4,120 scfm of LFG post-project and 4,000 scfm LFG pre-project, both referencing "Landfill gas generation rate based on USEPA LandGEM model, Version 3.02". Since the LandGEM calculations are not provided, it is unclear how these LFG generation rates were derived. However, since PBL is an existing minor source under the NSR-PSD program, the rules require that applicability be determined based on the potential emissions of the project. The project comprises the additional MSW received as a result of the proposed expansion. According to the accompanying EAW, absent the expansion, PBL will reach its design capacity in 2027. However, with the expansion, PBL will be able to receive 310,000 tons/yr of MSW through 2048. Entering this annual waste acceptance rate into LandGEM for the years 2027 through 2048 yields a predicted maximum LFG flow of 2,156 cfm in 2048. This results in uncontrolled VOC emissions of 6.90 lbs/hr and 30.2 tons/yr of VOC. Assuming 15% fugitive emissions from FUGI 2 and 85% collection and 98% destruction in TREA 6 gives 5.05 tons/yr of VOC. While this is significantly higher than the 0.252 tons/yr reported in the TSD, it is still well below the 250 tons/yr threshold required for the project to qualify as a major stationary source under NSR.

Please note that the above comments do not cover a comprehensive review of the workbooks identified at the beginning of this letter.

Thank you for the opportunity to provide these comments. If the MPCA has any questions, please contact City of Inver Grove Heights Environmental Specialist Ally Sutherland at 651-604-8511 or asutherland@ighmn.gov.

Sincerely,

CITY OF INVER GROVE HEIGHTS

c: Ally Sutherland, City of Inver Grove Heights
Aaron Janusz, Pine Bend Landfill
Tyler Kraft, Pine Bend Landfill
Tom Shustarich, Stantec Consulting Services Inc.
Terry Muller, Dakota County
Dave Magnuson, Dakota County
Bryan Pitterle, Barr Engineering Co.
Jeff Ubl, Barr Engineering Co.
Paul Taylor, Barr Engineering Co.

Notice of Availability of an Environmental Assessment Worksheet (EAW)

Pine Bend Landfill Vertical Expansion

Doc Type: Public Notice

Public comment information

EAW public comment period begins (45 days): October 31, 2023**EAW public comment period ends:** December 15, 2023**Notice published in the EQB Monitor:** October 31, 2023**Permit public comment period begins (45 days):** October 31, 2023**Permit public comment period ends:** December 15, 2023**Public Meeting Time and Location:** Thursday, November 30, 2023
5:30 – 7 p.m.
Woodcrest Church
525 Cliff Road
Eagan, MN 55123

Facility specific information

Facility name and location:Pine Bend Landfill
11380 Courthouse Boulevard
Inver Grove Heights, MN 55077
Dakota County**Facility contact:**Tyler Kraft, General Manager
Phone: 651.403.2200
Email: tkraft2@republicservices.com

MPCA contact Information

MPCA EAW contact person:Megen Kabele
Resource Management and Assistance Division
Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 55155
Phone: 651-757-2044
Email: megen.kabele@state.mn.us**MPCA Air Permit contact person:**Joy Wiecks
Industrial Division
Minnesota Pollution Control Agency
525 Lake Ave S. Ste 400
Phone: 218-302-6672
Email: joy.wiecks@state.mn.us

General information

The Minnesota Pollution Control Agency (MPCA) is distributing this Environmental Assessment Worksheet (EAW) for a 30-day review and comment period pursuant to the Environmental Quality Board (EQB) rules. The MPCA uses the EAW and any comments received to evaluate the potential for significant environmental effects from the project and decide on the need for an Environmental Impact Statement (EIS).

An electronic version of the EAW is available on the MPCA comment webpage at <https://mpca.commentinput.com/comment/search>. If you would like a copy of the EAW or Permit or have any questions on the EAW or Permit, contact the appropriate person(s) listed above.

Description of proposed project

BFI Waste Systems of North America, LLC. ("Proposer") owns and operates the Pine Bend Landfill ("Facility"), a mixed municipal solid waste landfill located in the City of Inver Grove Heights in Dakota County, Minnesota. The Project proposes to develop and permit a vertical expansion ("Phase 7") over the Phase 5 and 6 areas of the Facility ("Project") to increase the permitted capacity of the existing landfill. The Project increases the permitted design capacity by approximately 8,185,000 cubic yards (cy).

Air Permit: The draft air permit is the reissuance of the Part 70 operating permit and includes testing and monitoring for proper operation of the thermal oxidizer and open flare. The change was made to document the installation of the RNG plant, which replaces the previous process of combusting landfill gas for electricity generation. The draft air permit also addresses the vertical expansion.

To submit written comments on the EAW and Air

Written comments on the EAW must be received by the MPCA within the comment period listed above.

Comments may be submitted:

- Online at <http://www.pca.state.mn.us/publiccomments>; or
- By U.S. postal mail to the following address:
Minnesota Pollution Control Agency
Resource Management and Assistance Division
Megen Kabele
520 Lafayette Road North
St. Paul, MN 55155

For information on how to comment on the Air Permit, contact the MPCA Permit contact persons listed above.

Note: All comment letters are public documents and will be part of the official public record for this project.

Need for an EIS

The MPCA Commissioner will make a final decision on the need for an EIS after the end of the comment period.

December 2022 version

Environmental Assessment Worksheet

This most recent Environmental Assessment Worksheet (EAW) form and guidance documents are available at the Environmental Quality Board's website at: <https://www.eqb.state.mn.us/> The EAW form provides information about a project that may have the potential for significant environmental effects, and also used as the basis for scoping an Environmental Impact Statement. Guidance documents provide additional detail and links to resources for completing the EAW form.

Cumulative potential effects can either be addressed under each applicable EAW Item or can be addressed collectively under EAW Item 21.

Note to reviewers: Comments must be submitted to the RGU during the 30-day comment period following notice of the EAW in the *EQB Monitor*. Comments should address the accuracy and completeness of information, potential impacts that warrant further investigation and the need for an EIS.

1. Project Title

Pine Bend Landfill Vertical Expansion Project

2. Proposer

Proposer: BFI Waste Systems of North America, LLC
Contact person: Tyler Kraft
Title: General Manager
Address: 11380 Courthouse Boulevard
City, State, ZIP: Inver Grove Heights, MN 55077
Phone: 651.403.2200
Email: tkraft2@republicservices.com

3. Responsible Governmental Unit (RGU)

RGU Agency: Minnesota Pollution Control Agency (MPCA)
Contact person: Megan Kabele
Title: Project Manager
Address: 520 Lafayette Road North
City, State, ZIP: St. Paul, MN 55155
Phone: 651.757.2044
Email: megen.kabele@state.mn.us

4. Reason for EAW Preparation:

Required

- ☐ EIS Scoping
☒ Mandatory EAW

Discretionary

- ☐ Citizen petition
☐ RGU discretion
☐ Proposer initiated

If EAW or EIS is mandatory give EQB rule category subpart number(s) and name(s):

4410.4300, subpart 17 (F): *For expansion by at least ten percent but less than 25 percent of previously permitted capacity of a mixed municipal solid waste land disposal facility for 100,000 cubic yards or more of waste fill per year, the PCA is the RGU.*

5. Project Location:

County: Dakota

City/Township: City of Inver Grove Heights

PLS Location: Township 27 North, Range 22 West, Section 33, NENE, NWNE, SENE, and SWNE
Watershed: (81 major watershed scale): Mississippi River – Lake Pepin (38), Vermillion River Subwatershed
GPS Coordinates: Lat: 44°46'59" N, Lon: 93°3'15" W
Tax Parcel Number: 20-57575-01-010

Appendices:

Appendix A: Figures
Appendix B: Plan drawings
Appendix C: FEMA FIRMette
Appendix D: MDH Well Logs and 2022 Water Quality Monitoring Report
Appendix E: NHIS and IPaC Queries
Appendix F: SHPO Query
Appendix G: Phase 7 Air Emissions Evaluation Memorandum
Appendix H: GHG Assessment Report

Tables

Table 1. Historical leachate collection data
Table 2. Project magnitude
Table 3. Disposal area summary
Table 4. Pine Bend Landfill major feature construction summary
Table 5. Summary of reported climate trends
Table 6. Impacts and adaptations summary
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Table 14. MPCA WIMN database sites within 500-feet of the Project area
Table 15. Existing registered aboveground and underground storage tanks
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Table 18. Noise area classifications
Table 19. Landfill machinery noise levels during operation
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Figure 3. Phase development plan
Figure 4. RNG facility and pipeline
Figure 5. Land cover
Figure 6. Farmland and soil classifications
Figure 7. Future land use map
Figure 8. Zoning map
Figure 9. Water resources
Figure 10. County well index

Figure 11. MPCA potentially contaminated sites

6. Project Description

a. *Provide the brief project summary to be published in the EQB Monitor, (approximately 50 words).*

BFI Waste Systems of North America, LLC. owns and operates the Pine Bend Landfill, a mixed municipal solid waste landfill in the City of Inver Grove Heights in Dakota County, Minnesota. BFI Waste Systems of North America, LLC. proposes to develop and permit an 85-foot vertical expansion over the existing Phase 5 and 6 areas of the landfill to increase the permitted design capacity by approximately 8,185,000 cubic yards.

b. *Give a complete description of the proposed project and related new construction, including infrastructure needs. If the project is an expansion include a description of the existing facility. Emphasize: 1) construction, operation methods and features that will cause physical manipulation of the environment or will produce wastes, 2) modifications to existing equipment or industrial processes, 3) significant demolition, removal or remodeling of existing structures, and 4) timing and duration of construction activities.*

Existing landfill facility

BFI Waste Systems of North America, LLC. ("BFI") owns and operates the Pine Bend Landfill ("Facility"), a mixed municipal solid waste landfill in the City of Inver Grove Heights in Dakota County, Minnesota. The Facility is a mixed municipal solid waste (MSW) landfill consisting of approximately 255 acres in Township 27 North, Range 22 West, Section 33, in the City of Inver Grove Heights, Dakota County, Minnesota (Figure 1 and Figure 2, Appendix A). Figure 3, Appendix A illustrates the phase areas of the landfill. Figures 1 and 2, Appendix A provide a project location map and United States Geological Survey (USGS) topographic map.

The landfill and adjacent Renewable Natural Gas (RNG) facility property are owned by BFI as Pine Bend Landfill, Inc. Current, and former subsidiaries associated with Pine Bend Landfill are described as follows:

- **BFI Waste Systems of North America, LLC ("BFI"):** Proposer (subsidiary of Republic Services, Inc.) and owner of Pine Bend Landfill, Inc.
- **Pine Bend Landfill, Inc ("PBL"):** Owned by BFI
- **Pine Bend RNG LLC ("PBR"):** legal entity for the RNG Facility (named change requested in 2020 amendment from PBE)
- **Pine Bend Energy LLC ("PBE"):** Formal legal entity that owned the decommissioned LFGTE Facility
- **Fortistar Methane Group:** Former owner/operator of RNG Facility
- **Opal Fuels Inc:** Current owner/operator of RNG Facility
- **Petroleum Fuels Company:** Proposer of Pine Bend Pipeline (connected RNG Facility to Northern States Power Company natural gas system, affiliate of Xcel Energy).

The Facility is generally comprised of two areas:

1. Phases 1 and 2. A closed unlined MSW disposal area in the northern-most part of the Facility, designated as Phases 1 and 2. This area has an existing airspace utilized volume of approximately 15,500,000 cy.
2. Phases 3, 4, 5, and 6. An open lined MSW disposal area Phase 3 was developed after Phases 1 and 2 in the southeast quadrant of the site. Phase 4 is in the western portion of

the site. Phase 5 was developed as a valley fill between and over Phases 2, 3 and 4. Phase 6 was developed as a 3:1 sideslope fill area mainly around the northern and eastern portion of the site. This area has a total airspace of 18,437,400 cy and includes Phases 3, 4, 5, and 6. Phase 6 is the current active disposal areas at the Facility.

BFI has operated the Facility since 1980 and is currently operating under the Minnesota Pollution Control Agency ("MPCA") Solid Waste Permit (Permit No. SW-45). MPCA Permit No. SW-45 was most recently issued by the MPCA, as part of a permit modification, on May 31, 2019. On December 15, 2021, the MPCA issued a Findings of Fact granting PBL an additional 2,398,746 tons of Certificate of Need ("CON") capacity.

1) Construction, operation methods and features that will cause physical manipulation of the environment or will produce wastes.

Project

BFI Waste Systems of North America, LLC. Proposes to develop and permit a vertical expansion over the existing Phase 5 and 6 areas of the Facility ("Project"). BFI proposes a vertical expansion ("Phase 7") over an approximately 89-acre portion of the Facility ("Project Area") to extend the life of the landfill, which is nearing capacity. The Project would extend the existing permitted 3:1 cover slopes around and over the Phase 5 and Phase 6 areas of the landfill, not increasing the footprint of the Facility. Figure 3, Appendix A illustrates the existing Phase 5 and Phase 6 areas of the landfill BFI proposes to increase the currently permitted peak elevation of the existing Facility from the currently permitted maximum elevation of 1020 Mean Sea Level (MSL) approximately 85 vertical feet to 1105 msl. Based on a projected waste acceptance of 310,000 tons per year, it is anticipated that Phase 7 closure would occur in 2048. Under existing conditions, BFI anticipates that no additional waste could be accepted beyond 2027. The Project would accommodate approximately 21 years of additional disposal capacity based on existing waste flows to the landfill compared to existing conditions. BFI has prepared a request for a major modification to their Solid Waste Permit (SW-45) of the Facility. Appendix B includes the plan drawings.

2) Modifications to existing equipment or industrial processes

Liner system

The Project would increase the final permitted elevation of the Facility by extending the existing 3:1 side slope over the existing lined areas and would not require any additional base liner. The Project would be constructed over previously lined areas of the landfill (Phases 3, 4, 5, and 6).

The existing liner systems for MSW disposal areas must have a minimum leachate collection efficiency of 95 percent according to MPCA solid waste rules (Minnesota Rules 7035.2815 subpart 7J – Mixed Municipal Solid Waste Disposal Facilities). In addition, the liner system in combination with the final cover must have a minimum collection efficiency of 98.5 percent (Minn. R. 7035.2815, subp. 7(A)). The existing liner systems meet or exceed these minimum requirements.

The approved liner system designs for the existing and remaining Facility is determined by the existing liner system in-place below the vertical expansion. Liner installation in the existing landfill are as follows:

1. Western fill area / Phase 4 (1999). Construction of the western fill area or Phase 4 development is a composite liner of one 60-mil (0.060 inch) high density

polyethylene ("HDPE") liner covering a 2-foot compacted clay liner. The clay liner has a maximum permeability of 1×10^{-7} centimeters per second (cm/sec) and compacted to a minimum of 95 percent Standard Proctor Dry Density, with a moisture content 0 to 5 percent wet of optimum moisture content. Clay typically has a permeability of 1×10^{-7} cm/sec or lower, which is very low because liquid moves very slowly through clay. In comparison, sand typically has a permeability of 1×10^{-3} cm/sec or higher which allows liquid to move much more quickly.

2. Central fill area/Phase 5. The Central Fill Area or the valley between Phases 1, 2, 3, and Phase 4 development comprises Phase 5. A composite liner was permitted and construction for this area was initiated in 2005. The composite liner is the same design as utilized in Phase 4 was also utilized in Phases 5A through 5 F-1. The composite liner is also permitted for 5F-2, yet to be constructed.
3. Southeast fill area (1992). The southeast fill area is the portion of Phase 3 landfill development, which has received final cover with a 40-mil flexible membrane liner. The permitted and installed liner design for overfill in this area is one 60- mil HDPE liner, overlying a geosynthetic clay liner ("GCL").
4. Phase 6 Sideslope Fill Area (2019) – The majority of the Phase 6 expansion area is over Phases 1 and 2 which were constructed over an unlined area. The permitted liner design for overfill in this area and for that being proposed for this expansion is one 60- mil HDPE liner, overlying a GCL. Also, PBL will utilize the existing 2-foot clay cap as part of the base liner system for this area and not incorporate a GCL should the existing 2-foot clay cap be shown to meet base liner quality clay standards.

The majority of the Vertical Expansion Project Area will be over Phase 5 and a portion of Phase 6. Any leachate generated will be collected by the Phase 5 and Phase 6 leachate collection systems that are constructed and in-place.

Drainage layer system

An HDPE liner would be overlain by 12 inches of granular drainage layer material per MPCA Solid Waste requirements (Minnesota Rules 7035.2815, subpart 7E). A textured HDPE membrane will be installed on slopes greater than 10 percent to improve stability of the geomembrane/clay interface, geomembrane/drainage layer interface, and the geomembrane/GCL interface.

The granular drainage layers in Phases 5 and 6 and under the Phase 7 vertical expansion are designed and constructed to collect leachate and to provide drainage along the liner to the leachate collection trench. Embedded coarse aggregate around the collection pipes prevents damage and increases flow performance. An intermediate filter aggregate that is larger than sand but smaller than the coarse aggregate overlays the coarse aggregate. The granular drainage layer also functions as a protective layer to prevent equipment from damaging the HDPE liner.

Collection pipes

Construction of the leachate collection trench begins with the placement of a geotextile fabric in the pipe trenches above the HDPE liner. A 3-inch layer of coarse aggregate covers the geotextile fabric. The pipe is set and aligned on top of the layer of coarse aggregate. After installing the pipe additional coarse aggregate will cover the pipe. A 12-inch layer of graded filter aggregate will cover the coarse aggregate to provide a filter from the overlying granular drainage layer.

This filter would help stop migration of particles that might clog the collection pipe. The granular drainage layer material lies over the trench.

Calculations performed for the anticipated settlement and loading of the existing piping due to the vertical expansion assure that at least one percent slope (post-settlement) would remain in the pipes. Pipe strength calculations are provided as part of the major permit modification application submitted for this proposed vertical expansion.

Leachate collection sump, head build-up, and removal

Existing sumps serving the Phase 5 and 6 areas beneath the vertical expansion are a minimum of two feet deep and contain a minimum 4,000 gallons of leachate assuming the porosity of the coarse aggregate to be 0.4. This is a ratio of the volume of voids to the volume of soil and is unit less. In general, 4/10 (0.4) of the total volume of the coarse aggregate is void space and could be filled by liquid. During regular operations, sump pumps maintain leachate head to 12 inches or less. Existing sump pumps transfer leachate from the sumps to one of two existing leachate tanks. Leachate is controlled during initial filling of the vertical expansion by limiting size of the fill area and diverting surface water away from the fill area. A maximum open area of 20 acres will be maintained with operational berms to control storm water run-on into the fill area.

Leachate storage

Service of the Facility is by two leachate storage tanks:

- One 101,000-gallon tank in southern portion of site near office building
- One 80,000-gallon tank in southern portion of site near office building

Historical annual leachate collection volumes from 2017 through 2021 varied from approximately 5.1 to 9.7 million gallons. Table 1 provides the historical leachate collection data.

Table 1. Historical leachate collection data

Year	Leachate collection volumes (gallons)
2021	9,188,290
2020	5,148,812
2019	7,610,212
2018	9,670,009
2017	6,642,340

BFI presumes leachate generation will be 8 – 9 million gallons per year. The potential variability in leachate generate is a function of seasonal precipitation and the amount of open active disposal surface area, rather than total Facility area. As BFI plans final closure on portions of the Facility and opens new areas, the active disposal area will remain the same for landfill operations.

Final cover design

The design of the final cover contains or diverts precipitation from filled areas of the Facility. The final cover design proposes to continue the 3:1 benched final cover slope around the entire perimeter of the existing Facility. This design provides for increased capacity without increasing site footprint or elevation and has demonstrated stability and efficiency at surface water management. Construction of the benched sideslope final cover system will be at a 3:1 slope. The design of the Facility uses the MPCA guidance document for 3:1 final cover systems.

Appendix B includes the plan drawings. The final cover peaks at a three percent grade to a maximum elevation of 1,018 feet.

Dual extraction system

The Facility utilizes a dual extraction system to collect landfill gas as well as landfill leachate from a single well. This system is vital to reduce the amount of leachate generated within the closed portion of the landfill while also maximizing the amount of landfill gas recovered and delivered to the new gas plant. 26 dual-extraction wells at the landfill are configured into four sections or nodes with a separate control panel containing electrical breakers for each well within the node. The number of dual extraction wells has been reduced to allow for the construction of Phase 5 and 6 landfill cells. As waste placement within Phase 5 and 6 continues, the wells will be brought back online into the dual extraction system to maximize the capture of leachate and landfill gas. Additional dual extraction wells will be added into the new cells and brought online to collect leachate and landfill gas as construction and waste placement proceeds with the Project. PBL proposes the same approach of extending the dual extraction wells until final waste grades are reached and bringing the pumps back online be continued for proposed Phase 7 vertical expansion.

Surface water management

Stantec Consulting Services, Inc. ("Stantec") updated the MPCA-approved 2016 Surface Water Management Plan to include the proposed landfill expansion, including a vertical expansion, construction of drainage swales, downslope structures, terraces, and the development of the south-west corner of the Facility. The stormwater requirements are addressed through the noted expansion features and the existing infrastructure and basins.

The design of the surface water system is to manage a 100-year, 24-hour MSE 3 storm event of 7.43 inches. The system consists of benches, catch basins, drainage piping, downslope structures, junction vaults, and sedimentation ponds.

Final cover access

The proposed benches provide for more designed access roadway surface than typically provided on landfill covers. The large amount of final cover roadway access results in better access to the final cover, surface water control features, and many of the landfill gas wellheads for operation, maintenance, and inspection. Main access roads from the south that provide access to the top of the landfill will be maintained or new roads will be constructed as needed to ensure appropriate access to the final cover.

Peak run-off

Atlas 14 Rainfall values for Dakota County were used in setting the storm event composite Curve Number ("CN"), a commonly used parameter for predicting direct runoff or soil infiltration after a rainfall event.¹ The CN is related to soil type, soil infiltration capability, land use, and the depth of the seasonal high-water table.

Time of concentrations were calculated using sheet flow and shallow concentrated flow for the longest flow path for each subwatershed. To be conservative in the analysis, no infiltration is modeled in swales or downslopes. The 100-year high water level was also set by modeling no infiltration in the swales and downslopes.

¹ DNR. NOAA Atlas 14 Precipitation Frequency Estimates. https://www.dnr.state.mn.us/climate/noaa_atlas_14.html

Bench and drainage swale design

Benches are placed on all 3:1 slopes, graded into final cover and V-shaped with right and left side slopes 3:1 and 8:1 respectively. The benches are placed to intercept and direct flow, as well as minimize erosion. The drainage channel at the interior of the bench was designed with the following characteristics:

- Height = 22 inches (typical)
- Slope = 3 to 5 percent (typical)
- Manning “n” value = 0.035.

The drainage benches are designed to handle the flow for each subarea, spaced 40 feet vertically around the perimeter of the landfill. The peak flow depth will not exceed the depth of the bench. Proposed benches will have category 4 erosion control matting installed to protect against erosion until vegetation is established.

Runoff contained during the 100-year, 24-hour rainfall event.

Downslope structures

Each bench discharges into one of seven cable concrete lined downslope structures around the perimeter of the Facility. Each downslope structure is a trapezoidal channel with design characteristics summarized below:

- Depth = 2.0 feet (typical)
- Bottom width = 9 feet
- Manning “n” value= 0.040.

Runoff is contained during the back-to-back 100-year rainfall event.

Junction vaults

The downslope piping systems in the southwest and northeast corners of the currently permitted design discharge to concrete junction vaults. In the junction vaults, flow is combined to a single pipe that outlets to the existing railroad crossing culverts, a 48-inch reinforced concrete pipe (RCP) on the southwest and a 96-inch RCP on the northwest.

Sedimentation ponds

In accordance with City of Inver Grove Heights stormwater regulations, all stormwater ponds must infiltrate one inch of runoff from new impervious surfaces to meet National Pollutant Discharge Eliminations System (“NPDES”) permit standards. The stormwater ponds are designed to infiltrate one inch over the entire Facility, exceeding minimum infiltration requirements that only address new impervious surfaces. The stormwater ponds are designed to serve as infiltration ponds, and the sandy soils at the landfill are conducive to infiltration.

All stormwater ponds at the landfill are designed to contain a 100-year storm event. For the modeled back-to-back 100-year event, existing stormwater ponds 5P and 8P use emergency overflow discharge. Stormwater from 5P is routed to the eastern pond (6P) and stormwater from southwestern pond (8P) is routed to city storm sewer. The proposed model is designed for 5P to contain all water and 8P discharges during a back-to-back 100-year storm event. However, 8P discharges at a lower rate than in the existing model, therefore the major permit modification application submitted to the MPCA includes detailed calculations and results for the proposed stormwater pond design.

Landfill gas management

Background

The United States Environmental Protection Agency (“EPA”) and MPCA require control of landfill gas (“LFG”) generated at MSW landfills to achieve two objectives, regulating concentrations of explosive gas and meeting air quality standards.

First, the methane component of LFG combusts in the concentration range of five (5) to 15 percent by volume in air. Five (5) percent is considered the lower explosive limit (“LEL”) and 15 percent the upper explosive limit (“UEL”). Migration and concentration of methane into enclosed spaces could result in an explosive atmosphere, therefore Minnesota Rule 7035.2815 Subpart II requires that concentration of any explosive gas not exceed the LEL at the property boundary or 25 percent of the LEL in or around Facility structures. The Facility has an MPCA-approved gas collection and monitoring system to meet regulatory standard and to address concerns with migration of combustible gas. The LEL at the Pine Bend Landfill is 5% methane.

The second objective for controlling LFG is maintenance of air quality standards, discussed in Section 17 - Air Quality.

Gas system

Augmentation of the Facility’s gas extraction system in the Project Area includes horizontal gas collector systems, additional vertical gas wells, and the extension of pumping stations, which assist in leachate extraction. Although the primary purpose of the pumping station is to remove leachate from the unlined Facility area, with a retrofit they will serve as dual extraction wells and provide for landfill gas collection. Lateral sub-header piping will connect to the existing header piping system to provide vacuum to any new horizontal gas collection system. Installation of any horizontal collector piping will be as described in the Solid Waste Permit Application.

Existing and future extraction wells

Gas wells already exist in Facility areas where the Project will occur. BFI will extend the existing gas wells as filling progresses during Project development. This means periodically repositioning the well head assembly as development dictates. This may include remotely locating the wellhead away from the filling area in Phase 6 and/or 7. The possibility exists that certain wells will be temporarily taken out of service. Vertical extension of the wells happens by fusing piping to the existing well pipe and to the subheader connection to maintain the wellheads at 48 inches above the surface during operations. Removal of the existing wellhead assembly is before fusing the well and subheader extensions. Reinstallation of the wellhead assembly happens after completion of the extension. The Proposer will seal the annular space between the outer pipe and well casing using a bentonite mixture. The Proposer anticipates that the gas well extension process will take approximately two hours per well to complete. The existing gas system is set up to isolate individual gas wells from the active gas system by valves. Therefore, shutting down the entire active gas system is not necessary during the extension process. Isolation of a portion of the system is a preventive measure against excessive oxygen intrusion during the extension work.

New gas extraction wells will be placed in the waste expansion area. Drawings 8 and 9 in Appendix B includes the proposed Gas System Plan Drawings for the proposed gas system layout and location of the new extraction wells and piping.

Horizontal collectors

In conjunction with the vertical gas extraction wells and to maximize the amount of landfill gas collected at the Facility, horizontal collectors are proposed in the Project Area where the overfill waste thickness would be too shallow for practical installation of vertical extraction wells. The horizontal collectors would consist of six-inch HDPE piping. Coarse aggregate would incase the perforated horizontal collector piping. A geotextile fabric will cover the coarse aggregate. Sand will bed the solid piping section of the collectors. Condensate from the horizontal gas collection piping would drain to existing condensate pumps. The minimum pipe slope would be three percent to promote condensate drainage. Each horizontal gas collector will connect to the gas lateral subheader piping via a wellhead. The Proposer will install valves to regulate vacuum and gas flow. Appendix B provides a layout and details of the proposed horizontal collectors.

Gas system piping

Gas extraction from the existing wells through existing or temporary laterals, subheaders, and header piping will continue until final grades are reached. At that time, the Proposer will install new laterals from the existing wells to new subheaders. These will drain to either the existing header or the new header to along the southern boundary. This will complete a loop around the entire site. In 2006 the Proposer constructed a new header system around the west side of the Facility with subheader extensions. This provided several gas collection loops across the entire Facility. All piping within the waste will be at a minimum grade of three percent. This will allow for proper drainage of condensate liquids into low point collection sumps. This will eliminate any flow disturbances which could affect the performance of the extraction system.

Renewed Natural Gas Pipeline and RNG Facility

(In the past, unrefined landfill gas from the landfill was collected to drive generators that provide electricity into the Northern States Power Company ("NSPM") grid. The new RNG facility refines the landfill gas to pipeline quality, removing impurities (Co2 N2, O2, and VOCs) and compresses the refined LFG for injection into NSPM's natural gas system. The low-pressure pipeline is 24-inch high density polyethylene and A preliminary plan of the facility and the low-pressure landfill gas pipeline are included as Figure 10. The meter station in the northwest portion of the site will be the start of the pipeline that is the subject of this Application.

The refined gas is then routed into a new, natural gas pipeline in Inver Grove Heights to transport refined landfill gas extracted from the Republic Services Pine Bend Landfill to a delivery point into the NSPM high-pressure gas system. The gas is primarily methane (approximately 98%) with a small amount of carbon dioxide and trace amounts of other compounds, meeting specification required for renewable natural gas as established by NSPM.

Gas generation estimate

The previous estimated peak gas generation rate for the Facility was approximately 3,500 cubic feet per meter ("CFM"). In the past, the Proposer has completed a LandGEM (Landfill Gas Emissions Model) model on the waste mass to predict the future gas generation at the Facility. Additional information on the landfill gas generation is in the gas collection and control system ("GCCS") Plan and LandGEM model are within the Solid Waste Permit Application.

Landfill Construction

Technical Specifications and the Construction Quality Assurance (“CQA”) Manual described in the Solid Waste Permit Application will guide cell and final cover construction.

Environmental Monitoring System

Routine water monitoring occurs in accordance with the Facility permit occurs during active operation and the post-closure period in accordance with an approved Closure Order issued by the MPCA. The current Site-Specific Sampling Protocol includes the lists of analytical parameters and current sampling locations used to develop the proposed environmental monitoring system (“EMS”) for the monitoring of groundwater, surface water, and leachate.

Phased Closures

Upon reaching final grade, closure of each phase will occur according to the closure requirements in the permit. Prior to final closure and installing the final cover system, the waste fill surface will conform to the design plans for final grade and benching. The Proposer will place appropriate buffer layers to bring the surface to final grade during site operations. A summary of final closure procedures is as follows:

- Install minimum 40-mil synthetic flexible membrane liner
- Install geonet drainage layer according to the design plans
- Grading and placement of 18 inches of soil fill
- Placement of six inches of vegetation supporting topsoil
- Seed and mulch the final covered area.

3) *Significant demolition, removal, or remodeling of existing structures*

The Project will not require any demolition, removal, or remodeling of existing structures.

4) *Timing and duration of construction activities*

The timing and duration of the construction activities will vary for Phase 7 development. This is a vertical expansion over previously constructed composite lined landfill cells. Therefore, the only construction activity required for the Project is the stripping and stockpiling of existing covers soils. Phase 7 will be developed in an orderly fashion working from north to south. Based on a projected waste acceptance of 310,000 tons per year, it is anticipated that Phase 7 closure would occur in 2048 which would provide landfill capacity for approximately 25 years.

c. *Project magnitude*

Table 2 summarizes the Project magnitude.

Table 2. Project Magnitude

Description	Number
Total Project Acreage	89 acres
Linear project length	Not applicable (N/A)
Number and type of residential units	N/A
Residential building area (in square feet)	N/A
Commercial building area (in square feet)	N/A

Industrial building area (in square feet)	N/A
Institutional building area (in square feet)	N/A
Other uses – specify (in square feet)	N/A
Structure height(s)	1,106 MSL- top of permitted final closed Facility cells

- d. **Explain the project purpose; if the project will be carried out by a governmental unit, explain the need for the project and identify its beneficiaries.**

Project purpose

The Project will allow for the vertical expansion of airspace capacity over the existing Facility footprint. No horizontal footprint increase is included as part of this proposed vertical expansion. The Project will increase the permitted design capacity by 8,185,500 cubic yards ("cy"), for a total capacity of 42,122,900 cy and extend the life of the Facility by approximately 21 years compared to existing conditions. Table 3 summarizes the disposal area. The Project would result in an increase in the height of the waste fill by approximately 85 vertical feet from the currently permitted maximum elevation of 1020 MSL to 1105 MSL.

Table 3. Disposal area summary

Disposal area	Ultimate design capacity (cy)	Proposed additional capacity (cy)	Current permitted design capacity (cy)	Remaining permitted design capacity (cy)
MSW*	42,122,900	8,185,500	33,937,400	3,839,691

*Includes final cover volume.

- e. **Are future stages of this development including development on any other property planned or likely to happen?** ☐ Yes ☒ No

If yes, briefly describe future stages, relationship to present project, timeline and plans for environmental review.

- f. **Is this project a subsequent stage of an earlier project?** ☒ Yes ☐ No

If yes, briefly describe the past development, timeline and any past environmental review.

Past Landfill expansion phases

BFI currently owns and operates the Facility. The Facility has operated since 1971, under MPCA Solid Waste Permit SW-45. As specified in MPCA Permit SW-45, the Facility is a mixed MSW land disposal facility with the disposal of MSW limited to the existing and pre-existing footprint and a total permitted design capacity of 33,937,400 cy. The footprint of the landfill encompasses approximately 198 acres within the approximately 255-acre Facility property. Figure 3, Appendix A illustrates the phase areas of the Facility.

Phoenix, Inc. leased the Facility until 1976 when they purchased the Facility. Browning Ferris Industries purchased the stock of Phoenix, Inc. on August 1, 1980. Browning Ferris Industries then established Pine Bend Landfill, Inc. as a wholly owned subsidiary. The Facility ownership ultimately changed to its current status, BFI Waste Systems of North America, LLC. a subsidiary of Republic Services, Inc.

Phoenix Inc. completed an Environmental Impact Statement (“EIS”) for the Facility in 1980. With regards to capacity, on September 25, 1973, the MPCA approved an amended operating plan for the west portion of the Facility and a new operating plan for the east portion of the Facility. This amended plan allowed for a total airspace capacity of 16.43 million cy. The April 1980 EIS proposed a volume expansion of 4,500,000 cy, which resulted in 20.93 cy of total airspace capacity. On July 27, 1983, the MPCA authorized a further increase of 66,000 cubic yards to the airspace capacity.

On October 2, 1984, the MPCA made an amendment to the permit to reflect the change in ownership to the Proposer and to amend sections on landfill gas monitoring and reporting requirements. On December 14, 1993, the MPCA modified Permit SW-45 to include the requirements of Federal Rule 40 CFR Part 258 (subtitle D), which became effective at the Facility on October 9, 1993. Based on an April 1993 report prepared by Woodward-Clyde Consultants entitled “Evaluation of Airspace Capacity,” the Facility currently has an approved total airspace of 24.00 million cubic yards.

On March 4, 2003, the MPCA granted the Facility a CON capacity as part of the Phase 5 vertical expansion of the Facility. The CON capacity granted was 6 million cy and brought the total Facility disposal capacity to 29,800,000 cy.

On June 4, 2019, the MPCA approved the request for a major modification to allow for increased air space by allowing to increase the final cover slope to 3:1 around the entire existing landfill footprint, including the north and east sides and is referred to as Phase 6. Phase 6 included an expansion of 4,137,400 cy, resulting in a total Facility design capacity of 33,937,400 cy.

BFI was granted additional CON (2,398,746 tons) by the MPCA on December 15, 2021. Table 4 provides year-by-year construction summary.

Table 4. Pine Bend Landfill major feature construction summary

Feature	Year constructed
Methane Gas Extraction System	1995, 1996
Liner Base	
Phase 1	1987
Phase2	1988
Phase 3	1992
Phase 3B	1995
Phase 4 Cell A	1999
Phase 4 Cell B	2001
Phase 5 Cell A	2005
Phase 5 Cell B	2006
Phase 5 Cell C	2009
Phase 5 Cell D	2010
Phase 5 Cell E	2013
Phase 5 Cell F	Future Construction
Phase 6C-1	2019
Phase 6C-2	2020
Phase 6D & 6B-1	2021

Phase 6B-2 Phase 6A	2022 2023 (proposed)
Final Cover of Unlined Fill Area	
Phase 1	1993
Phases 2 and 3	1995, 1996
Phase 3 (SE corner)	2001
Phase 4 (lower portion of Phase 4)	2011
Liner Sidewall Extension	1995, 1996

The following summarizes past solid waste permitting processes completed at the Facility:

- April 23, 1985 – The Proposer and the MPCA entered into a Response Order by Consent (“Order”) under Section 17 and 18 of the Minnesota Environmental Response and Liability Act of 1983. Minn. Stat. Ch. 115B. The Order required the Proposer to perform a Remedial Investigation and Feasibility Study (“RI/FS”) to investigate the source or sources of groundwater contamination at and near the Facility; to assess actual and potential impacts of the releases or threatened releases of hazardous substances, pollutants, and contaminants from the Facility on public health, welfare and the environment; and to identify, assess, design, develop and implement response action alternatives.
- *October 23, 1990* – The Proposer and the MPCA entered an Amended Response Order by Consent (“Amended Order”). The scope of the Amended Order required the Proposer to redesign and complete the remedial investigation agreed to in the 1985 Order, conduct a feasibility study; develop a plan to provide an alternative drinking water source for certain residential wells adversely affected by the release(s) from the Facility and the neighboring Crosby American Demolition Landfill; and to develop a response action plan and implement the approved response actions.
- *September 23, 1991*– The MPCA approved the Updated Remedial Investigation Report for the Facility. Regarding the alternative drinking water source, the Proposer developed a plan and the MPCA issued a Record of Decision in September 1991 which required the residences with affected wells to connect to the city’s water supply system. The City of Inver Grove Heights completed the connections supplying municipal water to the residences in December 1994.
- *November 21, 1994*– The MPCA approved No Action Alternatives under the Superfund process for the source control and the remediation of groundwater contamination as recommended in the Updated Detailed Remedial Analysis Report. The Minnesota solid waste management rules require more stringent levels for cleanup and remediation than the Superfund program, therefore, the source control and the remediation of groundwater contamination was previously and currently managed in accordance with this Permit.
- *March 4, 2003*– The MPCA granted the Proposer a CON capacity as part of the Phase 5 vertical expansion of the Facility. The CON capacity granted was 6 million cy and brought the total Facility disposal capacity to 29,800,000 cy.

- *July 2008 and November 2013* – The Proposer submitted Applications for Permit Renewal with a new SW-45 Permit being reissued.
- *July 30, 2015*— The MPCA approved the request for a major modification to allow for increased air space by allowing to increase the final cover slope to 3:1 around the entire existing landfill footprint, including the north and east sides and is referred to as Phase 6.
- *December 2021*— BFI was granted additional CON (2,398,746 tons) due to the Phase 6 expansion.

RNG Facility and Pipeline Project

The Pine Bend Pipeline Project was recently constructed, which included an approximately 5,900-foot, 4.5 inch-outside-diameter, natural gas pipeline from a new RNG processing facility constructed along the northern portion of the Facility to a NSPM natural gas system interconnection point near the southeastern quadrant of the Rich Valley Boulevard/ 105th Street East intersection. The RNG processing facility replaced a landfill gas to energy (“LFGTE”) electricity generating facility at the Facility, which has since been decommissioned. The RNG Facility is approximately 12,000 square feet. The low-pressure pipeline was constructed of 24-inch high density polyethylene. Gas to be transported by the pipeline consists of methane (approximately 98 percent) with a small amount of carbon dioxide and trace amounts of other compounds. The gas will meet specifications required for renewable natural gas as established by NPSM.

The Minnesota Public Utilities Commission (“PUC”) evaluated the potential environmental impacts resulting from the project as part of the Pipeline Route Permit process for the Pine Bend Pipeline Project and issued the permit in July 2021. This project was subsequently constructed and is currently in operation. The RNG Facility and associated pipeline is owned and operated by Opal. Figure 4 in Appendix A illustrates the location of the recently constructed RNG Facility and Pine Bend Pipeline Project.

7. Climate Adaptation and Resilience

a. Describe the climate trends in the general location of the project (see guidance: Climate Adaptation and Resilience) and how climate change is anticipated to affect that location during the life of the project.

Climate trends for the Project Area are described in the following paragraphs based on Statewide trends and County-level trends. County-level data was utilized to describe the anticipated effects of climate change to the Project Area. The lifetime of the Project is assumed to be 25 years from 2023 to 2048. As described in Item 6 (Project Location), under existing conditions it is anticipated that the Facility would reach capacity by 2027. The Project would extend the life of the Facility by approximately 21 years through 2048. In accordance with Minnesota Rules and solid waste permit requirements, post-closure care is required at the Facility for a minimum of 30 years (anticipated to be 2068 based on the expected landfill life). After 30 years, the Facility would be evaluated and the post-closure period would be terminated or extended.

In general, Minnesota is anticipated to experience an increase in temperature, precipitation, and more frequent extreme precipitation events resulting from climate change. In Minnesota, annual average temperatures have risen two degrees over the past century and up to three degrees in the northern part of the state. The highest average temperature increases have occurred during the winter. Since 1895, temperatures during the winter have increased at a rate two to three times higher than during the summer.

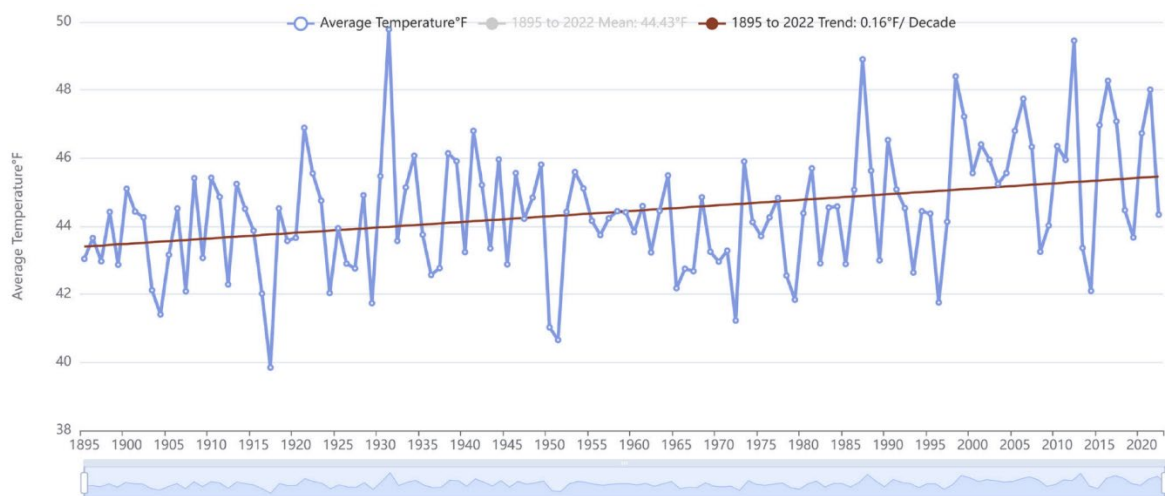
Winter warming rates have risen more sharply in recent decades.² Current climate warming trends, most notably during the winter, are anticipated to continue.³

Heavy rain events have become more frequent in Minnesota and more intense. From 1973 to 2020.

Minnesota experienced 17 mega-rain events⁴ with a notable increase since 2000. Of these 17 events, three occurred in the 1970s, two in the 1980s, one in the 1990s, six mega-rain events occurred in the 2000s, four in the 2010s, and one in 2020. Thus, in the past 21 years (2000 to 2020), almost two times as many mega rain events occurred compared to the prior 27 years (1973 to 1999).⁵

Climate trends in Dakota County parallel overall statewide trends indicating Minnesota's climate is becoming warmer and wetter. Exhibits 1 and 2 illustrate historical annual average temperature and precipitation trends for Dakota County from 1895 to 2021. During this time, Dakota County experienced an average annual temperature increase of 0.16 degrees Fahrenheit (°F) per decade and average annual precipitation increase of 0.48 inches per decade.

Exhibit 1. Historical annual average temperature in Dakota County (1895 – 2022)



Source: Minnesota Department of Natural Resources:
<https://arcgis.dnr.state.mn.us/climateexplorer/main/historical>

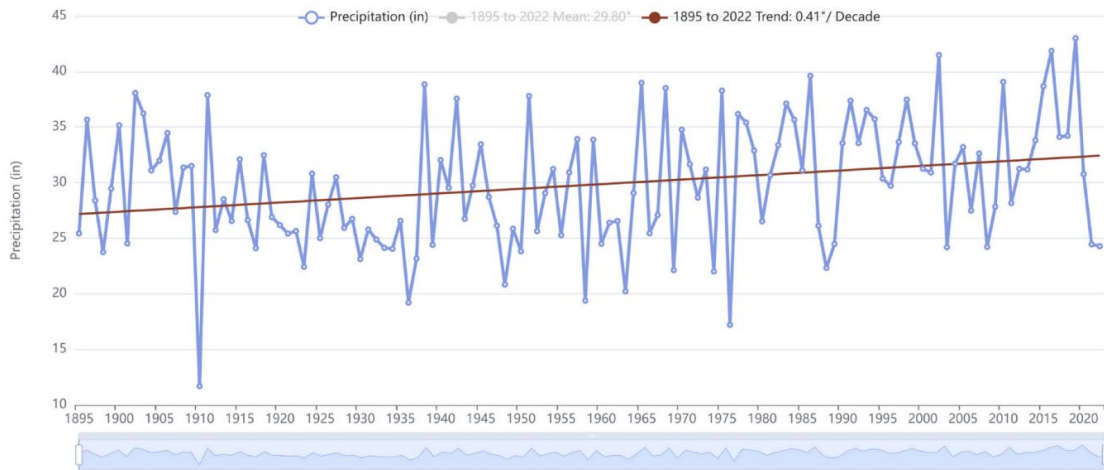
² MNDNR. Climate Trends. https://www.dnr.state.mn.us/climate/climate_change_info/climate-trends.html

³ MnDOT. Minnesota Go Climate Change Report. 2021. <https://www.minnesotago.org/trends/climate-change>

⁴ Mega-rain events are defined as events in which six inches of rain covers more than 1,000 square miles and the core of the event tops eight inches.

⁵ Minnesota Department of Natural Resources. Historic Mega-Rain Events in Minnesota.
https://www.dnr.state.mn.us/climate/summaries_and_publications/mega_rain_events.html

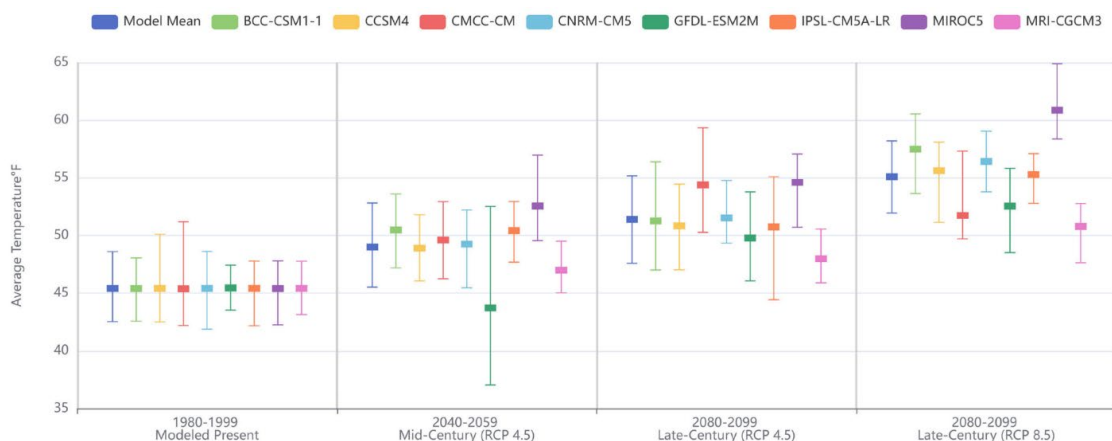
Exhibit 2. Historical annual average precipitation in Dakota County (1895 – 2022)



Source: Minnesota Department of Natural Resources: <https://arcgis.dnr.state.mn.us/climateexplorer/main/historical>

Projected climate trends indicate that temperatures in Dakota County will continue to increase. Exhibit 3 illustrates projected temperatures for Dakota County. Several climate models are shown in the projected temperature analysis. The model mean, shown in blue, illustrates the average of all models included in the analysis. Exhibit 3 shows the modeled present condition, mid-century (2040-2059) at Representative Concentration Pathway ("RCP") 4.5, late-century (2080-2099) at RCP 4.5, and late-century (2080-2099) at RCP 8.5. RCP is a greenhouse gas concentration scenario used by the Intergovernmental Panel on Climate Change in the fifth assessment report. RCP 4.5 is an intermediate scenario in which emissions decline after peaking around 2040 and RCP 8.5 represents a worst-case scenario in which emissions continue rising through the 21st century.

Exhibit 3. Projected temperatures in Dakota County



Source: Minnesota Department of Natural Resources: <https://arcgis.dnr.state.mn.us/climateexplorer/main/historical>

As shown in Exhibit 3, temperatures in Dakota County are projected to increase. Under the RCP 4.5 scenario, the temperature is anticipated to increase from a model present mean (1980 – 1999) of 45.4 degrees Fahrenheit (1980-1999) to a mid-century (2040 – 2059) model mean of 49.0 degrees Fahrenheit and a late-century (2080 – 2099) model

mean of 51.4°F t. Under the RCP 8.5 worst-case scenario, Dakota County would experience a late century modeled mean temperature of 55.1°F.

Increases in precipitation and mega-rain events are anticipated to contribute to an increase in flood events in Minnesota. According to an analysis of flood risk to properties completed by the First Street Foundation, over the next 30 years, the number of properties in Minnesota considered to be at risk of experiencing a flood event is projected to increase by approximately two percent.⁶ Appendix C shows that the Project Area is not within the regulated Federal Emergency Management Agency (“FEMA”) 100-year floodplain or floodway. The First Street Flood Model incorporates FEMA Flood Insurance Rate Maps (“FIRM”) and climate data to identify flood risk areas. Exhibit 4 shows the flood risk from a 100-year storm event based on the First Street Foundation’s flood risk model. Based on this model, the Project Area is not at risk of experiencing flood impacts during a 100-year storm event under Year 2050 conditions. The proposed vertical expansion of the Facility would further increase the existing elevation of the Project Area and reduce the flood risk potential.

Exhibit 4. Year 2050 100-year storm flood risk



Source: First Street Foundation Flood Risk Explorer <https://www.floodfactor.com/>

The U.S. Environmental Protection Agency’s (“EPA”) Climate Resilience Evaluation and Awareness Tool (“CREAT”)⁷ was reviewed to evaluate projected storm intensification for the local Area which includes portions of Dakota and Hennepin Counties. The future conditions evaluated in the CREAT tool include a “Stormy” Scenario, the highest intensity models, and “Not

⁶ First Street Foundation. *The First National Flood Risk Assessment: Defining America’s Growing Risk*. 2020. Page 78. https://assets.firststreet.org/uploads/2020/06/first_street_foundation_first_national_flood_risk_assessment.pdf

⁷ U.S. EPA. CREATE Climate Scenarios Projection Map. Accessed January 2023. <https://epa.maps.arcgis.com/apps/MapSeries/index.html?appid=3805293158d54846a29f750d63c6890e>

as Stormy” Scenario, the lowest intensity models, for two time periods, 2035 and 2060. Based on the CREAT tool, the 100-year storm intensity under the Not as Stormy Scenario is projected to increase 2.9 percent in 2035 and 5.6 percent in 2060 for the local area. The 100-year storm intensity under the Stormy Scenario is project to increase 13.7 percent in 2035 and 26.6 percent in 2060 for the local area.

Table 5. Summary of Reported Climate Trends

State of Minnesota - Climate trends (data driven) & projected climate change (model driven)	County/local trends	Anticipated affects to Project location - Address anticipated climate change hazards: storm intensity, flooding, extreme heat, drought, and wildfire
Increasing temperature Average annual temperature increasing	Average annual temperature increase of 0.16°F per decade since 1895 through 2022.*	Landfill has been designed for extreme temperatures. Increases in temperature and precipitation may result in slight increases of waste degradation, landfill gas generation, and leachate production. However, the Facility is conservatively designed to handle the maximum amount of landfill gas and leachate produced over the life of the landfill.
Increasing precipitation Average annual precipitation increasing	Annual precipitation increase of 0.37 inches per decade since 1895 through 2022.*	Not at risk of experiencing flood impacts during a 100-year storm event under year 2050 conditions. Increased risk of localized flooding in the vicinity of the Project Area. Increased quantity of stormwater.
Increasing temperature Winter minimums increasing	Average annual temperature increase of 0.33°F per decade for the 3-month period from December through March since 1895 through 2022.*	Landfill has been designed for extreme temperatures.
Increasing temperature Nighttime temperatures increasing	Minimum monthly temperature increase of 0.3°F per decade from 1895 through 2022.**	Landfill has been designed for extreme temperatures.
Increasing precipitation Extreme events increasing	Increase in projected 100-year storm intensity ranging from 2.9% to 13.7% in 2035 and 13.7 to 26.6% in 2060 for the local area that includes portions of Dakota and Hennepin Counties.***	Not at risk of experiencing flood impacts during a 100-year storm event under year 2050 conditions. Increased quantity of stormwater. Increases in temperature and precipitation may result in slight increases of waste degradation, LFG generation, and leachate production.
Projected climate change: Increasing risk of heat waves Early Century = 2015-2034 Mid Century = 2035-2064 Days vary dependent on emissions	Days over 90°F Early Century: -24 - 26.5 days (+14 to 16.5 days since 1976-2005) Mid Century: 33.2-41.7 days (+23 to 31.8 days since 1976-2005)	Increased risk to vegetation survival or competition with undesirable species. Increased

State of Minnesota - Climate trends (data driven) & projected climate change (model driven)	County/local trends	Anticipated affects to Project location - Address anticipated climate change hazards: storm intensity, flooding, extreme heat, drought, and wildfire
Projected climate change: Increasing risk of drought Early Century = 2015-2034 Mid Century = 2035-2064 Days vary dependent on emissions	Maximum number of consecutive dry days Early Century: 15.3-15.4 days (+0.1 – 0.2 days since 1976-2005) Mid Century: 15.3-15.5 days (+0.1-0.3 days since 1976-2005)	Increased concentrations of hazardous chemical compounds in leachate. Increased risk to vegetation survival or competition with undesirable species.

- b. For each Resource Category in the table below: Describe how the project's proposed activities and how the project's design will interact with those climate trends. Describe proposed adaptations to address the project effects identified.**

Table 6 demonstrates the connections between the various project components, the predicted climate trends, and the potential environmental impacts. This table also includes adaptation strategies that are proposed or under consideration for the potential environmental impacts. Table 6 is organized by the Resource Categories of the EAW Guidance including *Project Design, Land Use, and Contamination/Hazardous Materials/Wastes*, followed by the Project Components, Potential Environmental Impacts, and the proposed Adaptation strategies to those impacts.

Resource categories and components of activities

Project design:

- Increased elevation and capacity of landfill
- Increased quantity of LFG pipes and landfill liners
- Final cover

Land use:

- Increased total landfill waste capacity
- Increased leachate
- Increased lifespan of the landfill
- Temporary increases in vehicles during construction and landfill closing

Contamination/hazardous materials/wastes:

- Organized by a summary of potential environmental effects from the Project Design and Land Use Categories
- Addresses how current climate trends may influence the potential environmental effects of generation/use/storage of hazardous waste and materials

The impacts and adaptation strategies for *Water Resources, Fish, Wildlife, Plant Communities, and Sensitive Ecological Resources (Rare Features)*, and *GHG emissions* are summarized in Table 4 and described in more detail in their respective sections. *Vulnerable Communities* has been added as a resource category compared to the Environmental Quality Board's ("EQB") adopted EAW form

Table 6. Impacts and adaptations summary

Resource category	Climate trends & climate projections	Project information (components of proposed activities)	Potential environmental impacts address anticipated climate change hazards: storm intensity, flooding, extreme heat, drought, and wildfire	Adaptation strategies (with applicable timeframe construction, near-term, long-term)
	Increasing temperature Average temperature increasing	Increased elevation and capacity of landfill.	No known impacts.	
Project design		Increased quantity of LFG pipes and landfill liners.	Infrastructure may be more vulnerable to damage from elevated temperatures.	The landfill currently utilizes materials resilient to elevated temperatures. Normal temperatures within an MSW landfill typically range from 100 to 145 degrees F. HPDE piping works well in a wide range of temperatures ranging from -220 to +180 degrees F. Pine Bend will continue to evaluate proper and resilient engineering design for the landfill.
		Final cover	Increased risk to vegetation survival or competition with undesirable species.	Consider vegetating with a plant mix tolerant of long-term changes in temperature
	Increasing temperature Winter minimum Temperature increasing	Increased elevation and capacity of landfill.	No known impacts.	
		Increased quantity of LFG pipes and landfill liners.	Infrastructure may be more vulnerable to damage from elevated temperatures and increased exposure during winter melt periods.	The landfill currently utilizes materials resilient to temperature increases. Normal temperatures within an MSW landfill typically range from 100 to 145 degrees F. HPDE piping works well in a wide range of temperatures ranging from -220 to +180 degrees F. Pine Bend will continue to

				evaluate proper and resilient engineering design for the landfill.
		Final cover	Increased risk to vegetation survival or competition with undesirable species. Increased risk of heat stress and exposure of vegetation.	Consider vegetating with a plant mix tolerant of long-term changes in temperature and exposure during winter months.
	Increasing temperature Nighttime temp increasing	Increased elevation and capacity of landfill.	No known impacts.	
		Increased quantity of LFG pipes and landfill liners.	Infrastructure may be more vulnerable to damage from elevated temperatures.	The landfill currently utilizes materials resilient to temperature increases. Normal temperatures within an MSW landfill typically range from 100 to 145 degrees F. HPDE piping works well in a wide range of temperatures ranging from -220 to +180 degrees F. Pine Bend will continue to evaluate proper and resilient engineering design for the landfill.
		Final cover	Increased risk of heat stress on vegetation. Increased risk to vegetation survival or competition with undesirable species.	Consider a plant mix more tolerant of long-term changes in precipitation.
	Increasing precipitation Average annual Precipitation increasing	Increased elevation and capacity of landfill.	No known impacts.	
		Increased quantity of LFG pipes and landfill liners.	Infrastructure may be more vulnerable to damage due to increased precipitation.	Monitoring of site to detect weakened infrastructure to minimize washouts and equipment exposure and damage.

		Final cover	Increased risk to vegetation survival or competition with undesirable species. Saturation of soils.	Consider a plant mix more tolerant of long-term changes in precipitation. Monitoring of site to detect weakened infrastructure to minimize washouts and equipment exposure and damage.
	Projected climate change trends: Increasing risk of heatwaves	Increased elevation and capacity of landfill.	No known impacts.	
		Increased quantity of LFG pipes and landfill liners.	Infrastructure may be more vulnerable to damage due to increased periods of extreme heat.	The landfill currently utilizes materials resilient to temperature increases. Normal temperatures within an MSW landfill typically range from 100 to 145 degrees F. HPDE piping works well in a wide range of temperatures ranging from -220 to +180 degrees F. Pine Bend will continue to evaluate proper and resilient engineering design for the landfill.
		Final cover	Increased risk of heat stress on vegetation. Increased risk to vegetation survival or competition with undesirable species.	Consider vegetating with a plant mix tolerant of long-term changes in temperature and is resilient to extreme heat events.
	Projected climate change trends: Increasing risk of drought	Increased elevation and capacity of landfill	No known impacts.	
		Increased elevation and quantity of LFG pipes and landfill liners	No known impacts.	
		Final cover	Increased risk to vegetation survival or competition with undesirable species.	Consider vegetating with a plant tolerant of long-term changes in precipitation or temperature. Consider soil and/or mulch addition to increase water storage capacity.
		Increased elevation and capacity of landfill	No known impacts.	

	Projected climate change trends: Increasing risk of intensity of tornadoes and wind surges	Increased elevation and capacity of landfill	Increased risk of air pollution (dust) and flying debris	Landfill operation would cease in the event of extreme wind conditions.
		Increased elevation and quantity of LFG pipes and landfill liners	Infrastructure more vulnerable to damage	Landfill equipment such as pumps and valves are currently protected within structures, such as vaults and manholes. The Project does not include any new pumps and leachate collection system infrastructure.
		Final cover	No known impacts.	
	Projected climate change trends: Increasing groundwater levels	Increased elevation and capacity of landfill	No known impacts.	
		Increased elevation and quantity of LFG pipes and landfill liners	Increased risk of leachate contamination to groundwater.	A detection system is installed beneath each sump (north and south) to detect any leaking of landfill leachate. The Facility has an existing groundwater monitoring system in place and has been continuously monitoring groundwater for over 35 years. The Proposer will continue to closely monitor groundwater data.
		Final cover	No known impacts	

Resource category	Climate trends & climate projections	Project information (components of Proposed activities)	Potential Environmental Impact address <i>anticipated climate change hazards: storm intensity, flooding, extreme heat, drought, and wildfire</i>	Adaptation strategies (with applicable timeframe - construction, near-term, long-term)-
	Increasing temperature Average temperature increasing	Increased total landfill waste capacity	No known impacts	
Land use		Increased leachate	Potential slight increase in the rate of waste decomposition. Potential slight increase in generation of landfill gas. Low potential for Increased risk of landfill fires.	The Facility is designed, monitored, and operated per federal regulations to ensure sufficient collection and control of landfill gas throughout the lifetime of Project. An RNG Facility was recently constructed that converts LFG to RNG, which offsets a portion of GHG emissions. (See Item 18 for additional details).
		Increased lifespan of the landfill	No known impacts.	
		Temporary increases in vehicles during construction and landfill closing	No impacts as vehicle construction traffic would be short-term.	Vehicles will minimize idling onsite to the extent possible.
	Increasing temperature Winter minimum Temperature increasing	Increased total landfill capacity	No known impacts	
		Increased leachate	No known impacts	
		Increased lifespan of the landfill	No known impacts	

		Temporary increases in vehicles during construction, leachate transport and landfill closing	No impact. Short-term construction vehicle increases.	Vehicles will minimize idling onsite to the extent possible
	Increasing temperature Nighttime temp increasing	Increased total landfill capacity	No known impacts	
		Increased leachate	No known impacts	
		Increased lifespan of the landfill	Increased risk of heat stress on vegetation.	Consider vegetating with a plant mix more tolerant of long-term changes in precipitation or temperature.
		Temporary increase in vehicles during construction and landfill closing.	No impact. Short-term construction vehicle increases.	Vehicles will minimize idling onsite to the extent possible.
	Increasing precipitation Average annual Precipitation increasing	Increased total landfill capacity	Increased rate of decomposition of waste. Increased quantity of leachate. Increased quantity of stormwater.	Two additional 36-inch culverts will be installed under the railroad tracks. No new infiltration ponds are proposed as the current system has been designed to accommodate the Project. The surface water management system has been designed to capture and treat of stormwater for 100-year, 24-hour MSE 3 storm event of 7.43 inches.
		Increased leachate	The Project has been designed to accommodate conservative estimates of leachate production.	The Proposer will continue to collect leachate daily and transport to Metro Plant in the City of Saint Paul for treatment.
		Increased lifespan of the landfill	No known impacts	Monitoring of site to detect weakened infrastructure to minimize washouts and equipment exposure and damage.
		Temporary increase in vehicles during construction and landfill closing.	No impact. Minimal short-term vehicle increases during construction.	

	Increasing precipitation Extreme precipitation Events increasing	Increased total landfill capacity	Increased rate of decomposition of waste Increased quantity of leachate Increased quantity of stormwater	Two additional 36-inch culverts will be installed under the railroad tracks. No new infiltration ponds are proposed as the current system has been designed to accommodate the Project. The surface water management system has been designed to capture and treat of stormwater for 100-year, 24-hour MSE 3 storm event of 7.43 inches. The Proposer will continue to collect leachate daily and transport to Metro Plant in the City of Saint Paul for treatment.
		Increased leachate	Speeding up decomposition of waste. Increased quantity of leachate. Increased quantity of stormwater. Potential increase of emissions with increased daily trips to Metro Wastewater plant.	Two additional 36-inch culverts will be installed under the railroad tracks. No new infiltration ponds are proposed as the current system has been designed to accommodate the Project. The surface water management system has been designed to capture and treat of stormwater for 100-year, 24-hour MSE 3 storm event of 7.43 inches. The Proposer will continue to collect leachate daily and transport to the Metro Plant in the City of Saint Paul for treatment. Consider methods to increase efficiency of transport.
		Increased lifespan of open landfill	Increased quantity of leachate. Infrastructure may be more vulnerable to damage due to increased precipitation and longer lifespan.	Monitoring of site to detect weakened infrastructure to minimize washouts and equipment exposure and damage.
		Temporary short-term increases in vehicles during construction and landfill closing	No known impacts. Minimal short-term vehicle increases during construction.	
	Projected climate change trends:	Increased total landfill capacity	Increased rate of decomposition of waste.	Two additional 36-inch culverts will be installed under the railroad tracks. No new infiltration ponds

	Increasing risk of heatwaves			are proposed as the current system has been designed to accommodate the Project. The surface water management system has been designed to capture and treat of stormwater for 100-year, 24-hour MSE 3 storm event of 7.43 inches. The Proposer will continue to collect leachate daily and transport to the Metro Plant in the City of Saint Paul for treatment.
		Increased leachate	Speeding up decomposition of waste. Heatwaves are more associated with drought, when leachate would be reduced.	Two additional 36-inch culverts will be installed under the railroad tracks. No new infiltration ponds are proposed as the current system has been designed to accommodate the Project. The surface water management system has been designed to capture and treat of stormwater for 100-year, 24-hour MSE 3 storm event of 7.43 inches. The Proposer will continue to collect leachate daily and transport to the Metropolitan Wastewater Treatment Plant (Metro Plant) in the City of Saint Paul for treatment. Consider methods to increase efficiency of transport.
		Increased lifespan of open landfill	Increased quantity of leachate. Infrastructure may be more vulnerable to damage due to increased precipitation and longer lifespan.	Monitoring of site to detect weakened infrastructure to minimize washouts and equipment exposure and damage.
		Temporary short-term increases in vehicles during construction and landfill closing	No known impacts. Minimal short-term vehicle increases during construction.	
	Projected climate change trends:	Increased total landfill capacity	No known impacts.	

	Increasing risk of drought	Increased leachate	Reduced quantity of leachate.	
		Increased lifespan of open landfill	No known impacts	
		Temporary short-term increase in vehicles during construction and landfill closing.	No known impacts. Minimal short-term vehicle increases during construction.	
	Projected climate change Increasing risk of intensity of tornadoes and wind surges	Increased total landfill capacity.		
		Increased leachate.	No known impacts.	
		Increase lifespan of landfill	No known impacts.	
		Temporary increases in vehicles during construction and landfill closing	No impact. Vehicles would not operate during a storm.	Landfill operation ceases in the event of extreme weather conditions.
	Projected climate change: Increasing groundwater levels	Increased total landfill capacity	No known impacts.	
		Increased leachate	Increased risk of leachate contamination to groundwater.	A detection system is installed beneath each sump (north and south) to detect any leaking of landfill leachate. The Facility has an existing groundwater monitoring system in place and has been continuously monitoring groundwater for over 35 years. The Proposer will continue to closely monitor groundwater data.

		Increased lifespan of the open landfill	No known impacts	
		Temporary short-term increase in vehicles during construction and landfill closing.	No known impacts.	
Contamination/ hazardous materials/ wastes	Avg Temp Increasing: • Winter min. Increasing • Extreme Heat Increasing • Nighttime Temp Increasing	Infrastructure may be more vulnerable to damage from elevated temperatures. Increased risk of heat stress and exposure of vegetation. Increased risk to vegetation survival or competition with undesirable species. Potential slight increase in the rate of waste decomposition. Heatwaves are more associated with drought, when leachate would be reduced. Potential slight increase in generation of landfill gas. Low potential for Increased risk of landfill fires.	May damage infrastructure and create situations that result in accidental spills and releases. Increased erosion of exposed contaminated soil and waste. Increased rate of decomposition may increase presence of hazardous waste. Increased extreme heat and humidity, making environmental effects such as odors more likely and may increase their severity.	Include these anticipated consequences of climate change in the spill prevention plan contingency plans as relevant.
	Avg. Precipitation Increasing • Extreme Precipitation Events	Infrastructure may be more vulnerable to damage due to	Existing storage tanks are not located in areas at risk of flooding and are described in Item 13. No	

	Increasing (Flooding)	increased precipitation. Increased risk to vegetation survival or competition with undesirable species Saturation of soils. Increased rate of decomposition of waste. Increased quantity of leachate. Increased quantity of stormwater. Potential increase of emissions with increased daily trips to Metro Wastewater plant. Increased risk of leaching contaminants into the groundwater. Infrastructure may be more vulnerable to damage due to increased precipitation and longer lifespan.	new storage tanks are proposed. Risk of breaching capacity for holding and managing the leachate, stormwater, and wastewater volume generated. Increases in leachate and contact water needing treatment.	
	Increasing Groundwater Levels	Increased risk to vegetation survival or competition with undesirable species. Increased quantity of leachate.	Increased erosion of exposed contaminated soil and waste. Increased risk of leachate contamination to groundwater.	
	Drought	Infrastructure more vulnerable to damage.	No known impacts.	

		Wind-blown waste particles increasingly difficult to control.		
	Increasing intensity of tornadoes and wind surges	The surrounding area consists of industrial land uses. The closest residential homes are approximately 1,000 feet northwest of the edge of the landfill property boundary.	No known impacts.	

Resource category	Climate trends & climate projections	Summary of potential environmental effects (Project design and land use)	How current climate trends may influence the potential environmental effects of generation/use/storage of hazardous waste and materials	Adaptation strategies (with applicable timeframe construction, near-term, long-term)
Vulnerable communities	Avg Temp Increasing Winter min. Temp. Increasing Extreme Heat Increasing Nighttime Temp Increasing Avg. Precipitation Increasing	The surrounding area consists of industrial land uses. The closest residential homes are approximately 1,000 feet northwest of the edge of the landfill property boundary.	No known impacts.	Routine water monitoring occurs in accordance with the Facility permit and will happen during the post-closure period in accordance with an approved Closure Order issued by the MPCA.
	Extreme Precipitation Events Increasing (Flooding)	The surrounding area consists of industrial land uses. The closest residential homes are approximately 1,000 feet northwest of the edge of the landfill property boundary.	Not at risk of experiencing flood impacts during a 100-year storm event under year 2050 conditions.	
	Increasing groundwater levels	People living in close proximity to the project area	No known impacts.	
	Drought	People living in close proximity to the project area	No known impacts.	
	Increasing intensity of tornadoes and wind surges	People living in close proximity to the project area	Increased risk of exposure to harmful air pollutants (dust).	Landfill operation ceases under extreme weather conditions including high winds.
Fish, wildlife, plant communities and sensitive ecological resources	See Item 14			
Water resources	See Item 12			
GHG components	See Item 18			

8. Cover Types

Estimate the acreage of the site with each of the following cover types before and after development.

Figure 5, Appendix A shows land cover classifications for the Project Area based on geospatial data from the University of Minnesota land cover classification raster dataset. The Project is sited over existing active landfill cells and would not alter the existing cover type. At closure, disturbed areas will be re-vegetated as lawn/grassland. It is not anticipated that any significant impacts to existing land cover types will result from the Project. Land cover types before and after construction are presented in Table 7, green infrastructure is presented in Table 8, and tree canopy is presented in Table 9.

Table 7 Cover types

Cover types	Before(aces)	After (aces)
Wetlands and shallow lakes (<2 meters deep)	0	0
Deep lakes (>2 meters deep)	0	0
Wooded/forest	0	0
Rivers/streams	0	0
Brush/Grassland	0	0
Cropland	0	0
Livestock rangeland/pastureland	0	0
Lawn/landscaping ¹	0	89
Green infrastructure TOTAL (from table below**) ²	11	11
Impervious surface	0	0
Stormwater Pond (wet sedimentation basin)	0	0
Other (active landfill)	89	0
TOTAL	100	100

¹Final cover will be vegetated

²Existing stormwater infiltration basins are located outside of the vertical expansion limits

Table 8. Green infrastructure

Green infrastructure*	Before (acreage)	After (acreage)
Constructed infiltration systems (infiltration basins/infiltration trenches/ rainwater gardens/bioretention areas without underdrains/swales with impermeable check dams)	11	11
Constructed tree trenches and tree boxes	0	0
Constructed wetlands	0	0
Constructed green roofs	0	0
Constructed permeable pavements	0	0
Other (describe) Landfill-based geothermal system	0	0
TOTAL *	11	11

Table 9. Tree canopy

Trees	Percent	Number
Percent tree canopy removed or number of mature trees removed during development	0	0
Number of new trees planted	0	0

9. Permits and approvals required

List all known local, state and federal permits, approvals, certifications and financial assistance for the project. Include modifications of any existing permits, governmental review of plans and all direct and indirect forms of public financial assistance including bond guarantees, Tax Increment Financing and infrastructure. All of these final decisions are prohibited until all appropriate environmental review has been completed. See Minnesota Rules, Chapter 4410.3100.

Table 10 outlines known federal, state, and local permits, and associated regulatory agencies for the Project.

Table 10. Permits and approvals

Unit of government	Type of application	Status
State		
MPCA	Solid Waste Permit-45*	Expires July 30, 2025
	Air Permit 03700138-004	Current permit
MPCA	Air Permit Renewal 03700138-101	Submitted August 2009
MPCA	Minor Air Permit Amendments (3)	Submitted 2009, 2020, 2021
MPCA	Administrative Air Permit Amendment, Name Change	Submitted December 2020
MPCA	NPDES General Stormwater Permit For Industrial Activity Permit MNR053B5P	Expires March 31, 2025
MPCA	Certificate of Need (CON)	Recent approval December 2021
Minnesota Public Utilities Commission**	Pipeline Routing Permit	Issued July 2021
County		
Dakota County	Solid Waste Facility License	To be amended
Local		
Metropolitan Council	Industrial Discharge Permit #2001	Expires September 30, 2025
City of Inver Grove Heights	Conditional Use Permit	To be amended

* Solid Waste Permit-45 includes compliance with MN Statute 473-848 (Restriction on Disposal) in accordance with the Metropolitan Solid Waste Policy Plan 2016-2036.

**Issued to Petroleum Fuels Company (PFC) to construct a 5,600-foot pipeline to transport natural gas generated from a processing facility near the Pine Bend Landfill to an interconnection point. This project was approved and is in operation.

Cumulative potential effects may be considered and addressed in response to individual EAW Item Nos. 10-20, or the RGU can address all cumulative potential effects in response to EAW Item No. 22. If addressing cumulative effect under individual items, make sure to include information requested in EAW Item No. 21.

10. Land use

a. Describe:

i. Existing land use of the site as well as areas adjacent to and near the site, including parks and open space, cemeteries, trails, prime or unique farmlands.

The Project Area is an existing landfill. The Project proposes to increase the height of the landfill. The overall landfill footprint would remain the same. Existing land uses in the vicinity of the Project Area are primarily industrial uses. The existing Facility is bound by the closed Crosby American Properties Demolition landfill to the north, 117th Street to the south, and two Union Pacific Railroad lines to the east and west of the Facility. The SKB Rich Valley Demolition Landfill and a gravel pit are south of 117th Street and the Flint Hills Refinery is southeast of the Facility. Figure 2, Appendix A identifies the location of the Project Area.

Natural areas are present east of U.S. Highway 52, including the Pine Bend Scientific and Natural Area, the National Park Service's Mississippi River Recreation Area. The Mississippi River is approximately one mile east of the Project Area. Figure 2, Appendix A illustrates the locations of these park and recreation areas.

There are two existing regional bike trails and several more planned regional trails offsite but within a one-mile radius of the proposed Project Area. Figure 2, Appendix A shows the locations of these trails.

Approximately 31 acres of the 89-acre Project Area are classified as Prime Farmland or as Farmland of Statewide Importance based on Natural Resources Conservation Service ("NRCS") soils data, shown on Figure 5, Appendix A. The entire Project Area is currently an active landfill and is not suitable for farmland. Permitted for waste disposal activities since 1971, the Facility's future land use does not include agricultural uses. The Project over the existing waste footprint will not result in additional impacts to Prime Farmland. The Project does not include the use of federal funding.

ii. Plans. Describe planned land use as identified in comprehensive plan (if available) and any other applicable plan for land use, water, or resources management by a local, regional, state, or federal agency.

Based on the City of Inver Grove Heights 2040 Comprehensive Plan, the future land uses for the Project Area and surrounding areas primarily consist of General Industrial. The area west of the Project Area is identified as Light Industrial and the area northwest of the Project Area is identified as Rural Density Residential. The 2040 Comprehensive Plan outlines goals and policies for land use, environmental protection, housing, transportation, parks and recreation, sanitary sewer, water supply, critical areas, and surface water management in Inver Grove Heights for the next twenty years. Figure 7, Appendix A illustrates the future land uses within and in the vicinity of the Project Area.

iii. Zoning, including special districts or overlays such as shoreland, floodplain, wild and scenic rivers, critical area, agricultural preserves, etc.

The Project Area is within the General Industry (I-2) Zoning District. The majority of the surrounding areas to the east and south of the Project Area are also within the I-2 Zoning District. Areas west of the Project Area that are within the Limited Industry (I-1) Zoning District and areas northwest of the

Project Area are within the Agricultural (A) Zoning District. The Project Area is not in a special shoreland district or floodplain zoning district. Figures 8, Appendix A illustrates the zoning districts designated within and in the vicinity of the Project Area.

- iv. *If any critical facilities (i.e. facilities necessary for public health and safety, those storing hazardous materials, or those with housing occupants who may be insufficiently mobile) are proposed in floodplain areas and other areas identified as at risk for localized flooding, describe the risk potential considering changing precipitation and event intensity.***

The Project Area is not within the FEMA regulated 100-year floodplain and is not considered to be at high risk for potential flooding. No critical facilities are proposed in floodplain areas or other areas identified as at risk for localized flooding.

- b. *Discuss the project's compatibility with nearby land uses, zoning, and plans listed in Item 9a above, concentrating on implications for environmental effects.***

The Project is in the City of Inver Grove Heights in Dakota County. The city has planning and zoning jurisdiction over the Project. The proposed landfill expansion aligns with the City's planned land use and zoning regulations. The surrounding area is primarily General Industry or Limited Industry and compatible with the proposed Project. An approximately 500-foot-wide wooded area buffers the existing landfill Facility from rural residential areas to the northwest.

The Inver Grove Heights zoning ordinance allows for the airspace expansion of current landfills (10-13E-6) as a conditional use. Therefore, the Project is allowable through a Conditional Use Permit ("CUP"). The Facility currently operates under an existing CUP and a Non-Conforming Use Certificate from the City of Inver Grove Heights. The Facility also operates under a Solid Waste Facility License from Dakota County. The Proposer will need to amend their existing CUP and Dakota County Solid Waste License for the Project.

The Project would not change the nature of the Facility. The Project will not expand the footprint of the Facility and it would continue to operation as a municipal waste landfill. Existing conditions associated with traffic, noise, dust, odor, and other issues related to Facility operations would continue, but would not change from current operations.

- c. *Identify measures incorporated into the proposed project to mitigate any potential incompatibility as discussed in Item 10b above and any risk potential.***

The Project will not expand the footprint of the existing landfill and is compatible with the nearby industrial land uses. The nearest sensitive receptors are rural residences located northwest of the Project Area. These residences are buffered from the Project Area by a wooded area. No clearing or alterations to this natural buffer would result from the Project. The Project would increase the height of the existing landfill by approximately 85 vertical feet, which is further described in Item 16 (Visual).

11. Geology, Soils and Topography/Land Forms

- a. *Geology-- Describe the geology underlying the project area and identify and map any susceptible geologic features such as sinkholes, shallow limestone formations, unconfined/shallow aquifers, or karst conditions. Discuss any limitations of these features for the project and any effects the project could have on these features. Identify any project designs or mitigation measures to address effects to geologic features.***

Regional geology

The surficial and bedrock geology for Dakota County has been mapped in the Minnesota Geological Survey's Geologic Atlas of Dakota County⁸. The bedrock in the vicinity of the Project Area is overlain by a thick sequence of glacial deposits. Near the ground surface, the deposits consist of sand and gravel outwash associated with the Late Wisconsin Rosemount Outwash Plain. This sand and gravel outwash was a result of melt-water drainage from the Superior Lobe glacier. North of the Project Area, the sand and outwash deposits are overlain by till deposits consisting of sandy loam. West of the Project Area, the sand and outwash deposits are overlain by deposits associated with the Rich Valley melt-water channel that drained the Des Moines Lobe glacier. Hobbs and others (1990) identify the different outwash deposits as being underlain by Superior Lobe tills and undifferentiated valley fill sediments consisting chiefly of fine sand.

Four distinct bedrock formations that subcrop in the area of the Project Area are, from youngest to oldest, the Prairie du Chien Dolomite, the Jordan Sandstone, the St. Lawrence Formation, and the Franconia Formation. Below the Franconia Formation are Paleozoic sedimentary formations that include the Ironston and Galesville Sandstones, the Eau Claire Formation, and the Mt. Simon Sandstone.

In the vicinity of the Project Area, depth to bedrock varies from approximately 150 feet to more than 500 feet below grade (Bloomgren and others 1990). Consequently, the subcropping bedrock changes from the Prairie du Chien Dolomite just southwest of the Facility, to the Franconia Formation in a bedrock valley north and east of the Facility. The axis of this bedrock valley trends west/northwest to east/southeast and may have been incised by the ancestral Mississippi River before the Late Wisconsin glaciation. Regional information indicates that beneath the outwash and till of the Superior Lobe, the bedrock valley is filled (at depth) with fine sands and gravel.

Site geology

Site geology and hydrogeology has received extensive evaluation since the Facility began operations in 1971. The Facility owner installed a groundwater monitoring network in 1972 and collected more than 35 years of groundwater monitoring data.

An annual water monitoring report is submitted in compliance with MPCA solid waste permitting requirements that includes a compilation of site hydrogeologic information available. The following paragraphs provide a brief overview of the hydrogeology of the Project Area.

The uppermost aquifer underneath the Project Area consists of the glacial deposits hydraulically connected to the Prairie du Chien Group and the Jordan bedrock formations. In the bedrock valley, also hydraulically connected to the glacial deposits is the Franconia Formation. Prairie du Chien and Jordan together comprise the major aquifer in the Twin Cities Metropolitan Area. The Franconia Formation can provide small amounts of water, but is usually considered, along with the St. Lawrence Formation, a confining unit (Schoenberg, 1990). The Ironston and Galesville Sandstones serve as a regional aquifer above the Eau Claire formation, which acts as a major aquitard. The Mt. Simon Sandstone is considered the deepest aquifer in the area.

An extensive monitoring well network functions for water-level measurements and water quality sampling at the Facility. The water table in glacial deposits lies between 725 to 800 feet National Geodetic Vertical Datum (NGVD). Groundwater flows to the northeast with the northeast flow becoming more easterly as it approaches the bedrock valley along the northern boundary of the Project Area.

⁸ Balaban, N.H. Hobbs, H.C. (1990). C-06 Geologic atlas of Dakota County, Minnesota. Minnesota Geological Survey. Retrieved from the University of Minnesota Digital Conservancy, <https://hdl.handle.net/11299/58494>.

The average horizontal hydraulic gradient in the uppermost aquifer was calculated to be 0.010 feet per foot. Historically, the gradient has been steeper along the eastern boundary of the Project Area. Adjacent to and east of the Project Area, the hydraulic gradient becomes more gradual until about U.S. Highway 52/Minnesota Highway 55 where the hydraulic gradient increases once again due to the proximity of the Mississippi River Valley.

There are no known sinkholes or geologic features suggesting the presence of sinkholes located within one mile of the Project Area.

- b. Soils and topography— Describe the soils on the site, giving NRCS (SCS) classifications and ` project activities (distinguish between construction and operational activities) related to soils and topography. Identify measures during and after project construction to address soil limitations including stabilization, soil corrections or other measures. Erosion/sedimentation control related to stormwater runoff should be addressed in response to Item 12.b.ii.**

Table 11 lists hydrologic soil groups. The four hydrologic soil groups are:

- **Group B:** Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained, or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.
- **Group C:** Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Table 11. Soils within the project area.

Map symbol	Name	Percent slopes	Hydrologic soil group	Acres	Approx. percent of project area
1072	Udorthents, moderately shallow	--	Not rated	54	61
342C	Kingsley sandy loam	8-15	Group C	13	15
342B	Kingsley sandy loam	3-8	Group C	9	10
1816	Kennebec variant silt loam	--	Group C	6	7
1902B	Jewett silt loam	1-6	Group C	4	4
896E	Kingsley-Mahtomedi Complex	15-25	Group C	2	2
49B	Antigo silt loam	1-8	Group B	1	1
			Total:	89	100

Source: USDA Natural Resources Conservation Service (NRCS) Dakota County Soil Survey

Project impacts

Soil components

Construction and operation of the Project requires several soil components, including Controlled Fill; Clay; Drainage Material, Coarse Aggregate, Cover Soils and Top Soils. These soils may not be available at the Project Area and would need to be trucked in for construction.

The Project requires the following soils and aggregates for construction and final closure:

- **Controlled fill**

Construction of the necessary subgrade and berms utilizes controlled fill. Off-site sources will provide the majority of the controlled fill. Useable soils classified under the Unified Soils Classification System are clayey sand ("SC"); silty sand ("SM"); poorly graded sand ("SP"); well-graded sand, fine to coarse sand ("SW"); silt ("ML"); and clay of low plasticity, lean clay ("CL").

- **Clay barrier layer**

The clay barrier layer will consist of soils classified as SC, CL or CH. Off-site sources will provide the clay barrier layer material needed for the remaining Phase 6 cells and cell 5F-2. No clay is needed for the proposed Phase 7 as all liners are in-place.

- **Drainage layer**

The Project will use granular material for the drainage layer in the leachate collection system for the remaining Phase 6 cells and cell 5F-2. No sand drainage is needed for the proposed Phase 7 as all drainage material is in-place.

- **Coarse and intermediate filter aggregate**

Placement in the leachate collection trenches requires coarse aggregate. Coarse aggregate provides a highly permeable drainage media, and a bedding material for the leachate collection pipes, as well as bedding for the gas extraction well casings.

- **Cover soils**

Cover soils are necessary between the drainage layer and topsoil in the final cover. These soils need to provide a rooting zone for the final cover vegetation. The Proposer will use yard waste compost or a mix of yard waste and organic waste compost as intermediate cover at the Facility.

- **Topsoil**

The top layer (six inches) of the final cover requires topsoil as well as for the top layer on berms, embankments, and drainage ditches, etc. This soil will meet Minnesota Department of Transportation ("MnDOT") 3877.2A or an approved equal.

- **Class 5 aggregate**

Class 5 aggregate is required as a surface stabilizer for the site access roads.

NOTE: For silica sand projects, the EAW must include a hydrogeologic investigation assessing the potential groundwater and surface water effects and geologic conditions that could create an increased risk of potentially significant effects on groundwater and surface water. Descriptions of water resources and potential effects from the project in EAW Item 12 must be consistent with the geology, soils and topography/land forms and potential effects described in EAW Item 11.

12. Water Resources

a. Describe surface water and groundwater features on or near the site in a.i. and a.ii. below.

i. Surface water-- lakes, streams, wetlands, intermittent channels, and county/judicial ditches. Include any special designations such as public waters, shoreland classification and floodway/floodplain, trout stream/lake, wildlife lakes, migratory waterfowl feeding/resting lake, and outstanding resource value water. Include the presence of aquatic invasive species and the water quality impairments or special designations listed on the current MPCA 303d Impaired Waters List that are within 1 mile of the project. Include DNR Public Waters Inventory number(s), if any.

Surface waters

There are no surface waters within the Project Area. No streams or ditches were identified within the Project Area. The Mississippi River is approximately one mile east of the Project Area. Minnesota Department of Natural Resources (DNR) Public Waters and wetlands are present within one mile of the Project Area and are described in the following sections.

DNR Public waters

No DNR Public Waters are present within the Project Area. There are eight DNR Public Waters and Watercourses within a one-mile radius of the Project Area. The closest DNR Public Water to the Project Area is a DNR Public Water Wetland (19031000), which is on the north side of 117th Street and separated from the Project Area near the railroad. Table 12 identifies DNR Public Waters in the vicinity of the Project Area. The Project would not encroach into DNR Public Waters and Watercourses. Figure 9, Appendix A identifies the locations of DNR Public Waters in the vicinity of the Project Area.

Table 12. DNR Public waters within one mile of the project area

Name	Public water ID	Type
Unnamed	19029900	Public Water Wetland
Unnamed	19030100	Public Water Wetland
Unnamed	19030200	Public Water Wetland
Unnamed	19030300	Public Water Wetland
Unnamed	19030400	Public Water Wetland
Unnamed	19031000	Public Water Wetland
Mississippi River	19000502	Public Water Watercourse
U.S. Lock & Dam #2 Pool (main channel)	19000599	Public Water Watercourse

Wetland resources

No wetlands are within the Project Area. Based on a review of National Wetlands Inventory ("NWI") geospatial data, NWI features are towards the western, northern, and eastern edges of the existing landfill boundary. These NWI features consist of existing stormwater ponds. Figure 9, Appendix A identifies NWI features within a one-mile radius of the Project Area.

MPCA 303d Impaired waters list

The Mississippi River is approximately one mile east of the Project Area and is designated as impaired, Assessment Unit Identification ("AUID") 07010206-814. The Mississippi River is designated as impaired for aluminum; fecal coliform; mercury in fish tissue and the water column; nutrients; polychlorinated biphenyls ("PCBs") in fish tissue and the water column; perfluorooctane sulfonate ("PFOS") and total suspended solids ("TSS"). Figure 9, Appendix A identifies that there are no MPCA 303d impaired waters within or adjacent to the Project Area.

Floodway/floodplain

There are no floodplains within the Project Area. The Facility lies approximately 200 feet above the present level of the Mississippi River. Consequently, it is not in the 100-year floodplain. The Mississippi River lies approximately one mile to the east of the Facility at its nearest point. Appendix C includes the FEMA FIRMette for the Project Area.

- ii. **Groundwater – aquifers, springs, seeps. Include: 1) depth to groundwater; 2) if project is within a MDH wellhead protection area; 3) identification of any onsite and/or nearby wells, including unique numbers and well logs if available. If there are no wells known on site or nearby, explain the methodology used to determine this.**

The Project will not appropriate or consume groundwater and; therefore, would not contribute to groundwater supply issues in the area. The Facility has an existing groundwater monitoring network in place and would continue to monitor groundwater quality. This system would ensure early detection of groundwater quality impacts. If the Proposer observes groundwater quality impacts during monitoring, they will closely coordinate with the MPCA to develop appropriate actions to address and improve groundwater quality under the terms of their solid waste permit. The Proposer would secure all necessary permits required prior to implementing actions targeted at improving groundwater quality.

1) Depth to groundwater

Based on a review of Minnesota Department of Health (“MDH”) well log data for wells in the vicinity of the Project Area, the depth to static water level ranges from 74 feet and 176 feet. Appendix D includes MDH well log reports.

2) MDH Wellhead Protection Area

The Project Area is not within a MDH Wellhead Protection Area (“WHPA”) or Drinking Water supply Management Area (“DWSMA”). There are no known sinkholes or geologic features suggesting the presence of sinkholes within one mile of the Project Area.

3) Onsite and/or nearby wells

Over 20 monitoring wells are around the perimeter of the existing landfill, as well as additional monitoring wells on other industrial properties. The majority of the public supply wells are east of the Project Area. A few domestic wells are north and west of the Project Area. Table 13 identifies wells within the Facility based available data from the MDH Minnesota Well Index (“MWI”) database. Figure 10, Appendix A shows the locations of these wells. Numerous existing monitoring wells are present which are regularly monitored in accordance with permit requirements. Groundwater elevations are included in the 2022 Annual Water Quality Report provided in Appendix D.

Table 13. MDH Wells within Pine Bend Landfill

Well ID	Well name	Use type	Well depth (ft.)	Static water level (ft.)
00426264	MW-30 Pine Bend Landfill	Monitor Well	223	Unknown
00568553	IW-3 Pine Bend Landfill	Remedial	218	170
00568552	IW-2 Pine Bend Landfill	Remedial	237	170
00149795	WELL 7 A.W. Martin Assoc., Inc.	Test Well	152	110
00426270	MW-36 Pine Bend Landfill	Monitor Well	395	169
00207293	MW-3 Pine Bend Development	Monitor Well	227	74
00591294	MW-52 Pine Bend Landfill	Monitor Well	185	176
00100014	Phoenix Inc. Landfill	Commercial	466	120
00207294	Pine Bend Landfill	Test Well	377	128

00568551	IW-1 Pine Bend Landfill	Remedial	220	170
00511919	GW-2 Pine Bend Landfill	Monitor Well	197	153
00235965	MW-2A Pine Bend Landfill	Abandoned	103	95
00447845	MW-40 Pine Bend Landfill	Monitor Well	342	Unknown
00469296	P-5 Pine Bend Landfill	Monitor Well	185	Unknown
00529488	MW-44 Pine Bend Landfill	Monitor Well	178	131
00529489	MW-45 Pine Bend Landfill	Monitor Well	169	129
00469297	P-6 Pine Bend Landfill	Monitor Well	185	Unknown
00415942	Pine Bend Landfill	Test Well	160	159
00426261	MW-28 Pine Bend Landfill	Monitor Well	144	Unknown
00564058	MW-50 Pine Bend Landfill	Monitor Well	181	165
00564059	MW-51 Pine Bend Landfill	Monitor Well	180	165
00426248	MW-25 Pine Bend Landfill	Monitor Well	113	Unknown
00511918	P-4 Pine Bend Landfill	Piezometer	183	Unknown

Per- and polyfluoroalkyl substances: The MPCA more recently conducted additional monitoring for emerging contaminants of concern including per- and polyfluoroalkyl substances (“PFAS”), at closed landfills across the state. According to the MPCA⁹, PFAS contamination was found in 97 percent of assessed closed landfills. In February 2021, The MPCA, along with other state agencies, released Minnesota’s PFAS Blueprint – a strategic, coordinated approach to protect families and communities from PFAS.

In March of 2022, the MPCA developed a PFAS Monitoring Plan.¹⁰ The PFAS Monitoring Plan addresses PFAS monitoring at several different types of industries including Solid Waste Facilities. To implement the PFAS Monitoring Plan at Minnesota’s solid waste facilities, the MPCA is requesting all landfills sample groundwater monitoring wells for PFAS over the next two years.

Pine Bend has been sampling for PFAS during annual summer groundwater monitoring activities since 2011, therefore was removed from the formal PFAS Monitoring Plan. Sampling was first conducted as part of a PFC Monitoring Work Plan that was submitted to the MPCA at the end of 2010. The annual sampling requirement was then incorporated into PBL’s Solid Waste Facility Permit when the permit was modified as part of the 2018 expansion. This PFAS monitoring will continue to be required indefinitely and will be a part of future Solid Waste permit reissuance.

⁹ <https://www.pca.state.mn.us/news-and-stories/nearly-60-closed-landfills-in-41-counties-have-pfas-contamination-in-groundwater-that-exceeds-the>

¹⁰ March 2022, PFAS Monitoring Plan, Minnesota Pollution Control Agency. Available online at <https://www.pca.state.mn.us/sites/default/files/p-gen1-22b.pdf>

Perfluoroalkyl substance analyses

The July 2022 sampling event included analyses for PFAS at 22 monitoring wells and 2 springs, see Appendix D.

The May 31, 2019 Solid Waste permit revision sets specific limits for Perfluorobutane Sulfonate (“PFBS”) of 0.5 µg/L, Perfluorobutanoic acid (“PFBA”) of 1.75 µg/L, (“PFOS”) of 0.00375 µg/L and Perfluorooctanoic Acid (“PFOA”) of 0.00875 µg/L. Levels were detected at or above these limits for one or more of the PFAS at 12 wells and two springs. Where there is enough data to calculate concentration trends, PFAS concentration trends are decreasing or stable at all locations (shown in Appendix D) except the following five, where concentrations exhibit an upward trend:

- PFBA – M-28
- PFHxS – M-26
- PFOS – M-26, M-30, M-42, M-47
- PFOA – M-26, M-30, M-42

b. Describe effects from project activities on water resources and measures to minimize or mitigate the effects in Item b.i. through Item b.iv. below.

i. Wastewater-- For each of the following, describe the sources, quantities and composition of all sanitary, municipal/domestic and industrial wastewater produced or treated at the site.

1) If the wastewater discharge is to a publicly owned treatment facility, identify any pretreatment measures and the ability of the facility to handle the added water and waste loadings, including any effects on, or required expansion of, municipal wastewater infrastructure.

Sanitary system

The domestic sanitary system at the Facility consists of one 1,000-gallon tank and a drain field. A sewage collection company pumps this tank out once every two years.

Landfill leachate

The Facility is a source of leachate, which varies in quantity based on precipitation and the existence of active waste cells. The MPCA does not consider landfill leachate a hazardous substance. Leachate is water, which has percolated through the refuse, carrying with it some of the dissolved and suspended components of the refuse. Its composition varies with the amount of water in the landfill, the composition and age of the buried refuse, and the thickness and degree of compaction within the waste cells.

Design of the leachate collection system is for the Project to collect and convey leachate from the Project Area to existing Phase 5 and 6 leachate collection sumps. Appendix B includes plan drawings.

A submersible pump capable of pumping approximately 80 to 120 gallons per minute (gpm) will pump leachate collected in the sumps to the existing forcemain that encircles the perimeter of the Facility. Buried at a five-foot depth to prevent freezing the forcemain is a double-wall, solid HDPE pipe. The forcemain transfers leachate to the two leachate tanks.

A leak detection system is installed beneath the low point of each sump (north, south) for pollution prevention. The leak detection system includes a small leak detection sump beneath the clay barrier of the leachate collection sump.

The Proposer will continue to collect leachate daily and transport to the Metro Plant in the City of Saint Paul for treatment. There are no pretreatment provisions for the landfill leachate.

- 2) *If the wastewater discharge is to a subsurface sewage treatment system (SSTS), describe the system used, the design flow, and suitability of site conditions for such a system. If septic systems are part of the project, describe the availability of septage disposal options within the region to handle the ongoing amounts generated as a result of the project. Consider the effects of current Minnesota climate trends and anticipated changes in rainfall frequency, intensity and amount with this discussion.***

Sanitary system

The domestic sanitary system consists of one 1,000-gallon tank and a drain field. A sewage collection company pumps this tank out once every two years and transports the sewage to the Metro Plant facility for treatment.

- 3) *If the wastewater discharge is to surface water, identify the wastewater treatment methods and identify discharge points and proposed effluent limitations to mitigate impacts. Discuss any effects to surface or groundwater from wastewater discharges, taking into consideration how current Minnesota climate trends and anticipated climate change in the general location of the project may influence the effects.***

No wastewater is discharged to surface waters from the Facility. Leachate is transported to Metro Plant and treated.

- ii. *Stormwater— Describe changes in surface hydrology resulting from change of land cover. Describe the routes and receiving water bodies for runoff from the project site (major downstream water bodies as well as the immediate receiving waters). Discuss environmental effects from stormwater discharges on receiving waters post construction including how the project will affect runoff volume, discharge rate and change in pollutants. Consider the effects of current Minnesota climate trends and anticipated changes in rainfall frequency, intensity and amount with this discussion. For projects requiring NPDES/SDS Construction Stormwater permit coverage, state the total number of acres that will be disturbed by the project and describe the stormwater pollution prevention plan (SWPPP), including specific best management practices to address soil erosion and sedimentation during and after project construction. Discuss permanent stormwater management plans, including methods of achieving volume reduction to restore or maintain the natural hydrology of the site using green infrastructure practices or other stormwater management practices. Identify any receiving waters that have construction-related water impairments or are classified as special as defined in the Construction Stormwater permit. Describe additional requirements for special and/or impaired waters.***

On-site surface water management

The design of the surface water system is to manage a 100-year, 24-hour Type II storm event of 7.43 inches. The system consists of benches, catch basins, drainage piping, downslope structures, junction vaults, and infiltration ponds. The surface water management system is described in detail in Item 6.b (Project Description) of this EAW.

As discussed in Item 7 (Climate Adaptation and Resilience) of this EAW, the Project Area is not anticipated to experience a high risk for potential flooding. Atlas 14 rainfall values for Dakota County were used to define storm events in the HydroCAD model to determine the maximum

discharge from the final cover system to each of the infiltration ponds. The 100-year high water level was conservatively modeled assuming no infiltration in the swales and downslopes and consider future climate change conditions consisting of more frequent major storm events. The surface water management system exceeds infiltration requirements per the City's stormwater management requirements. The infiltration ponds can contain the 100-year storm. For modeled back-to-back 100-year storm events, existing ponds use emergency overflow discharge to the existing infiltration pond east of the railroad (6P) and the city storm sewer. Currently, one existing 36-inch culvert conveys stormwater runoff from the landfill beneath the railroad tracks to the eastern pond (6P). To accommodate additional stormwater flows, two additional 36-inch culverts will be installed under the railroad tracks.

- iii. Water appropriation-- Describe if the project proposes to appropriate surface or groundwater (including dewatering). Describe the source, quantity, duration, use and purpose of the water use and if a DNR water appropriation permit is required. Describe any well abandonment. If connecting to an existing municipal water supply, identify the wells to be used as a water source and any effects on, or required expansion of, municipal water infrastructure. Discuss environmental effects from water appropriation, including an assessment of the water resources available for appropriation. Discuss how the proposed water use is resilient in the event of changes in total precipitation, large precipitation events, drought, increased temperatures, variable surface water flows and elevations, and longer growing seasons. Identify any measures to avoid, minimize, or mitigate environmental effects from the water appropriation. Describe contingency plans should the appropriation volume increase beyond infrastructure capacity or water supply for the project diminish in quantity or quality, such as reuse of water, connections with another water source, or emergency connections.**

No water appropriations occur with this Project.

iv. Surface Waters

- a) Wetlands-- Describe any anticipated physical effects or alterations to wetland features such as draining, filling, permanent inundation, dredging and vegetative removal. Discuss direct and indirect environmental effects from physical modification of wetlands, including the anticipated effects that any proposed wetland alterations may have to the host watershed, taking into consideration how current Minnesota climate trends and anticipated climate change in the general location of the project may influence the effects. Identify measures to avoid (e.g., available alternatives that were considered), minimize, or mitigate environmental effects to wetlands. Discuss whether any required compensatory wetland mitigation for unavoidable wetland impacts will occur in the same minor or major watershed and identify those probable locations.**

No wetlands are within the Project Area. The Project is a vertical expansion of the existing landfill and will not result in impacts to wetlands.

- b) Other surface waters- Describe any anticipated physical effects or alterations to surface water features (lakes, streams, ponds, intermittent channels, county/judicial ditches) such as draining, filling, permanent inundation, dredging, diking, stream diversion, impoundment, aquatic plant removal and riparian alteration. Discuss direct and indirect environmental effects from physical modification of water features, taking into consideration how current Minnesota climate trends and anticipated climate change in the general location of the project may influence the effects. Identify measures to avoid, minimize, or mitigate environmental effects to surface water features, including in-water**

Best Management Practices that are proposed to avoid or minimize turbidity/sedimentation while physically altering the water features. Discuss how the project will change the number or type of watercraft on any water body, including current and projected watercraft usage.

The Mississippi River lies approximately one mile to the east of the Facility. The Project would not result in impacts or alterations to the Mississippi River or other surface waters.

13. Contamination/Hazardous Materials/Wastes

- a. Pre-project site conditions-- Describe existing contamination or potential environmental hazardson or in close proximity to the project site such as soil or ground water contamination, abandoned dumps, closed landfills, existing or abandoned storage tanks, and hazardous liquid or gas pipelines. Discuss any potential environmental effects from pre-project site conditions that would be caused or exacerbated by project construction and operation. Identify measures to avoid, minimize or mitigate adverse effects from existing contamination or potential environmental hazards. Include development of a Contingency Plan or Response Action Plan.**

A review of the MPCA's *What's in My Neighborhood* ("WIMN") database¹¹ was conducted to identify documented potentially contaminated sites within or in the vicinity of the entire Project Area. Table 14 identifies MPCA potentially contaminated within 500 feet of the Project Area. Figure 11, Appendix A illustrates the locations of potentially contaminated sites identified in the MPCA database.

Table 14. MPCA WIMN Database Sites within 500 feet of the Project Area

Site ID	Site name	MPCA Program
4910	Republic Services - Pine Bend Landfill	Environmental review (ENR-00032, inactive) Environmental review (ENR-00886, active) Hazardous waste, very small quantity generator (MND000245795, active) Investigation and cleanup, Federal and State superfund project (SR0000111, inactive) Investigation and cleanup, CERCLIS Site (MND000245795, inactive) Industrial stormwater (MNR53B5P, active) Permitted solid waste facility (SW-45, active) Construction stormwater (C00007620 and C00054017, active) Industrial stormwater (MNR053B5P, active) Wastewater, significant industrial user (SIU000631, active)
1546	Pine Bend Energy, LLC	Aboveground tanks (TS0001000, active) Underground tanks (TS0001000, active) Air Quality (03700138-004, active) Hazardous waste, minimal quantity generator (MNR000019174, active)
110277	Pine Bend Energy, LLC	Aboveground tanks (TS0121622, active) Underground tanks (TS0121611, active)

¹¹ MPCA. *What's in My Neighborhood*. Accessed March 2022. <https://www.pca.state.mn.us/data/whats-my-neighborhood>

141720	Phase 5 Cell E Landfill Cell Construct	Construction stormwater (C00035686, active)
131241	Pine Bend Compost Site	Solid waste permit by rule (PBR000538, active) Solid waste permit by rule (PBR000836, inactive) Construction stormwater (C0056781, active)
233409	Roseport DTL	Industrial stormwater (MNR053DYQ, active)
247695	Fortistar RNG Facility	Construction stormwater (C00060521, active)
248556	Pine Bend Pipeline	Construction stormwater (C00061356, active)

It is not anticipated that the Project would impact registered MPCA sites within the vicinity of the Project Area. The Proposer will renew and maintain all listed permits required to operate the expansion MSW landfill including the industrial stormwater permit and a major modification to permit solid waste (Permit SW-45). The Proposer will conduct proper closure of the landfill in accordance with all MPCA rules.

- b. Project related generation/storage of solid wastes - Describe solid wastes generated/stored during construction and/or operation of the project. Indicate method of disposal. Discuss potential environmental effects from solid waste handling, storage and disposal. Identify measures to avoid, minimize or mitigate adverse effects from the generation/storage of solid waste including source reduction and recycling.**

The Facility is a permitted disposal site for MSW. The Facility's office activities generate a minimal amount of MSW, consisting of office-related waste disposed of at the Facility. Office recyclables go to the adjacent Material Recovery Facility (MRF) for processing.

During construction, solid wastes generated will be consistent with typical solid waste disposal facility and industrial construction projects. To the extent possible, all industrial and construction wastes generated onsite will be disposed of onsite, as allowed by the Facility Solid Waste Permit. All other solid wastes generated by construction that are not permitted for disposal at the Facility will be disposed of properly in a permitted, licensed solid waste facility.

- c. Project related use/storage of hazardous materials-- Describe chemicals/hazardous materials used/stored during construction and/or operation of the project including method of storage. Indicate the number, location and size of any new above or below ground tanks to store petroleum or other materials. Indicate the number, location, size and age of existing tanks on the property that the project will use. Discuss potential environmental effects from accidental spill or release of hazardous materials. Identify measures to avoid, minimize or mitigate adverse effects from the use/storage of chemicals/hazardous materials including source reduction and recycling. Include development of a spill prevention plan.**

The Facility utilizes petroleum products and used oil during operation of the landfill. All tanks are required to be registered with the MPCA and adhere to design and operating regulations pursuant to Minnesota Rules Chapter 7150. Table 15 identifies existing active tanks stored onsite that are registered with the MPCA at the Facility (MPCA ID TS0001000). No changes to the existing storage tanks are proposed as part of this Project.

Table 15. Existing registered aboveground and underground storage tanks

Tank No.	Install date	Stored product	Capacity (gal)	Aboveground/underground
004	09/29/1992	Diesel	10,000	Underground
005	09/29/1992	Used or waste oil	560	Underground
1006	10/01/1995	Lubricating oils	225	Aboveground
1007	10/01/1995	Lubricating oils	225	Aboveground
1008	10/01/1995	Lubricating oils	225	Aboveground

During construction, some hazardous materials typical of a construction site (e.g., fuel oil, hydraulic fluid, etc.) will be stored in approved containers. All products that have the potential to leach pollutants will be stored under cover, or similar protection, to prevent discharge in compliance with the Facility's NPDES Industrial Stormwater Permit requirements. All hazardous materials will be properly stored in sealed containers to prevent spills, leaks, or other discharges. An existing wash bay is located within the maintenance building.

The Facility has a Spill Prevention, Control, and Countermeasure ("SPCC") Plan that includes the vertical expansion area and contains the procedures and Best Management Practices (BMPs) used to prevent these materials from impacting the environment. If a leak or spill occurs during construction, appropriate action to remedy the situation will be taken immediately in accordance with MPCA guidelines and regulations.

- d. *Project related generation/storage of hazardous wastes-- Describe hazardous wastes generated/stored during construction and/or operation of the project. Indicate method of disposal. Discuss potential environmental effects from hazardous waste handling, storage, and disposal. Identify measures to avoid, minimize or mitigate adverse effects from the generation/storage of hazardous waste including source reduction and recycling.***

The Facility generates a minimal amount of waste oil (approximately 1,200 to 1,300 gallons per year) and has a Very Small Quantity Generator License from the MPCA (MND000245785). A 560-gallon underground storage tank stores waste oil on site. Safety Kleen pumps out this tank approximately every three months and disposes of as fuel blending. Hazardous waste generated at the Project Area will not increase as a result of the Project.

14. Fish, Wildlife, Plant Communities, and Sensitive Ecological Resources (Rare Features)

- a. *Describe fish and wildlife resources as well as habitats and vegetation on or in near the site.***

The Project Area is restricted to the existing footprint of a portion of an active landfill that has been heavily disturbed. The adjacent land uses consist of industrial, storage, and other landfill facilities, as well as the Flint Hills Refinery property to the south. Within and adjacent to the Project Area, limited suitable habitat is available for wildlife and plant communities. Wildlife species found at the proposed site are those generally adapted to live in areas of development and fragmented habitats. The U.S. National Park Service (NPS) Mississippi River Recreation Area and DNR Pine Bend Bluffs Scientific and Natural Area (SNA) are approximately one mile east of the Project and contain areas of suitable wildlife, fish, and plant species. These natural areas are separated from the Project Area by the U.S. Highway 52.

- b. **Describe rare features such as state-listed (endangered, threatened or special concern) species, native plant communities, Minnesota County Biological Survey Sites of Biodiversity Significance, and other sensitive ecological resources on or within close proximity to the site. Provide the license agreement number (LA-____) and/or correspondence number (ERDB____) from which the data were obtained and attach the Natural Heritage letter from the DNR. Indicate if any additional habitat or species survey work has been conducted within the site and describe the results.**

Under Stantec's Limited License to Use Copyrighted Material (LA2022-023) related to Rare Features Data, the DNR's Natural Heritage Information System ("NHIS") was searched in May 2023 to identify species within a one-mile radius of the Project Area. The NHIS search did not indicate any records within the proposed expansion site. Records of species, biodiversity sites, and Central Region Regionally Significant Ecological Areas ("RESA") were identified within the one-mile review area. These findings are described in the following paragraphs. Appendix E provides the response from the DNR (MCE No. 2022-00192) received through the Minnesota Conservation Explorer ("MCE") on June 2, 2022. Given that the findings of the DNR's review are only valid for one year, an updated review request was submitted. The updated MCE response letter (MCE No. 2023-00368, dated May 18, 2023) is consistent with the previous NHIS findings.

Native plant communities and sites of biodiversity significance

Native plant communities, biodiversity sites, and RESA sites were reviewed for the area within one mile of the Project Area. In 2003, the DNR Central Regional conducted a landscape-scale assessment of the seven-county metropolitan area to identify ecologically significant terrestrial and wetland areas based on LandSat data and aerial photography. This assessment was updated in 2008 based on Minnesota Land Cover Classification System ("MLCCS") data.

Review of biodiversity sites and the RESA data identified ten total ecological sites within a one-mile buffer of the Project Area. One site of biodiversity significance is a native plant community (mesic hardwood forest system) that ranked as outstanding significance was identified approximately one mile from the expansion site. Nine RESA sites extend wholly or partially into the one-mile review area. Of these, six are ranked as moderate, one site is ranked as high, and two sites are ranked as outstanding ecological areas. All biodiversity and RESA sites are outside of the Project Area and will not be impacted by Project activities.

State – listed species

Under Stantec's Limited License to Use Copyrighted Material (LA2022-023) related to Rare Features Data, the DNR NHIS database was searched in May 2023 to identify state listed threatened, endangered, and special concern species within a one-mile radius of the Project Area. The NHIS search did not indicate any records within the Project Area, but seven species were identified within the one-mile review area. The seven species included the peregrine falcon (*Falco peregrinus*) a state special concern species, the lark sparrow (*Chondestes grammacus*) a state special concern species, the loggerheaded shrike (*Lanius ludovicianus*) a state endangered species, Bell's vireo (*Vireo bellii*) a state special concern species, the gopher snake (*Pituophis catenifer*) a state special concern species, kitten tails (*Besseyia bullii*) a state threatened species, and James Polania (*Polania jamesii*) a state threatened species.

Peregrine Falcon (Falco peregrinus)

Peregrine Falcons are a migratory bird listed as a state special concern species. The falcons return from migration to their northern breeding grounds from late April to May. Preferred habitat and nesting locations include cliff ledges along rivers and lakes, but recently they have adapted to nesting primarily on buildings and bridges in urban settings. Their diet consists of birds ranging in size from warblers to

ducks. In addition to birds as a source of prey they also consume small mammals, lizards, and fish and prefer hunting in open non-forested areas (MDNR 2022c)¹².

The Project Area is an active landfill that has been heavily disturbed, and the Project Area does not contain cliffs, buildings, or bridges that would provide suitable habitat for peregrine falcon nesting. With the previous level of disturbance at the Facility and limited suitable nesting opportunities, there will be no impact to the peregrine falcon.

Lark Sparrow (Chondestes grammacus)

Lark sparrows is a migratory bird that is a state listed special concern species. Lark sparrows typically occur in dry grasslands with a specific set of features such as: usually native short and/or sparse grasses in areas of sand or gravel soils, with at least some bare ground and widely scattered or patchy trees. Tree species often associated with the lark sparrow include bur oak (*Quercus macrocarpa*), northern pin oak (*Quercus ellipsoidalis*), and eastern red cedar (*Juniperus virginiana*). While lark sparrows are often associated with native plant communities they can also be found in disturbed or human-altered habitats consisting of short grass, scattered trees and sandy soils including pastures, gravel pits, restored prairie-savanna, brushy fence lines, and similar areas (MDNR 2022d)¹³.

The Project Area is an active landfill that is heavily disturbed, and it is not likely that the Facility would serve as suitable habitat for the lark sparrow. NHIS review shows occurrences of the lark sparrow have been documented within close proximity to the Project Area. However, the Project Area is on the portion of the existing landfill that is an active, open disposal area. The Project Area does not contain short grass prairie with widely scattered trees that would provide suitable habitat for the lark sparrow. Therefore, there will be no impact to the lark sparrow.

Loggerhead Shrike (Lanius ludovicianus)

The loggerheaded shrike is migratory bird that is a state listed endangered species. They return from migration in March and prefer to live in areas of upland grasslands and agricultural fields where short grass vegetation and perching sites such as hedgerows, shrubs, and small trees are found. They are largely restricted to areas that were historically prairie or prairie oak savanna and have been documented in Minnesota in both native and non-native grasslands, pastures, fields, farmyards, and cemeteries. They nest in well-hidden trees or brush and feed on insects, amphibians, lizards, small snakes, mice, and small birds (MDNR 2022e)¹⁴.

The Project Area is a heavily disturbed active landfill that does not contain habitat that would support the loggerheaded shrike such as, upland grassland, pastures, or hedgerows. Due to the lack of supporting habitat for the loggerheaded shrike in the Project Area, the Project will have no impact on the loggerheaded shrike.

Bell's Vireo (Vireo bellii)

Bell's vireo is migratory bird and a state listed special concern species. It prefers shrub thickets, clumps, and edges within or bordering open habitats such as grasslands or wetlands. Furthermore, it prefers wetland habitats that consist of sedges and grasses rather than cattails and is often associated with woody species such as, willows (*Salix spp.*), dogwood (*Cornus spp.*) and wild plum (*Prunus americana*). Bell's vireo begins its breeding season in early June and young emerge out of the nest by July. Its primary

¹² MDNRc. 2022. Rare Species Guide *Falco peregrinus*. Available at:

<https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=ABNKD06070>. Accessed February 2022.

¹³ MDNRd. 2022. Rare Species Guide *Chondestes grammacus*. Available at:

<https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=ABPBX96010>. Accessed February 2022.

¹⁴ MDNRe. 2022. Rare Species Guide *Lanius ludovicianus*. Available at:

<https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=ABPBR01030>. Accessed February 2022.

diet consists of insects, spiders, and arthropods. The species is generally rare and locally distributed in southern Minnesota, which is considered the northern edge of its breeding range (MDNR 2022f)¹⁵.

The Project Area is a heavily disturbed active landfill that does not contain habitat that would support Bell's vireo such as, willows, dogwood, wild plum, or open habitat, such as grassland or wetlands. Based on a review of the NHIS data, occurrences of Bell's Vireo have been associated with bluff habitat near the Mississippi River. Therefore, the Project would have no impact on the Bell's Vireo.

Gopher Snake (Pituophis catenifer)

The gopher snake is a state listed special concern species. It prefers habitats consisting of well-drained, loose sandy and gravel soils. Dry sand prairie and bluff prairies are considered prime habitat for this species. Hibernation sites include rodent burrows and rock fissures in bluffs and outcrops. Gopher Snakes will utilize abandoned mammal burrows or excavate a nest chamber in sandy soils for nesting. Its primary source of prey consists of small mammals and ground nesting birds. The Gopher Snake has primarily been documented in areas along the Minnesota, Mississippi, and St. Croix Rivers¹⁶.

The Project Area consists of an active landfill that does not contain habitat such as, well-drained, loose sandy soils or bluff prairies that would support the gopher snake. Therefore, the Project will have no impact to the gopher snake.

Kitten Tails (Besseyia bullii)

Kitten tails is a perennial native plant that is a state listed threatened species. The species occurs in oak savanna, dry prairies, and oak woodlands. It prefers partial shade over full sunlight on upper slopes of well drained sandy to gravelly soils. In Minnesota the populations are largely restricted to bluffs and terraces of the St. Croix, Mississippi, and Minnesota River Valley¹⁷.

The Project Area is currently on an active landfill that does not contain habitat features suitable for kitten tails such as, well drained sandy to gravelly soils or river bluffs and terraces. Review of NHIS data indicates plant observations were made along the Mississippi River in a hardwood oak stand nearly a mile from the Project Area. Due to the lack of suitable habitat the Project will have no impact on kitten tails.

James Polanisia (Polanisia jamesii)

James polanisia is an annual native plant that is a state listed endangered species. The plant grows in full sunlight on sandy or sandy-gravelly soil in dry open settings with sand prairie species. This includes southern dry prairie and southern dry savanna native plant communities. Threats to this species include urban development and encroachment by woody plants or taller more aggressive plants that shield sunlight from the plant¹⁸.

The Project Area is currently on an active landfill that does not contain native plant communities or undisturbed native sandy soils or that would support James polanisia. Furthermore, review of NHIS data indicates occurrences of James polanisia in the Pine Bluffs SNA nearly one mile from the Project Area.

¹⁵ MDNRf. 2022. Rare Species Guide *Vireo bellii*. Available at:

<https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=ABPBW01110>. Accessed February 2022.

¹⁶ MDNRg. 2022. Rare Species Guide *Pituophis catenifer*. Available at:

<https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=ARADB26020>. Accessed February 2022.

¹⁷ MDNRh. 2022. Rare Species Guide *Besseyia bullii*. Available at:

<https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=PDSCR09030>. Accessed February 2022.

¹⁸ MDNRi. 2022. Rare Species Guide *Polanisia jamesii*. Available at:

<https://www.dnr.state.mn.us/rsg/profile.html?action=elementDetail&selectedElement=PDCPP08030>. Accessed February 2022.

Due to the lack of native sand prairie and other native plant communities in the Project Area there will be no impact to James polania.

Federally – listed species

The USFWS Information for Planning and Consultation (“IPaC”) tool was reviewed to identify federally listed threatened, endangered, and candidate species under the Endangered Species Act (“ESA”) as well as critical species habitat within or in close proximity to the Project Area. The IPaC identified four species including the northern long-eared bat (*Myotis septentrionalis*; endangered), tricolored bat (*Perimyotis subflavus*; proposed endangered), whooping crane (*Grus americana*; experimental population, non-essential), the rusty patched bumble bee (*Bombus affinis*; endangered), and the monarch butterfly (*Danaus plexippus*; candidate) (USFWS 2021)¹⁹. Appendix E provides the IPaC review results.

Northern Long-Eared Bat (Myotis septentrionalis)

The northern long eared bat (“NLEB”) is federally listed as endangered under the ESA. Suitable roosting, forage, and travel habitat for the NLEB in the summer consists of a wide variety of forested and wooded habitats. While roosting, NLEB is generally found in deep crevices in areas such as forests and woodlots (i.e., live or dead trees and/or snags greater than or equal to three inches diameter at breast height that have exfoliating bark, cracks, crevices, and/or cavities) as well as linear features such as fencerows, riparian forests, and other wooded corridors. NLEB roosts in both trees or snags (Sasse and Perkins 1996²⁰, Owen et al. 2003²¹). During winter months, NLEB hibernate in caves or abandoned mines (Foster and Kurta 1999)²². The NLEB is federally listed as threatened due to marked population declines caused by white-nose syndrome.

The Project Area does not provide suitable habitat for NLEB as no contiguous areas of forested habitat occur for roosting habitat, nor do any caves or mine occur for hibernacula. The DNR maintains a list of townships containing documented northern long-eared bat maternity roost trees and/or hibernacula entrances (MDNR 2021)²³. Based on a review of this list, no known NLEB maternity and roosting trees are within the township in which the Project is located. The Project Area is an active landfill that is currently disturbed and does not contain trees that could provide suitable habitat for the NLEB. Therefore, there will be no effect on the NLEB.

Tri-colored Bat (Perimyotis subflavus)

During the non-hibernating seasons, tri-colored bats will roost in live and dead leaf clusters of live or dead deciduous hardwood trees. Tri-colored bats have also been observed roosting in artificial structures such as barns, bridges, roofs, and other concrete structures. During the winter, tri-colored bats hibernate in caves and mines. If mines or caves are not present within the region, they have been observed hibernating in road-associated culverts, tree cavities, and abandoned water wells. (USFWS 2022b)²⁴.

¹⁹ USFWS. 2021xx. Information for Planning and Consultation. [IPaC: Explore Location resources \(fws.gov\)](https://fws.gov/ipac). Accessed February 2022.

²⁰ Sasse, D.B., and P.J. Pekins. 1996. Summer roosting ecology of northern long-eared bats (*Myotis septentrionalis*) in the White Mountain National Forest. Bats and forests symposium. British Columbia Ministry of Forests Working Paper 23:91-101.

²¹ Owen, et al. 2003. Home range size and habitat use by northern *Myotis* (*Myotis septentrionalis*). American Midland Naturalist 150: 352-359.

²² Foster, R. W. and A. Kurta. 1999. Roosting ecology of the northern bat. (*Myotis septentrionalis*) and comparisons with the endangered Indiana bat (*Myotis sodalis*). Journal of Mammalogy 80:659–672.

²³ MDNR. 2021. Townships Containing Documented Northern Long-Eared Bat (NLEB) maternity Roosts Trees and/or Hibernacula Entrances in Minnesota. https://files.dnr.state.mn.us/eco/ereview/minnesota_nleb_township_list_and_map.pdf. Accessed February 2022.

²⁴ USFWS. 2022b. Tricolored Bat (*Perimyotis subflavus*). U.S. Fish & Wildlife Service. Available: <https://fws.gov/species/tricolored-bat-perimyotis-subflavus>. Accessed January 2023.

The tri-colored bat is proposed to be listed as endangered and is not regulated by the USFWS at this time. The Project Area does not provide suitable habitat for the tri-colored bat. The Project Area is an active landfill that does not contain trees. The Project would not result in removal of trees or structures that could potentially provide suitable habitat for the tri-colored bat. Therefore, there would be no effect on the tri-colored bat.

Whooping Crane (Grus americana)

The whooping crane is a migratory bird species that once nested in northern prairies, but now breeds in remote northern forests in Canada as well as in an experimental population in Wisconsin, preferably within coniferous habitat containing swamps and nearby lakes or ponds. Winter habitat consists of coastal marshes (e.g., Texas, Louisiana, and Florida). The diet of the whooping crane is not well known in summer months, but it is thought to be similar to their wintering diet of shellfish, frogs, snakes, insects, small fish, and plant matter like roots and berries. (National Audubon Society undated)²⁵.

The Project is within the range of a known, non-essential experimental population of whooping cranes. If this species is found within Minnesota, it is highly likely to be from this experimental population from Wisconsin that is non-migratory. Whether part of a natural or experimental population, Minnesota is out of the Central Flyway used by this species, so there is no concern for stopover sites. Additionally, Minnesota is not within a known wintering or breeding ground for this species. Finally, suitable habitat (prairies, coniferous swamps, lakes, ponds, or coastal marshes) is not present within the Project Area, and the Project does not overlap any USFWS or National Park Service lands. As such, impacts are not anticipated for this species.

Rusty-Patched Bumble Bee (Bombus affinis)

The rusty patched bumble bee ("RPBB") is Federally listed as endangered under the ESA. The RPBB is a habitat generalist that is typically found in areas that contain natural and semi-natural upland grassland, shrubland, woodlands, and forests. Nests are built in abandoned rodent burrows or similar ground cavities one to four feet below ground. In the winter months the bees overwinter in small chambers in loose soil and leaf litter a few centimeters below ground. They emerge from winter hibernation in the early spring where they are found near woodland habitats and forage on flowering native plant species such as, wild bergamot (*Monarda fistulosa*), goldenrod (*Solidago spp.*) asters (*Asteraceae spp.*), coneflowers (*Echinacea spp.*) and sunflowers (*Helianthus spp.*) (USFWS 2019a)²⁶.

The USFWS Rusty Patched Bumble Bee Map (USFWS 2021xx)²⁷ which delineates the high and low potential zones, uncertain zones, and historical range of the species was reviewed for the Project Area. Based on review the Project is within a high potential zone as identified by the USFWS. However, the majority of the Project Area has been previously disturbed and does not include undisturbed soil that would support the bee's lifecycle or flowering plant species that would provide suitable for the RPBB. Therefore, the Project may affect, but will not adversely affect the rusty patched bumble bee.

Monarch Butterfly (Danaus plexippus)

The monarch butterfly is a candidate for listing under the ESA. The status of the species will be reviewed each year until a proposal to list the monarch butterfly is developed. The monarch butterfly is a

²⁵ National Audubon Society. undated. Guide to North American Birds: Whooping Crane. Available at: <https://www.audubon.org/field-guide/bird/whooping-crane>. Accessed September 2022.

²⁶ USFWS. 2019a. Pollinators, Featured Pollinator: Rusty Patch Bumble Bee. Available at: <https://www.fws.gov/species/rusty-patched-bumble-bee-bombus-affinis>. Accessed February 2022.

²⁷ USFWS. 2021. Midwest Region Endangered Species- Rusty Patched Bumble Bee Map. Available At: [USFWS: Rusty Patched Bumble Bee Map](#). Accessed February 2022.

migratory butterfly species that lives in a variety of habitats across North America (USFWS 2019b)²⁸. This species generally occurs in areas with high densities of nectar sources, preferably those of native prairies. The presence of milkweeds (genus *Asclepias*) is required for the survival of caterpillars, as it is the only plant that they feed on (North Dakota Game and Fish)²⁹. The monarch butterfly is a candidate for federal listing due to habitat loss, relating mainly to the loss of milkweeds and native prairies.

The Project Area does not contain any native prairies that would support the feeding behaviors and life cycle of the monarch butterfly.

- c. ***Discuss how the identified fish, wildlife, plant communities, rare features and ecosystems may be affected by the project including how current Minnesota climate trends and anticipated climate change in the general location of the project may influence the effects. Include a discussion on introduction and spread of invasive species from the project construction and operation. Separately discuss effects to known threatened and endangered species.***

The Project Area has been substantially disturbed previously, contains limited potential suitable habitat for rare plants, animals, native plant communities, and other rare features. The Project would not result in removal of suitable habitat for rare species or native plant communities as the Project will occur within an area previously disturbed by landfill activities. Therefore, it is not anticipated that the Project would impact federal or state-listed species. Once the proposed landfill is closed, the final cover would provide a vegetated open space habitat.

As discussed in Item 7, Minnesota's climate is changing rapidly and is expected to continue to change in the foreseeable future. Notably winter and nighttime temperatures are increasing, and more frequent and extreme precipitation events are occurring³⁰. These climate trends in Minnesota are expected to impact ecosystem functions and species. The Audubon's 2019 Climate Change Report was utilized to identify if any of the listed bird species would be impacted by these climate trends in or near the Project Area. The report indicates that if temperatures rise by 2.7 degrees Fahrenheit the peregrine falcon will likely lose summer habitat availability in the Project Area due to spring heat waves that endanger young nesting birds³¹. The report was analyzed for other federal, and state listed bird species, the lark sparrow, loggerheaded shrike, and Bell's vireo documented in the vicinity of the Project Area. The report suggests that these bird species are not anticipated to lose summer habitat as a result of increasing temperatures.

Given the Project Area does not provide suitable habitat for rare plants and wildlife, the Project would not exacerbate the impacts of climate change on these species. Once the landfill is closed, the Project Area will provide potential vegetated open space habitat.

- d. ***Identify measures that will be taken to avoid, minimize, or mitigate the adverse effects to fish, wildlife, plant communities, ecosystems, and sensitive ecological resources.***

The following avoidance, minimization, and mitigation measures will be implemented with the Project:

- Native pollinator seed mixes will be considered where opportunities exist, such as adjacent to stormwater pond buffers.

²⁸ USFWS. 2019b. United States Fish and Wildlife Service - Pollinators. <https://www.fws.gov/initiative/pollinators/monarchs>. Accessed February 2022.

²⁹ North Dakota Game and Fish. Undated. Monarch Butterfly. Available at: <https://gf.nd.gov/wildlife/id/insects/monarch-butterfly>. Accessed February 2022.

³⁰ MDNR. 2022. Climate Trends. Available at: [Climate trends | Minnesota DNR \(state.mn.us\)](https://climate.trends.mn.us). Accessed February 2022.

³¹ Audubon 2019a. How Climate Change Will Reshape the Range of the Peregrine Falcon. Available at: [Peregrine Falcon | Audubon Field Guide](https://www.audubon.org/field-guide/peregrine-falcon). Accessed February 2022.

- Erosion control and runoff prevention measures will be implemented in compliance with the NPDES permit.
- Historic NHIS data documented observations of the lark sparrow near the Project Area during breeding season. Given the proximity of documented occurrences to the Project Area, workers onsite will be made aware of the species presence in the surrounding area and any sightings will be reported to the DNR Regional Nongame Wildlife Specialist.
- Once the proposed landfill is closed, the final cover will provide future vegetated open space habitat.

15. Historic Properties

Describe any historic structures, archeological sites, and/or traditional cultural properties on or in close proximity to the site. Include: 1) historic designations, 2) known artifact areas, and 3) architectural features. Attach letter received from the State Historic Preservation Office (SHPO). Discuss any anticipated effects to historic properties during project construction and operation. Identify measures that will be taken to avoid, minimize, or mitigate adverse effects to historic properties.

The Minnesota State Historic Preservation Office (SHPO) was contacted regarding the presence of architectural or archaeological resources. Archaeological resources have not been documented within the Project Area. The Project Area was previously reviewed as part of a past EAW process completed in 2016 which concluded that no properties eligible for or listed on the National Register of Historic Places exist within the area of potential effect for the Project. The SHPO database query completed for this EAW identified one historical roadway, the Mendota-Wabasha Military Road, did exist within the same Township, Range, Section as the Project. The SHPO query results are consistent with the results of previous SHPO database queries completed as part of the 2016 EAW. This historic roadway is now Rich Valley Boulevard (County Highway 71), northwest of the Facility. Rich Valley Boulevard has been altered and paved. The Project would not alter or impact the current state of the roadway. Appendix F provides correspondence from SHPO.

16. Visual

Describe any scenic views or vistas on or near the project site. Describe any project related visual effects such as vapor plumes or glare from intense lights. Discuss the potential visual effects from the project. Identify any measures to avoid, minimize, or mitigate visual effects.

The Project Area consists of an operational landfill facility that is heavily disturbed. It is surrounded by heavy industrial activities including the Rich Valley landfill and the Flint Hills Refinery to the south, warehouse and light industrial facilities to the east and west, and agricultural land to the north. The Project will conform with its surrounding and designated land uses. There are no immediate sensitive receptors such as parks, hospitals, daycare centers, or residential areas adjacent to the Project Area³². No scenic views, vistas, residences, or other sensitive receptors are in close proximity to the Project Area.

The Project would result in an increase in the height of the waste fill by approximately 85 vertical feet from the currently permitted maximum elevation of 1020 MSL to 1105 MSL. The Project is adjacent to other landfill facilities and heavy industrial uses. The proposed vertical expansion height would be higher compared to other nearby landfill facilities. For instance, the existing Rich Valley Landfill on the south side of 117th Street, across from PBL, is approximately 960 MSL.

³² Dakota County. 2022. County GIS. Available at: [Dakota County GIS](#). Accessed: February 2022.

The closest sensitive receptors are residences along Bartley Court and 108th Street, northwest of the Project. These residences are approximately 500-feet from the northwestern edge of the existing landfill boundary to the eastern edge of the residential property boundaries. The distance from the northwestern edge of the landfill property boundary to the nearest residential home is over 1,000 feet. The landfill is visible from some of these residences under existing conditions. The Project would increase the height of the existing landfill. Approximately 500 feet of wooded vegetation provides a natural buffer between these residential homes and the Project Area. No tree clearing or alterations to this existing natural buffer area would result from the Project.

17. Air

- a. Stationary source emissions - Describe the type, sources, quantities and compositions of any emissions from stationary sources such as boilers or exhaust stacks. Include any hazardous air pollutants, criteria pollutants. Discuss effects to air quality including any sensitive receptors, human health or applicable regulatory criteria. Include a discussion of any methods used assess the project's effect on air quality and the results of that assessment. Identify pollution control equipment and other measures that will be taken to avoid, minimize, or mitigate adverse effects from stationary source emissions.**

The Facility is a stationary source for air emissions associated with typical landfill operations, including fugitive dust, fugitive landfill gas emissions, and controlled gas emissions. Traffic, compacting, and earth moving activities have the potential to generate fugitive dust emissions. Fugitive dust control measures are in-place at the Facility. Minimization and mitigation measures for fugitive dust have included paving the approach road and main on-site road, utilizing an on-site water tank truck to apply water to unpaved aggregate branch roads, and, if necessary, spreading sand on the unpaved roads. Operations at the Facility are expected to decrease from past peaks but remain relatively constant with current calendar year 2023 acceptance rates; therefore, it is not anticipated that the Project would result in an increase in fugitive dust at the Facility.

Carbon dioxide ("CO₂") is a product of refuse decomposition under aerobic conditions. Buried refuse quickly reaches anaerobic conditions. The anaerobic decomposition of refuse produces methane, a component of LFG. LFG under anaerobic conditions generally roughly consists of 50 percent methane and 48 percent CO₂ and 2 percent volatile organic compounds. The waste accepted daily at the Facility will not change with the Project and will remain below past historical peak rates; therefore, landfill gases (greenhouse gases and VOCs) emitted on a daily or annual basis are expected to remain relatively steady until landfill closure. After landfill closure, landfill gas generation is expected to gradually decline. Landfill gas emissions are not expected to pose a safety or health hazard.

In March of 1996, the EPA promulgated air emissions regulations for large new and existing MSW landfills, known as the New Source Performance Standards and Emission Guidelines ("NSPS"). Under these regulations, affected facilities that emit more than 50 megagrams per year ("Mg/year") of non-methane organic compounds ("NMOC") must install controls. The Facility estimated NMOC emissions to be 891 Mg/year based on Tier 1 procedures estimated. It is noted that the Tier 1 procedure provides a conservative estimate of NMOC emissions based on default values and is not representative of actual NMOC emissions at the Facility. The installed controls must be capable of reducing the NMOC in the collected LFG by at least 98 percent by weight.

The Facility employs a comprehensive monitoring program for early detection of LFG in on-site structures and at adjacent properties. The Proposer monitors occupied buildings and structures located at the Facility using electronic monitoring devices. These devices allow for detection of concentrations of LFG relative to the LEL. Permanent LFG monitoring probes around the perimeter of the Facility

monitor gas migration from the Facility. The waste accepted daily at the Facility will not change with the Project; therefore, LFG produced on a daily or annual basis would not change appreciably and would not pose a safety or health hazard.

Currently, the Proposer is working with the MPCA and the City of Inver Grove Heights to address gas migration concerns. This is an ongoing process and additional gas migration mitigation measures were implemented in 2022. The results of these activities were provided to the City of Inver Grove Heights, Dakota County, and the MPCA in the 2023 Annual Report.

As described in Item 6 (Project Description), prior to the construction of the current RNG Facility, an electricity generating facility in the northwest corner of PBL processed LFG to generate electricity that connected to the NPSM grid. Following construction of the RNG Facility, the electric generating facility was decommissioned. Currently, LFG is processed at the RNG Facility and injected into NSPM's natural gas system through an approximately 5,600-foot pipeline.

Air permits

The existing Facility is permitted by the MPCA under Air Emissions Permit (Title V Permit) No. 0370018-004, which allows for the operation of the stationary sources associated with the PBL. The Title V Permit allows PBL to collect and combust up to 7,750 standard cubic feet per minute ("scfm") (30-day average). Additionally, the Title V Permit 03700138-004 allows PBL to operate a LFGTE plant and the continued expansion of the landfill gas collection system as needed. Additionally, the PBL submitted an updated GCCS Design Plan to MPCA dated February 2011. The revised GCCS Design Plan was completed in accordance with 40 CFR § 60.752(b)(2)(i), and 40 CFR § 60.757(c).

An updated LandGEM model was completed that reflects the increased design capacity and actual past waste acceptance through calendar year 2022. As shown, the model estimates the maximum landfill gas generation potential is approximately 3,799 scfm. Not all gas generated will be collected. However, the total landfill gas generation predicted is approximately 51 percent less than the permitted collection limit. Therefore, the increase in design capacity does not increase the permitted emissions from the facility.

PBL submitted a Part 70 operating permit re-issuance in August 2009 to the MPCA. In 2009, PBL also submitted a minor permit amendment for a diesel fired tipper. A minor permit amendment was submitted by Fortistar Methane Group (Pine Bend Energy LLC) in May 2018 to replace the existing LFGTE facility with the RNG Facility. In December 2020, a minor permit amendment was submitted to address design changes of the RNG Facility and rescind the prior May 2018 minor permit application. In January 2021, a minor permit amendment was submitted for the expansion project.

The MPCA is currently processing the Part 70 operating permit re-issuance, the 2020 RNG facility minor permit amendment, and the expansion minor amendment. The additional requirements under 40 CFR 60 Subp. XXX will be addressed in the permit renewal since construction of Phase 6 started after the applicability date for this standard. It is anticipated that the air permit renewal will be issued in fall 2023. Air permit requirements for Phase 7 will be confirmed upon issuance of the new permit. The proposed vertical expansion requires a minor modification to the Air Emissions Permit, to address the vertical expansion and design capacity of 33,937,400 cubic yards, and to incorporate new federal regulations into the air permit. The proposed vertical expansion would not affect the permitted emissions units significantly because the existing landfill was permitted based on the equipment design rather than the size of the landfill.

Project emission changes

For the expansion, a projected waste acceptance rate of 310,000 tons per year of degradable solid waste for calendar year 2023 through Phase 7 closure (anticipated in calendar year 2048). The baseline

(without expansion) scenario also assumes a 310,000 tons per year projected waste acceptance for 2023 through 2027, with no additional waste accepted beyond 2027.

The maximum landfill gas generation rate without the expansion is 3,799 scfm, expected to occur in 2023. With the expansion, the maximum landfill gas generation is also 3,799 scfm, expected in calendar year 2023, with landfill gas remaining relatively constant through closure in 2048. Landfill gas will continue to be processed with the flare and thermal oxidizer at the RNG Facility, with the flare used on an as needed basis for RNG Facility maintenance. No significant change in flare or thermal oxidizer use, RNG Facility waste gas emissions, nor fugitive landfill gas emissions are expected as a result of the Project. Since waste acceptance will decrease from maximum historic acceptance rates, fugitive dust emissions are expected to decrease from maximum historic rates. Therefore, emission estimates submitted for the Facility's recent minor air permit amendment application for RNG plant and Title V air permit renewal application for fugitive dust are accurate.

- b. *Vehicle emissions - Describe the effect of the project's traffic generation on air emissions. Discuss the project's vehicle-related emissions effect on air quality. Identify measures (e.g. traffic operational improvements, diesel idling minimization plan) that will be taken to minimize or mitigate vehicle-related emissions.***

Operating hours and truck traffic at the Facility will not change as a result of the Project. The Facility currently accepts approximately 160 refuse trucks per day which access the Facility from 117th Street. The Project will not increase traffic volumes. Vehicle emissions associated with operations of the Facility are minor and would not increase vehicle-related emissions. At times, vehicles will idle onsite when delivering loads of waste. Landfill operators will minimize to the extent practical vehicle to minimize vehicle-related emissions.

During construction of the Project, up to an additional 20 to 40 trucks per day would enter and leave the Facility. It is anticipated that additional traffic generated during construction would continue for approximately 15 weeks, mainly during the time when material needed for construction of the new cell is hauled gets from offsite. A temporary increase in vehicle-related emission may occur during construction.

As part of a separate future project, Dakota County and the City of Inver Grove Heights plan to reconstruct 117th Street, which may include widening the roadway shoulder or adding turn lanes. Improvement along 117th Street would reduce congestion and idling of traffic on 117th Street, which would have the potential to reduce vehicle-related emissions associated with traffic congestion on 117th Street.

- c. *Dust and odors - Describe sources, characteristics, duration, quantities, and intensity of dust and odors generated during project construction and operation. (Fugitive dust may be discussed under item 17a). Discuss the effect of dust and odors in the vicinity of the project including nearby sensitive receptors and quality of life. Identify measures that will be taken to minimize or mitigate the effects of dust and odors.***

Item 17.a includes a discussion of fugitive dust emissions and avoidance, minimization and mitigation measures implemented at the Facility. The nearest sensitive receptors are residences along Bartley Court and 108th Street, northwest of the Project. These residences are approximately 500-feet from the northwestern boundary of the existing landfill to the edge of the residential property boundaries. The residential homes are separated from the landfill by the railroad corridor and wooded vegetation.

18. Greenhouse Gas (GHG) Emissions/Carbon Footprint

- a. GHG Quantification: For all proposed projects, provide quantification and discussion of project GHG emissions. Include additional rows in the tables as necessary to provide project-specific emission sources. Describe the methods used to quantify emissions. If calculation methods are not readily available to quantify GHG emissions for a source, describe the process used to come to that conclusion and any GHG emission sources not included in the total calculation.*

Table 16 and Table 17 provide a summary of anticipated greenhouse gas (“GHG”) emissions from construction and operation of the Project, respectively. Data was provided by a March 2022 report by SCS Engineers³³. GHG emissions for both construction and operation of the Project were calculated based on EPA published emission factors. Appendix H includes the complete GHG assessment report.

Table 16. Construction emissions

Scope	Source description	Emission sub-type	Project-related CO ₂ e emissions (Mtons/year)	Calculation method(s)
Scope 1	Construction	Combustion Mobile Sources	4,757	Emission factors and info from 40 CFR 98 Subpart C

Table 17. Operational emissions

Scope	Source description	Emission sub-type	Calculation method(s)	Existing facility CO ₂ emissions (Mtons/year)	Project-related CO ₂ e emissions (Mtons/year)	Change in CO ₂ e emissions (Mtons/year)
Scope 1	Flare	Combustion	Emission factors and info from 40 CFR 98 Subpart C	110,861	110,861	0
Scope 2	Renewable Natural Gas (RNG) Plant (Thermal Oxidizer)	Combustion	Emission factors and info from 40 CFR 98 Subpart C	56,316	56,316	0
Scope 3	Fugitive Landfill Gas	Fugitive	Emission factors and info from 40 CFR 98 Subpart C	7,853	7,853	0
Scope 4	Waste Disposal Operations	Combustion Mobile Sources	Emission factors and info from 40 CFR 98 Subpart C	6,075,453	6,075,453	0

³³ SCS Engineers. 2022. Pine Bend Landfill – Expansion Greenhouse Gas Emission Environmental Assessment. Accessed April 2022.

Scope 5	Insignificant Operations	Combustion Mobile Sources	Emission factors and info from 40 CFR 98 Subpart C	177	177	0
Scope 6	Indirect Operations	Electrical Usage	Emission factors and info from 40 CFR 98 Subpart C and USEPA's* Emission Factor's Hub	69	69	0
TOTAL				6,250,729	6,250,729	0

*United States Environmental Protection Agency

b. GHG Assessment

i. Describe any mitigation considered to reduce the project's GHG emissions.

A RNG Facility was recently constructed and is now in operation, converting LFG to RNG that can then be sold as fuel and offset fossil fuel use. The RNG process does not directly generate GHG emissions. A thermal oxidizer will treat waste gases produced by the RNG Facility. Operating the landfill gas collection and control system, RNG plant and flare in compliance with applicable regulations mitigates GHG emissions by maximizing methane collection.

Construction GHG emissions would be generated by diesel-operated engines including four dump trucks, two bulldozers, two scrapers, two off-road dump trucks, one excavator, one grader, one vibratory roller, one sheepsfoot compactor, one front loader and backhoe, and passenger trucks used to get to and from the Project. The Proposer will decrease GHG emissions from these vehicles by only operating these engines as needed and will avoid idling engines when they are not in use.

ii. Describe and quantify reductions from selected mitigation, if proposed to reduce the project's GHG emissions. Explain why the selected mitigation was preferred.

In terms of potential GHG emissions, when the RNG Plant, thermal oxidizer, and flare are operating at capacity over 8,760 hours per year, GHG emissions will remain unchanged from current conditions. Potential emissions associated with fugitive GHG from the landfill will also be unchanged since the peak generation of landfill gas of 3,799 standard cubic feet per minute predicted for existing conditions as well as after the Project.

iii. Quantify the proposed projects predicted net lifetime GHG emissions (total tons/#of years) and how those predicted emissions may affect achievement of the Minnesota Next Generation Energy Act goals and/or other more stringent state or local GHG reduction goals.

The GHG assessment memo in Appendix H demonstrates the decline of landfill gas flow and GHG emissions over time. The expected GHG emissions reduction achieved by implementing the RNG Facility aligns with the goals of the Minnesota Generation Energy Act.

19. Noise

Describe sources, characteristics, duration, quantities, and intensity of noise generated during project construction and operation. Discuss the effect of noise in the vicinity of the project including 1) existing

noise levels/sources in the area, 2) nearby sensitive receptors, 3) conformance to state noise standards, and 4) quality of life. Identify measures that will be taken to minimize or mitigate the effects of noise.

1) Existing noise levels/sources in the area

The Project Area and surrounding landscape is heavy industrial area and generates noise typical of industrial activities. Other noise sources in the area include two railroads that extend along the eastern and western boundaries of the Facility and traffic-related noise from County Highway 71, 117th Street, and U.S. Highway 52. Agricultural fields and wooded areas surround the northern section of the Facility and provide a buffer to residential areas. The Rich Valley Landfill and Flint Hills Refinery are south of the Facility and separated by 117th street.

Sources of noise from the Facility include trucks hauling waste onsite, trucks hauling leachate offsite, and heavy equipment used to move waste and cover materials. BFI anticipates using a dozer, compactor, and loader onsite for its operations. These vehicles and equipment produce noise from their engines, backup warning devices, and tailgates. Increased traffic because of the Project would be minimal and limited to construction as discussed in detail in Item 18 of this EAW.

In accordance with the Facility's Nonconforming Use Certificate from the City of Inver Grove Heights, BFI maintains operating hours from 6:00 a.m. to 4:00 p.m. from Monday through Friday and may be opened on Saturday between 7:00 a.m. - 4:00 p.m. upon request service. The Project would not alter the existing operating hours at the Facility. Noise associated with landfill activities will not occur outside of operating hours.

2) Nearby sensitive receptors

The nearest sensitive receptors are residences along Bartley Court and 108th Street, northwest of the Project. These residences are approximately 500-feet from the northwestern boundary of the existing landfill to the edge of the residential property boundaries. The residences are separated from the Project Area by railroad corridor and approximately 500 feet of wooded area that provides a natural buffer between the Project Area and nearest sensitive receptors.

3) Conformance to State noise standards

Minnesota's noise pollution rules³⁴ are based on statistical calculations that quantify noise levels over a one-hour monitoring period. The L_{10} calculation is the noise level that is exceeded for 10 percent, or 6 minutes, of the hour, and the L_{50} calculation is the noise level exceeded for 50 percent, or 30 minutes, of the hour. There is no limit on maximum noise.

The statutory limits for a residential location are $L_{10} = 65$ dBA and $L_{50} = 60$ dBA during the daytime (7:00 a.m. – 10:00 p.m.) and $L_{10} = 55$ dBA and $L_{50} = 50$ dBA during the nighttime (10:00 p.m. – 7:00 a.m.). This means that during the one-hour period of monitoring, daytime noise levels cannot exceed 65 dBA for more than 10 percent of the time or 60 dBA more than 50 percent of the time. Table 18 summarizes noise area classifications.

³⁴More information on Minnesota Noise rules, [Minn. Rules Ch. 7030](https://www.pca.state.mn.us/sites/default/files/p-gen6-01.pdf), may be found at: <https://www.pca.state.mn.us/sites/default/files/p-gen6-01.pdf>

Table 18. Noise area classifications

Noise area classification	Common land use associated with the noise area classification	Daytime (dBA)		Nighttime (dBA)	
		L ₁₀	L ₅₀	L ₁₀	L ₅₀
1	Residential housing, religious activities, camping and picnicking areas, health services, hotels, educational services	65	60	55	50
2	Retail, business and government services, recreational activities, transit passenger terminals	70	65	70	65
3	Manufacturing, fairgrounds and amusement parks, agricultural and forestry activities	80	75	80	75

Project

BFI's proposed expansion will alter the existing noise generation at the Facility during the 5-week construction window. Operation noise would not substantially change from existing conditions as shown in Table 19. The Project would not alter the existing wooded area that buffers the Facility from residences to the northwest.

Landfill equipment/machinery related to waste disposal

Equipment used for hauling, compacting, and covering the refuse currently generates the majority of the noise at the Facility. Machines or vehicles operating at the Facility include landfill machinery and haul trucks. Table 19 summarizes expected noise levels associated with landfill machinery and haul trucks during operation of the Facility.

Table 19. Landfill machinery noise levels during operation

Landfill machinery	dBA at 50 feet*	Hours per week
Backhoe	80	42
Compactor 1 (836G)	82	72
Compactor 2 (836H)	82	14
Dozer (D8-T)	85	36
Soil hauling truck	84	42

*Construction noise levels estimated based on the FTA and FHWA Construction Noise guidance.

Haul Trucks

Refuse trucks delivering refuse to the Facility also generate noise at the Facility. Approximately 160 refuse hauling trucks per day enter the Facility. The majority (80 percent) of these trucks are semi-trailer trucks and the remaining (20 percent) dump trucks. These trucks are likely to generate approximately 84 dBA at 50 feet based on data published by the Federal Highway Administration ("FHWA")³⁵ and Federal

³⁵ FHWA. Highway Construction Noise Handbook. Final Report. August 2006.
https://www.fhwa.dot.gov/environment/noise/construction_noise/handbook/

Transit Administration (FTA).³⁶ Traffic from these trucks takes place from U.S. Highway 52 onto 117th Street into the south entrance of the Facility.

Operating Hours

The Facility's operating hours from 6:00 a.m. to 4:00 p.m. from Monday through Friday. The facility may be open for limited hours on Saturday if there was a holiday during the week. Operational activities may occur until 5:00 p.m. No heavy equipment operates outside of these times.

Landfill equipment/machinery related to cell construction

Noise generated during cell construction involves dozers, compactors, loaders, hauling trucks, and backhoes. Table 20 summarizes typical construction noise levels at 50 feet for these equipment types based on the FTA Noise and Vibration Impact Assessment Manual (September 2018).³⁷

Table 20. Typical construction noise levels at 50 feet

Equipment	dBA	Hours per week	Approx. duration (weeks)
Backhoe	80	60	15
Compactor	82	60	15
Dozer	85	60	15
Loader	80	60	15
Soil Hauling Truck	84	60	15

Haul trucks

Approximately 17,000 trucks will enter the Facility to haul soils during a cell's construction. Haul trucks are estimated to generate noise levels of 84 dBA at 50 feet.

Construction hours

Construction activities will adhere to the requirements per the City of Inver Grove Heights' Ordinance, Section 5-5-12 which prohibits the operation of construction equipment from 10:00 p.m. to 7:00 a.m. during weekdays and from 9:00 p.m. to 7:00 a.m. on weekends and holidays. Construction activities would occur during operating hours between 6:00 a.m. to 4:00 p.m. from Monday through Friday. The operation of garbage, refuse hauling, and recycling trucks are exempt from these restrictions.

4) Quality of life

The Facility commenced landfill operations in 1971 and is compatible with the surrounding land uses, characterized by industrial development. The proposed vertical landfill expansion would not degrade the quality of life at abutting residences, as there are no substantial operational changes. Construction noise would be temporary and will adhere to local ordinance requirements. Section 5-5-12 (Unnecessary Noise) of the City's ordinance restricts construction activities to the hours of 7:00 a.m. to 7:00 p.m., Monday through Sunday. Per Section 5.5.12.C, garbage, refuse hauling, and recycling trucks operating as permitted under Section 8-6-3 are exempt. No construction or operation hours would occur during nighttime hours. Construction equipment will be properly muffled and maintained in working order.

³⁶ FTA, prepared by John A. Volpe National Transportation Systems Center. Transit Noise and Vibration Impact Assessment Manual. FTA Report No. 0123. Table 7-1: Construction Equipment Noise Emission Levels.

https://www.transit.dot.gov/sites/fta.dot.gov/files/docs/research-innovation/118131/transit-noise-and-vibration-impact-assessment-manual-fta-report-no-0123_0.pdf

³⁷ Ibid.

20. Transportation

- a. ***Describe traffic-related aspects of project construction and operation. Include: 1) existing and proposed additional parking spaces, 2) estimated total average daily traffic generated, 3) estimated maximum peak hour traffic generated and time of occurrence, 4) indicate source of trip generation rates used in the estimates, and 5) availability of transit and/or other alternative transportation modes.***

1) Existing and proposed additional parking spaces

Approximately 15 parking spaces are available at the existing office facility accessible from 117th Street. Approximately 15 employees are present at the Facility during operation hours. No changes in the number of employees will result as a result of this Project. The Project will not require additional parking spaces.

2) Estimated total average daily traffic generated

The Facility currently accepts approximately 160 trucks per day. The Project will not alter the existing traffic operations at the Facility and will not generate additional traffic.

Access to the Facility is provided from 117th Street, which is classified as an A-Minor arterial roadway. 117th Street is a two-lane, undivided roadway extending east to west from County Highway 71 (Rich Valley Boulevard) to U.S. Highway 52. Based on MnDOT's Traffic Mapping Application³⁸, 2019 Annual Average Daily Traffic volumes on 117th Street consist of 4,650 vehicles per day.

3) Estimated maximum peak hour traffic generated and time of occurrence

Delivery trucks enter and exit the landfill facility throughout the day. The Facility accepts traffic from 6:00 a.m. to 4:00 p.m. from Monday through Friday. The Facility is closed on Saturday and Sunday unless there was a holiday during the week, in which case the Facility is open for a limited time period between 6:00 a.m. to 4:00 p.m. on Saturday.

4) Indicate source of trip generation rates used in the estimates

Facility traffic was based on the current number of employees and allowable trucks accessing the Facility.

Traffic volumes on 117th Street are based on the most recent published MnDOT data.

5) Availability of transit and/or other alternative transportation modes

Minnesota Valley Transit Authority (MVTA) operates an express transit route (Route 484) that provides services from the City of Rosemount to Downtown Saint Paul. This transit route extends along U.S. Highway 52, approximately one mile east of the Project Area. No transit routes operate along 117th Street. The Project would not result in impacts to the operation of transit routes in the vicinity of the Project Area.

³⁸ MnDOT. Traffic Mapping Application. Accessed March 2022. <https://www.dot.state.mn.us/traffic/data/tma.html>

- b. Discuss the effect on traffic congestion on affected roads and describe any traffic improvements necessary. The analysis must discuss the project's impact on the regional transportation system. If the peak hour traffic generated exceeds 250 vehicles or the total daily trips exceeds 2,500, a traffic impact study must be prepared as part of the EAW. Use the format and procedures described in the Minnesota Department of Transportation's Access Management Manual, Chapter 5 (available at: <http://www.dot.state.mn.us/accessmanagement/resources.html>) or a similar local guidance.**

The Project would not increase operational traffic at the Facility. Existing truck traffic, consisting of up to 160 trucks per day, will not change as a result of this Project. Trucks would continue to primarily utilize U.S. Highway 52 to access the Facility from 117th Street.

During construction of the Project, up to an additional 20 to 40 trucks per day would enter and leave the Facility. It is anticipated that additional traffic generated during construction would continue for approximately 15 weeks, mainly during the time when material needed for construction of the new cell is hauled gets from offsite.

It is anticipated that traffic levels would return to current levels following completion of construction of the Project.

- c. Identify measures that will be taken to minimize or mitigate project related transportation effects.**

Construction related traffic will avoid accessing the Facility from County Highway 71 to the extent possible. Construction traffic will be routed to US Highway 52 and will enter the Facility from the east to the maximum extent possible.

21. Cumulative Potential Effects

(Preparers can leave this item blank if cumulative potential effects are addressed under the applicable EAW Items)

- a. Describe the geographic scales and timeframes of the project related environmental effects that could combine with other environmental effects resulting in cumulative potential effects.**

The geographic scale considered for the cumulative effects analysis includes the adjacent industrial development and the 117th Street Corridor. The analysis considered other projects under construction or known to be completing environmental review and permitting processes.

- b. Describe any reasonably foreseeable future projects (for which a basis of expectation has been laid) that may interact with environmental effects of the proposed project within the geographic scales and timeframes identified above.**

Two projects are known to be under development in the vicinity of the Project Area including the proposed reconstruction of 117th Street and proposed municipal solid waste landfill expansion at the existing Rich Valley Landfill Facility. These projects are described in the following paragraphs.

117th Street Reconstruction Project

The City of Inver Grove Heights, in partnership with Dakota County, is currently evaluating roadway improvement alternatives for the section of 117th Street from County Highway 71 to U.S. Highway 52. Current design plans propose to reconstruct the 117th Street from an undivided two-lane undivided roadway to a ten-ton, two-lane divided roadway with a trail facility on the north side of the roadway. Other improvements include new turn lanes and upgrades to the two existing at-grade railroad crossings to current safety standards. Project construction is anticipated in 2024.

Rich Valley MSW Landfill Project

SKB Environmental, Inc. (SKB) is proposing to expand the Rich Valley Landfill facility for the disposal of municipal solid waste. The landfill facility is south of the Pine Bend Landfill on 117th Street in the City of Inver Grove Heights. The MPCA issued a CON for the proposed municipal solid waste disposal capacity in 2021. The project is currently completing the environmental review process.

- c. ***Discuss the nature of the cumulative potential effects and summarize any other available information relevant to determining whether there is potential for significant environmental effects due to these cumulative effects.***

Future projects will be subject to State environmental review requirements per the Minnesota Environmental Policy Act (MEPA) along with federal, state, and local permitting and approval requirements. Any future projects will be required to identify potential environmental impacts and implement avoidance, minimization, and mitigation measures as required in compliance with permitting requirements. Potential cumulative potential effects include water resources, air quality, and land use.

Water resources

Groundwater

The Project will not involve water appropriation and dewatering activities. Therefore, the Project will not contribute to groundwater supply constraints in the area. The proposed vertical expansion will include lined cells to ensure capture and treatment of leachate within the landfill to minimize the potential for groundwater contamination. The Facility includes an existing groundwater monitoring system to ensure early detection of groundwater quality impacts. If any groundwater impacts are identified, the Proposer will coordinate closely with the MPCA to implement appropriate actions to address and improve groundwater quality in compliance with the solid waste permit. The existing groundwater monitoring network and sampling program is designed to detect if leachate or other landfill constituents have entered the groundwater prior to reaching sensitive waterbodies such as the Mississippi River.

Other existing industrial facilities and future landfill expansion projects in the vicinity of the Project Area are required to report environmental monitoring data, including groundwater monitoring results, in compliance with MPCA solid waste permitting requirements to minimize the potential adverse groundwater impacts. Any potential impacts to groundwater would require coordination with the MPCA to determine appropriate remediation actions.

Surface water

As discussed in Item 12, the Facility is approximately one mile west of the Mississippi River, designated as an impaired water body. The Facility has implemented a surface water management system to capture and treat runoff generated from the landfill. The Facility operates under a NPDES General Stormwater Permit for Industrial Activity Permit (No. MNR053B5P), which includes monitoring requirements for water quality. The surface water management system has been conservatively sized to capture and treat stormwater runoff and remove pollutants such as nutrients and TSS. The Proposer will update the existing NPDES permit for the proposed vertical expansion.

Other landfill facilities and industrial development in the vicinity of the Project Area will be required to adequately capture and treat stormwater runoff generated in compliance with State and local regulations. The City of Inver Grove Heights and Dakota County will be required to construct stormwater BMPs to adequately capture and treat stormwater runoff generated by the proposed

117th Street Reconstruction Project in compliance with State and local stormwater regulations. The proposed Rich Valley MSW Landfill Expansion Project will also be required to capture and treat stormwater in compliance with NPDES industrial stormwater permit requirements.

Air quality

As discussed in Item 17, the existing Facility produces air emissions associated with landfill gas, fugitive dust associated with the operation of equipment, and vehicular emissions generated by haul trucks. The Project would not increase the amount of waste accepted on a daily basis or vehicle traffic accessing the Facility. It is projected that daily waste acceptance rates will remain relatively constant with the current 2023 acceptance rate of 310,000 tons per year. Therefore, air emission generated by landfill gas, fugitive dust, and vehicular traffic volumes will not substantially change compared to existing conditions.

As discussed in Item 18, an RNG Facility was recently constructed which converts landfill gas to RNG that can then be utilized as fuel. This has resulted in a reduction of GHG emissions since a portion of the landfill gas is redirected to the RNG Facility. There has been an increase in fugitive dust at the new RNG plant due to increased traffic.

Other existing landfill facilities and future landfill expansion projects in the vicinity of the Project will generate similar air emissions associated with landfill gas, fugitive dust, and vehicle emissions. Air emissions associated with these facilities are subject to MPCA air permitting requirements. Required air emission minimization and mitigation measures would be identified through the permitting process to demonstrate how these facilities will adhere to federal and state air quality regulations.

Land use

The Project is consistent with the City's planned land use for the Project Area and permitting per the City's zoning requirements. The surrounding area is primarily General Industry or Limited Industry and compatible with the Project. The Project is allowable as a condition use. BFI will seek an amendment from the City to the existing Condition Use Permit.

Other proposed projects in the vicinity of the Project will also be subject to the City's land use and zoning regulations. The City has the authority to review and approve these projects through the local permitting process.

22. Other Potential Environmental Effects

If the project may cause any additional environmental effects not addressed by items 1 to 19, describe the effects here, discuss how the environment will be affected, and identify measures that will be taken to minimize and mitigate these effects.

No other potential environmental effects are anticipated that are not addressed by Items 1 through 21.

RGU CERTIFICATION

*(The Environmental Quality Board will only accept **SIGNED** Environmental Assessment Worksheets for public notice in the EQB Monitor.)*

I hereby certify that:

- The information contained in this document is accurate and complete to the best of my knowledge.
- The EAW describes the complete Project; there are no other projects, stages or components other than those described in this document, which are related to the Project as connected actions or phased actions, as defined at Minnesota Rules, parts 4410.0200, subparts 9c and 60, respectively.
- Copies of this EAW are being sent to the entire EQB distribution list.

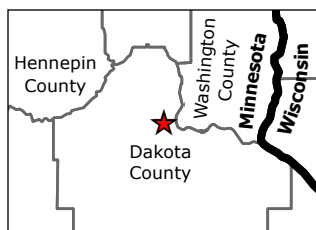
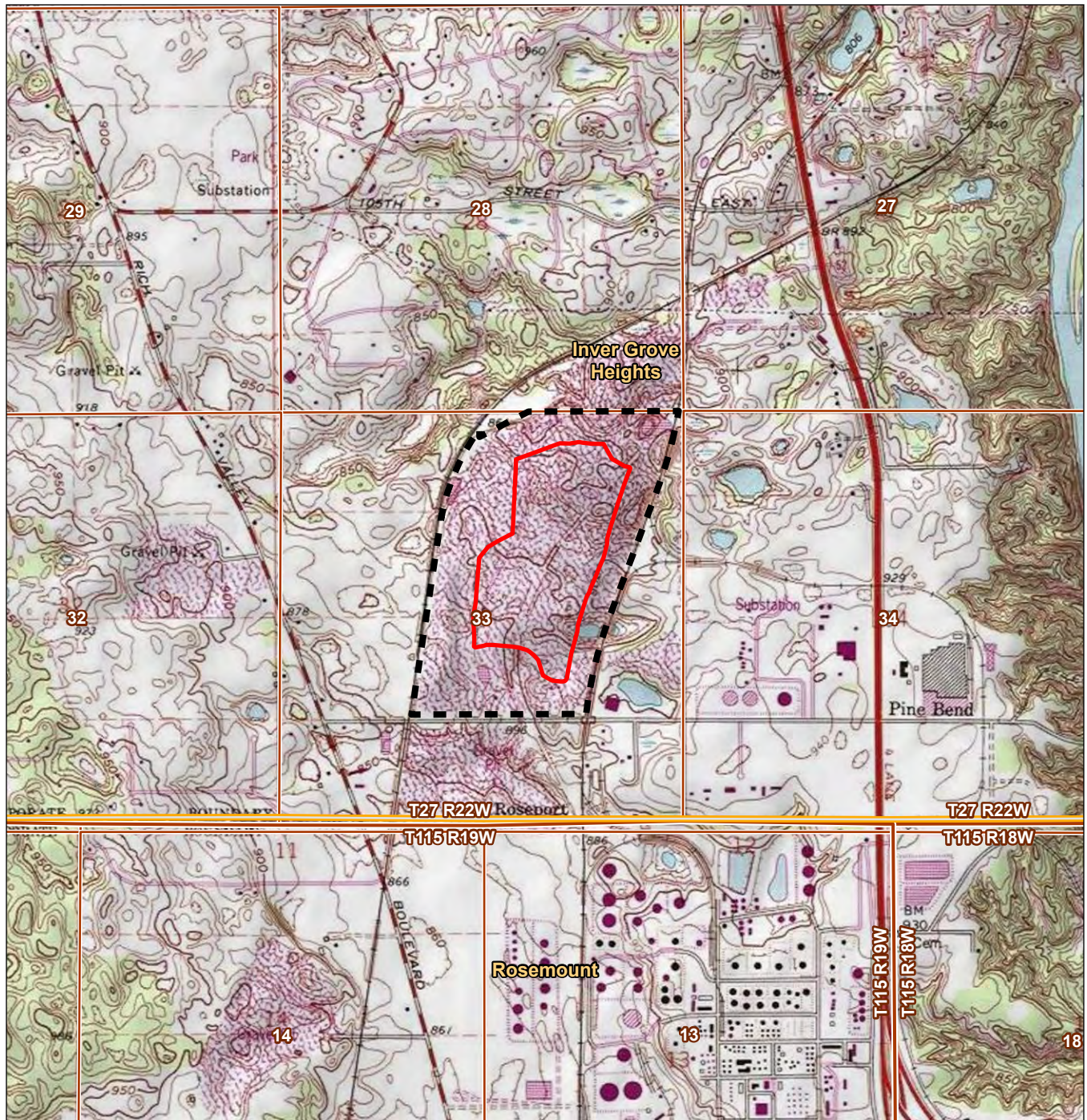
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Date: 10/10/2023

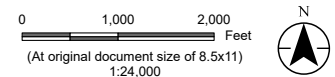
Dan R. Card, P.E.
Supervisor
Environmental Review Unit
Resource Management and Assistance Division

Appendix A

Figures



- Legend**
- Proposed Project Area
 - Pine Bend Landfill
 - Property Boundary
 - Municipal Boundary
 - Township, Range & Section Boundary



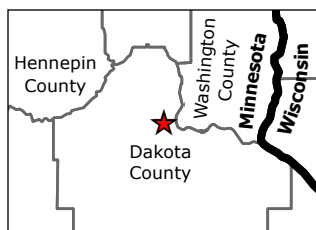
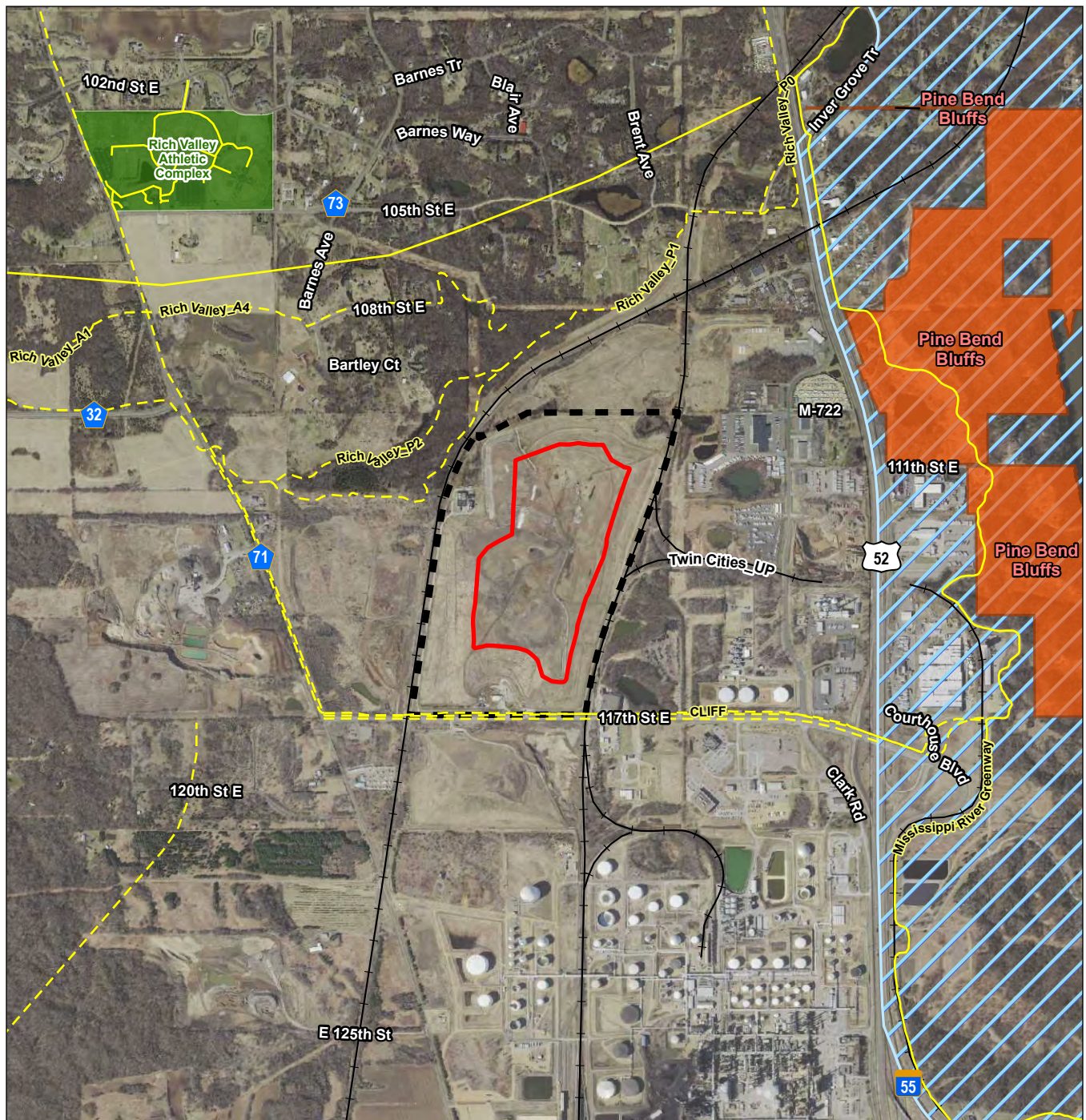
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Inver Grove Heights, Dakota Co., MN

Prepared by KJM on 2022-04-26
TR by XXX on 2020-XX-XX
IR by XXX on 2020-XX-XX

Client/Project
Republic Services
PBL Major Permit Mod & EAW
EAW

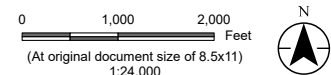
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1

Title
Project Location USGS Topo Map



Notes
 1. Coordinate System: NAD 1983 HARN Adj MN
 Dakota Feet
 2. Data Sources: Stantec, MnGeo, MnDNR, MnDOT
 3. Background: 2020 color 7-county

- Legend**
- Proposed Project Area
 - Pine Bend Landfill Property Boundary
 - Railroads
 - Metro Region Trails/Bikeways
 - Trail Status
 - Planned
 - Existing
 - Metro Region Parks
 - NPS Mississippi River Recreation Area
 - MnDNR - Management Units
 - Scientific and Natural Area - SNA



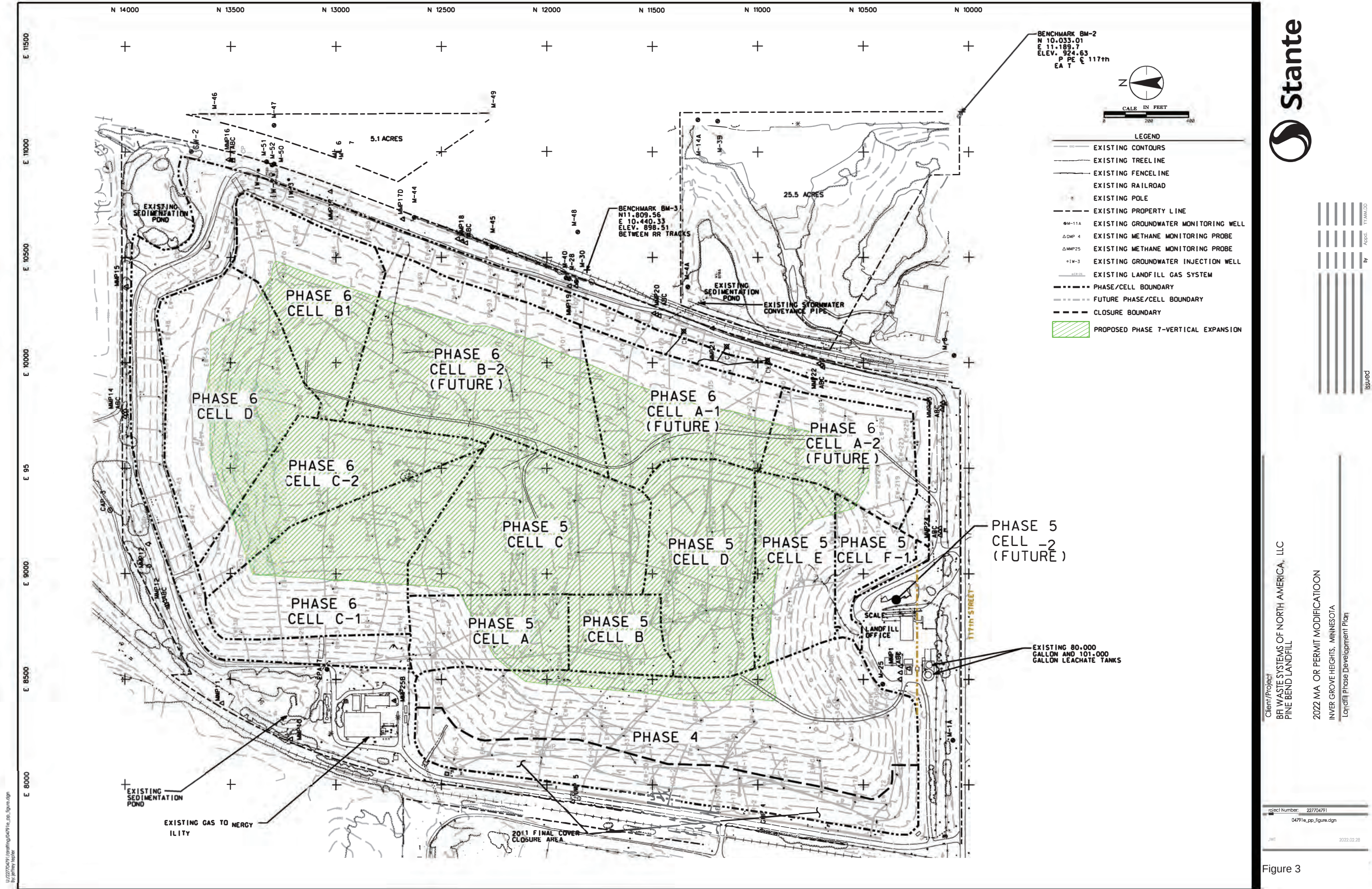
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 Inver Grove Heights, Dakota Co., MN

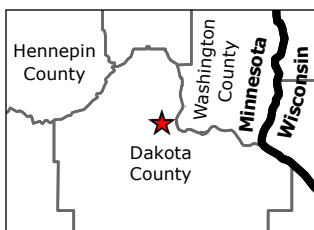
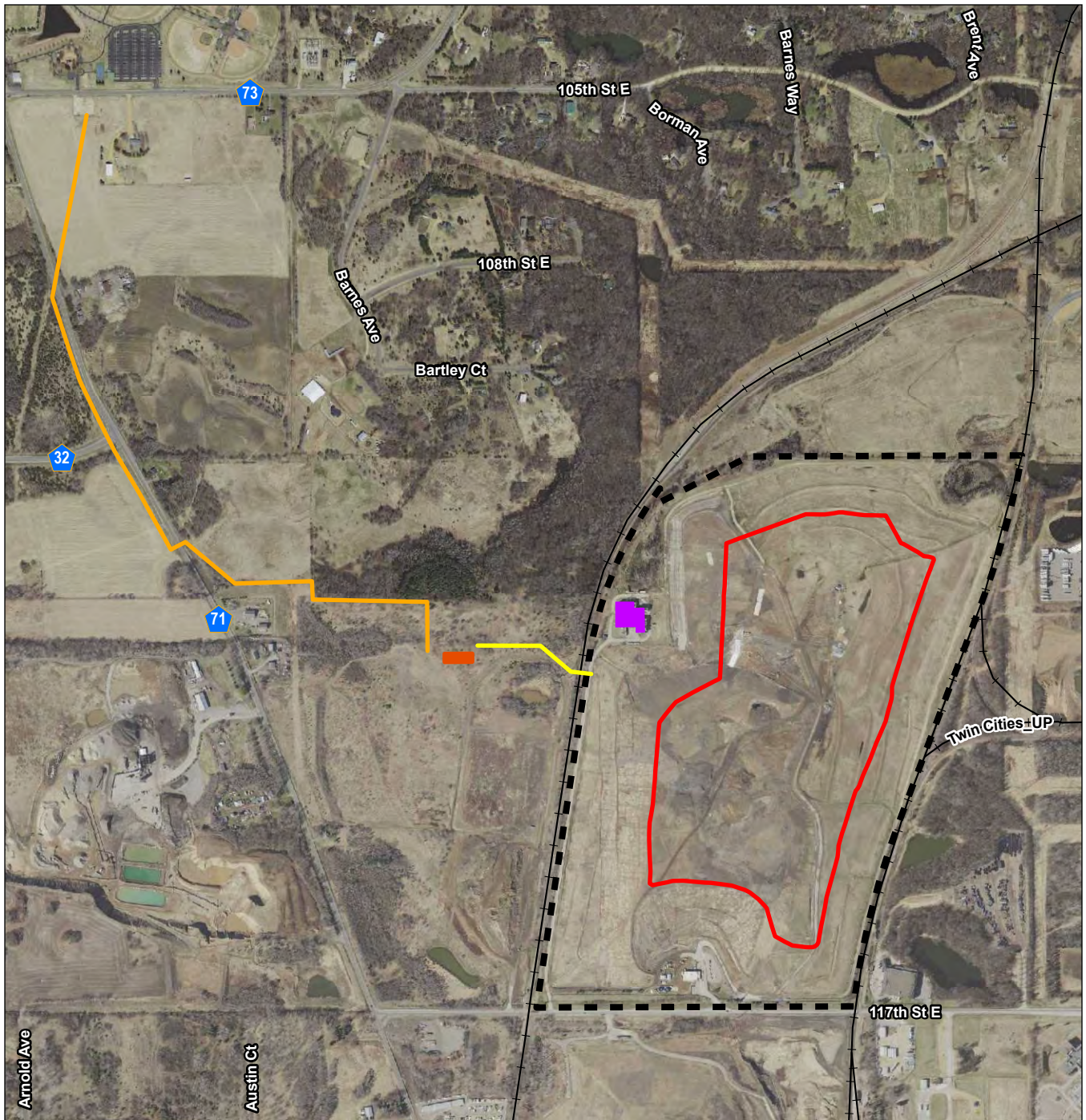
Prepared by KJM on 2022-04-26
 TR by XXX on 2020-XX-XX
 IR by XXX on 2020-XX-XX

Client/Project
 Republic Services
 PBL Major Permit Mod & EAW
 EAW

Figure No.
 2

Title
 Project Location Aerial Map





Notes
 1. Coordinate System: NAD 1983 HARN Adj MN
 Dakota Feet
 2. Data Sources: Stantec, MnGeo, MnDNR, MnDOT
 3. Background: 2020 color 7-county

- Legend**
- Railroads
 - Landfill Pipeline Connection
 - RNG Pipeline (Constructed)
 - RNG Facility (In Operation)
 - Decommissioned Electricity Generating Facility
 - Proposed Project Area
 - Pine Bend Landfill Property Boundary

0 500 1,000
 Feet
 (At original document size of 8.5x11)
 1:13,200



Project Location
 T27N, R22W, S33
 Inver Grove Heights, Dakota Co., MN

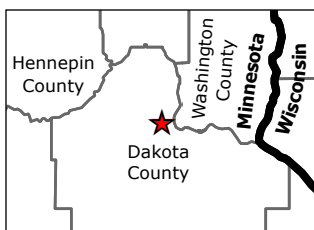
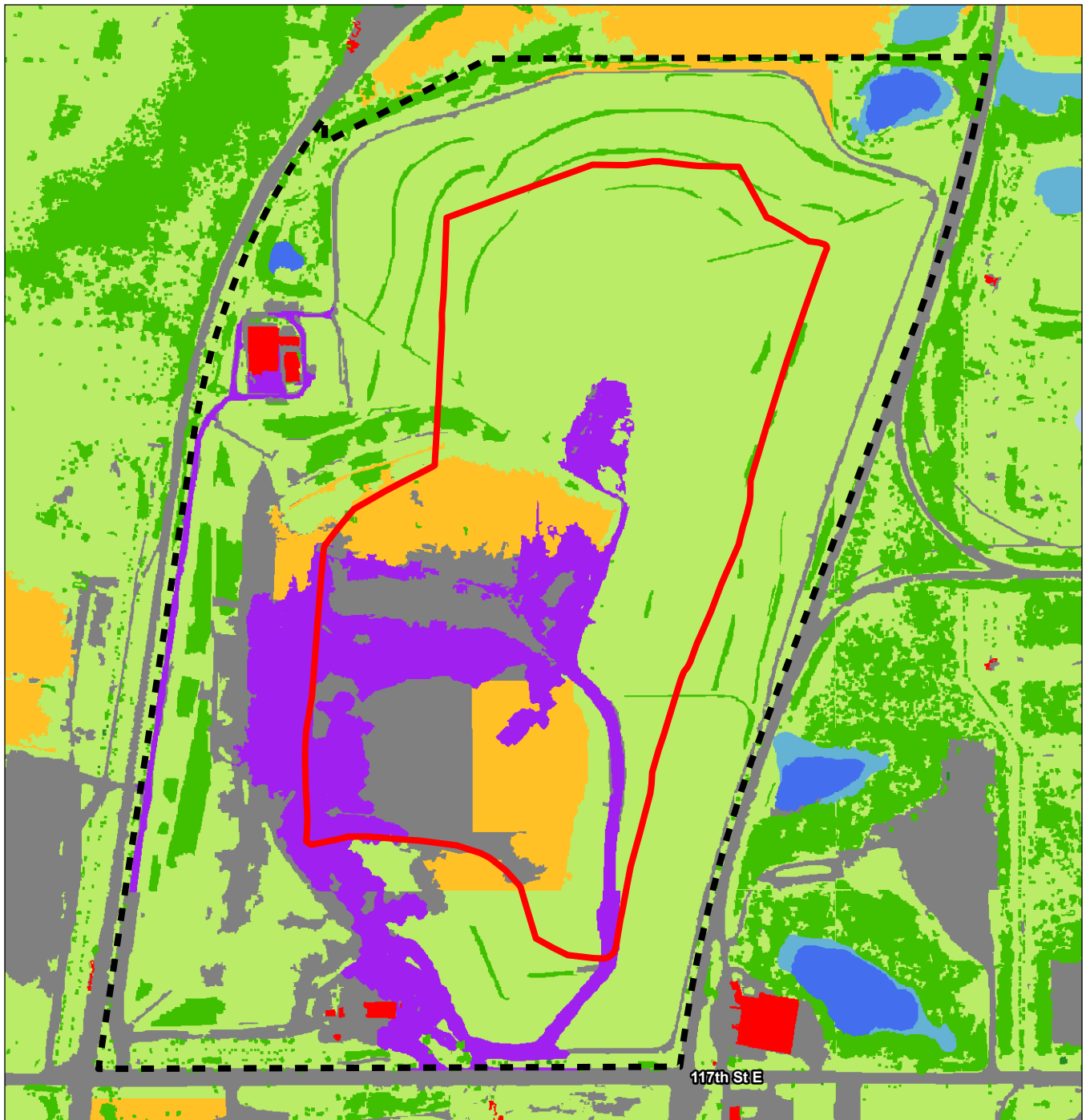
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 TR by XXX on 2020-XX-XX
 IR by XXX on 2020-XX-XX

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Figure No.
 4

Title
 RNG Facility and Pipeline

V:\2277\active\227704791\03_data\gis_cad\gis\proj\leaw\leaw.aprx Revised: 2023-04-07 By: kjmueller



Notes
1. Coordinate System: NAD 1983 HARN Adj MN
Dakota Feet
2. Data Sources: Stantec, MnGeo, MnDOT, UMN -
Twin Cities 1-Meter Land Cover (2016)
3. Background: 2020 color 7-county

Legend
[Red outline] Proposed Project Area
[Dashed black line] Pine Bend Landfill
[Black line] Property Boundary
TCMA Land Cover 2016
[Green] Grass/Shrub
[Red] Buildings
[Grey] Roads/Paved Surfaces
[Blue] Lakes/Ponds
[Green] Deciduous Tree Canopy
[Yellow] Coniferous Tree Canopy
[Orange] Agriculture
[Light Blue] Emergent Wetland
[Dark Blue] Forested/Shrub Wetland
[Purple] Extraction

0 300 600 Feet
(At original document size of 8.5x11)
1:7,200



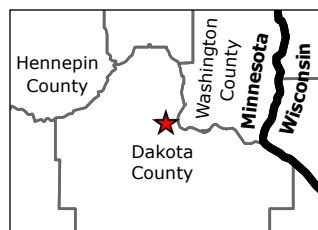
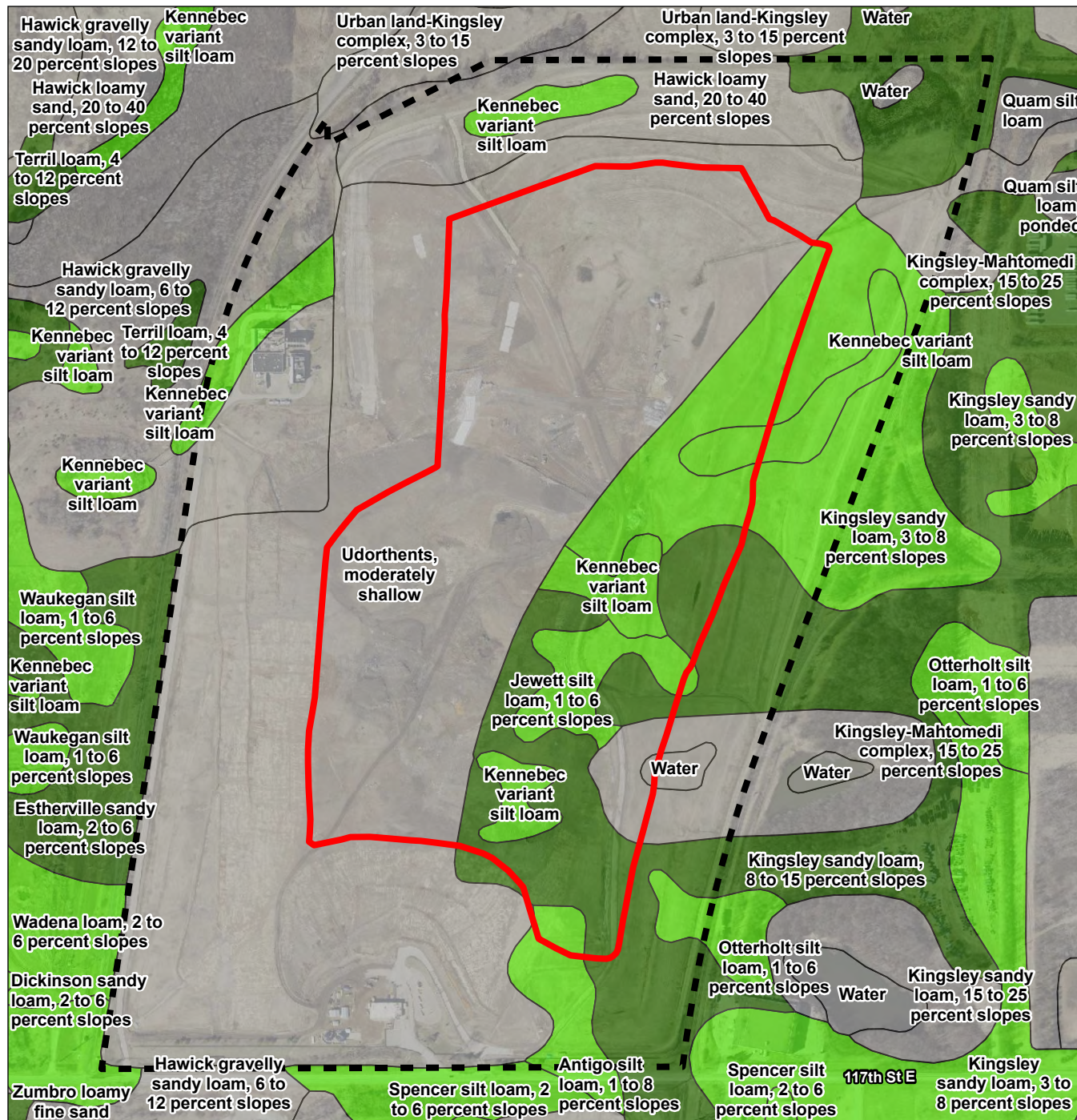
Project Location
T27N, R22W, S33
Inver Grove Heights, Dakota Co., MN
Client/Project
Republic Services
PBL Major Permit Mod & EAW
EAW
Figure No.
5
Title
Land Cover

Prepared by KJM on 2023-04-07
TR by XXX on 2020-XX-XX
IR by XXX on 2020-XX-XX
227704791

227704791

5

Land Cover



Notes
 1. Coordinate System: NAD 1983 HARN Adj MN
 Dakota Feet
 2. Data Sources: Stantec, MnGeo, MnDOT, NRCS
 3. Background: 2020 color 7-county

Legend

- Proposed Project Area
- Pine Bend Landfill
- Property Boundary
- Farmland Class**
- All areas are prime farmland
- Farmland of statewide importance
- Not prime farmland

0 300 600 Feet
 (At original document size of 8.5x11)
 1:7,200



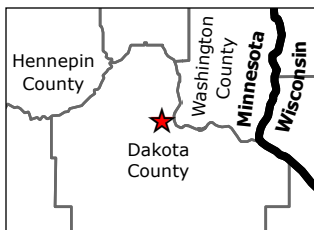
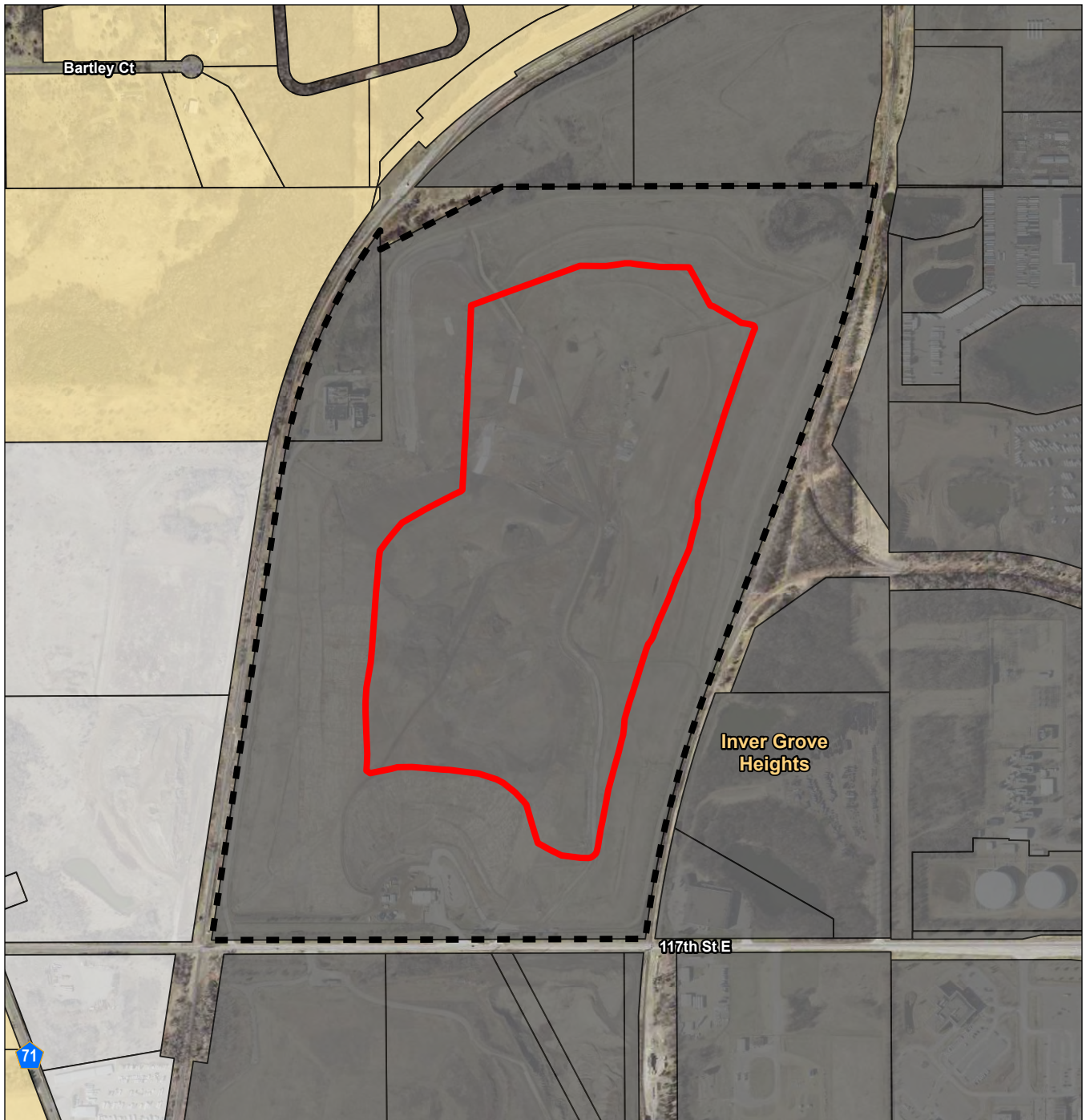
Project Location
 T27N, R22W, S33
 Inver Grove Heights, Dakota Co., MN

Prepared by KJM on 2023-04-07
 TR by XXX on 2020-XX-XX
 IR by XXX on 2020-XX-XX

Client/Project
 Republic Services
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 EAW

Figure No.
 6

Title
 Farmland and Soils Classification



Notes
 1. Coordinate System: NAD 1983 HARN Adj MN
 Dakota Feet
 2. Data Sources: Stantec, MnGeo, MnDOT, Inver
 Grove Heights
 3. Background: 2020 color 7-county

- Legend**
- Proposed Project Area
 - Pine Bend Landfill
 - Property Boundary
 - Municipal Boundary
 - Inver Grove 2040
Comprehensive Plan
Land Use**
 - General Industrial
 - Light Industrial
 - Rural Density
 - Residential

0 400 800 Feet
 (At original document size of 8.5x11)
 1:9,652



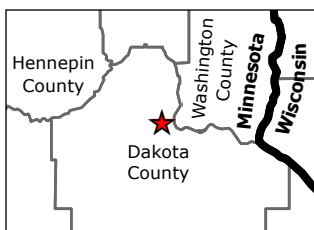
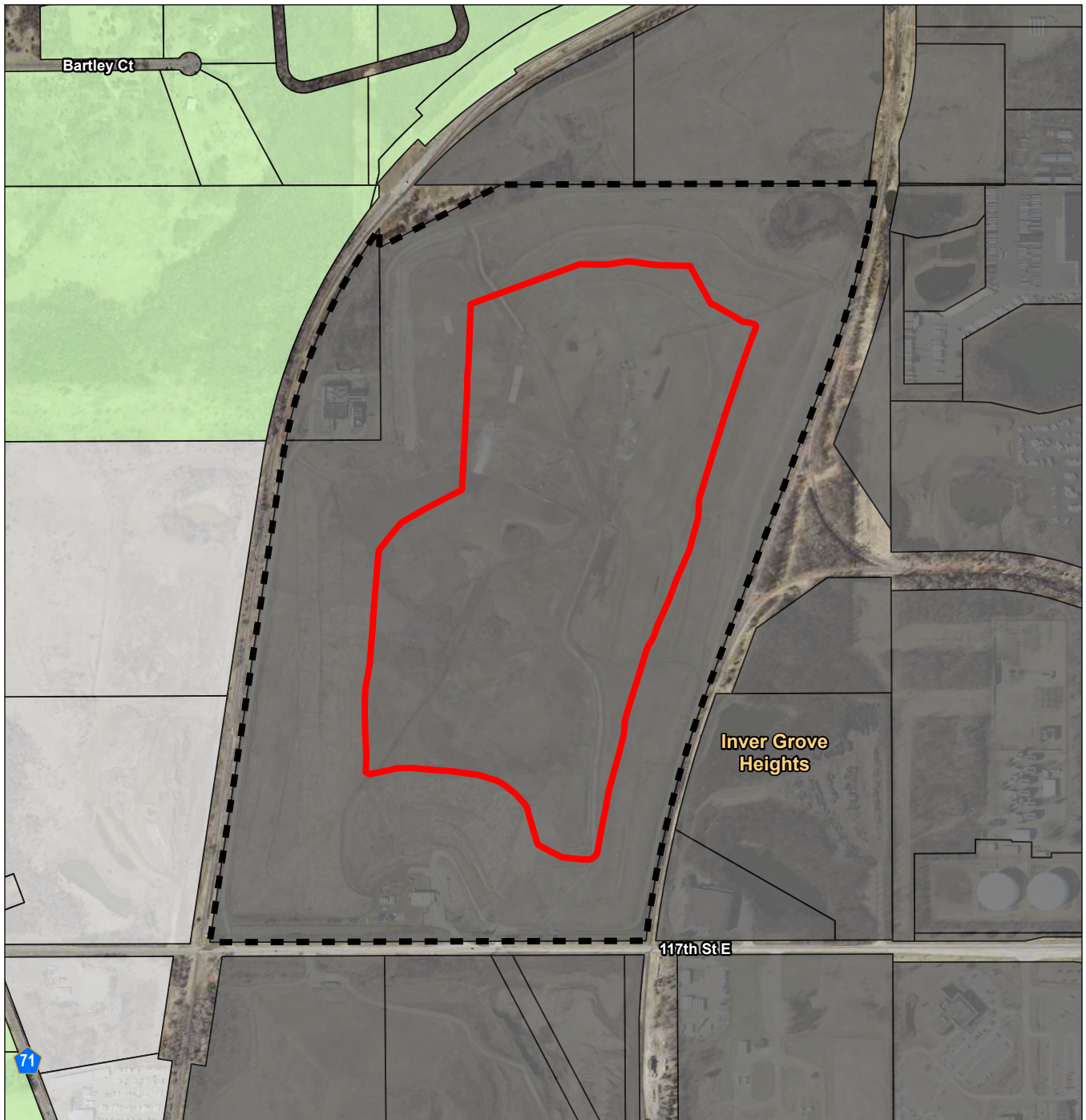
Project Location
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 Inver Grove Heights, Dakota Co., MN

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 IR by XXX on 2020-XX-XX

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Figure No.
 7

Title
**Future Land Use (Inver Grove
 Heights)**



Notes
 1. Coordinate System: NAD 1983 HARN Adj MN Dakota Feet
 2. Data Sources: Stantec, MnGeo, MnDOT, Inver Grove Heights
 3. Background: 2020 color 7-county

- Legend**
- Proposed Project Area
 - Pine Bend Landfill
 - Property Boundary
 - Municipal Boundary
 - Inver Grove Zoning**
 - A, Agricultural
 - I-1 - Limited Industry
 - I-2 - General Industry

0 400 800 Feet
 (At original document size of 8.5x11)
 1:9,600



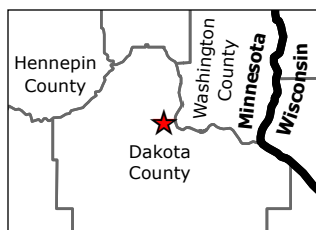
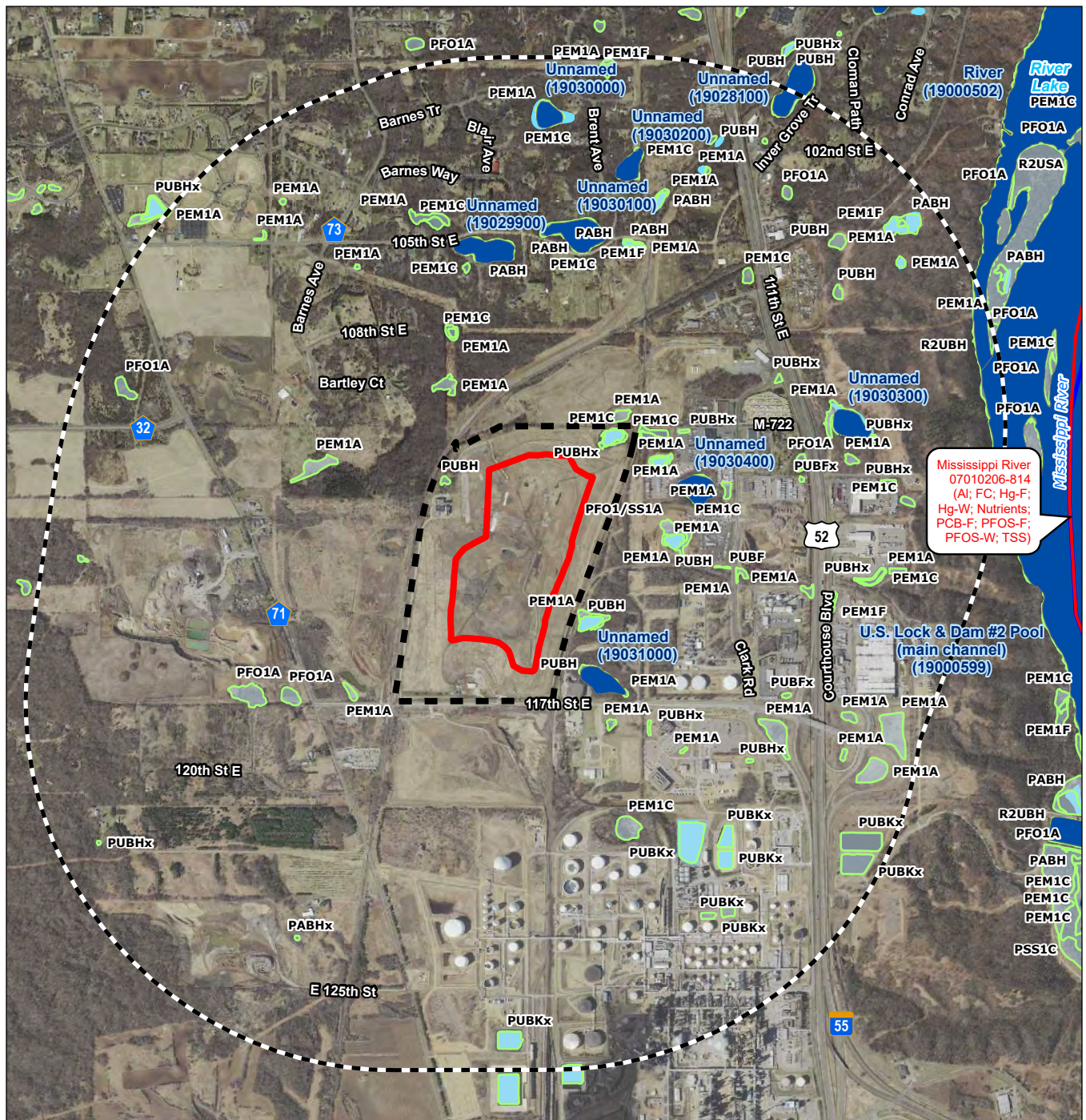
Project Location
 T27N, R22W, S33
 Inver Grove Heights, Dakota Co., MN

Prepared by KJM on 2023-04-07
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Figure No.
 8

Title
 Zoning (Inver Grove Heights)



Notes
 1. Coordinate System: NAD 1983 HARN Adj MN Dakota Feet
 2. Data Sources: Stantec, MNDNR, USGS, USFWS
 3. Background: 2020 Color 7-county

- Legend**
- Proposed Project Area
 - Pine Bend Landfill
 - Property Boundary
 - 1 Mile Radius
 - National Wetlands Inventory Feature
 - 2022 MPCA Impaired Streams (Draft)
 - 2022 MPCA Impaired Wetlands (Draft)
 - 2022 MPCA Impaired Lakes (Draft)

- Minnesota Public Waters Delineations**
- Public Water Watercourse
 - - Public Ditch/Altered
 - Natural Watercourse
 - Public Waters Basins
 - National Hydrography Dataset
 - ~ Stream
 - Waterbody

0 1,000 2,000
 Feet
 (At original document size of 8.5x11)
 1:26,400

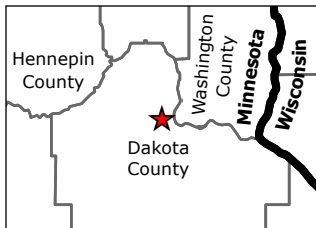


Project Location
 T27N, R22W, S33
 Inver Grove Heights, Dakota Co., MN

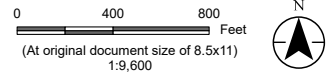
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 Republic Services
 PBL Major Permit Mod & EAW
 EAW
 Figure No. 9

Title
Water Resources Map

Prepared by KJM on 2023-04-07
 TR by XXX on 2021-XX-XX
 IR by XXX on 2021-XX-XX
 227704791



- Legend**
- Proposed Project Area
 - ▬ Pine Bend Landfill Property Boundary
 - ▬ 500 ft Radius Field Verified Wells
 - Commercial
 - Domestic
 - Industrial
 - Monitor Well
 - Observation Well
 - Other
 - Public Supply
 - Piezometer
 - Recovery Well
 - Test Well
 - Unknown



Project Location
T27N, R22W, S33
Inver Grove Heights, Dakota Co., MN

Prepared by KJM on 2023-04-07
TR by XXX on 2020-XX-XX
IR by XXX on 2020-XX-XX

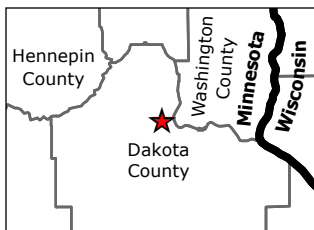
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Republic Services
PBL Major Permit Mod & EAW
EAW

Figure No.
10

Title
County Well Index Map

Notes

1. Coordinate System: NAD 1983 HARN Adj MN Dakota Feet
2. Data Sources: Stantec, MnGeo, MnDOT, MDA, MGS
3. Background: 2020 color 7-county



Notes
 1. Coordinate System: NAD 1983 HARN Adj MN Dakota Feet
 2. Data Sources: Stantec, MnGeo, MnDOT, MPCA
 3. Background: 2020 color 7-county

Legend

- Proposed Project Area
- Pine Bend Landfill Property Boundary
- 500 ft Buffer
- MPCA Sites**
- Program Name**
- Multiple Programs
- Hazardous Waste
- Investigation and Cleanup
- Stormwater
- ▲ Tanks

0 400 800 Feet
 (At original document size of 8.5x11)
 1:9,600



Project Location Prepared by KJM on 2023-04-07
 T27N, R22W, S33
 Inver Grove Heights, Dakota Co., MN

Client/Project 227704791
 Republic Services

PBL Major Permit Mod & EAW
 EAW

Figure No.
 11

Title
MPCA WIMN Potentially Contaminated Sites

Appendix B

Plan Drawings

BFI Waste Systems
of North America, LLC
Pine Bend Landfill
Inver Grove Heights, Minnesota
2022 Major Permit Modification

Prepared By:



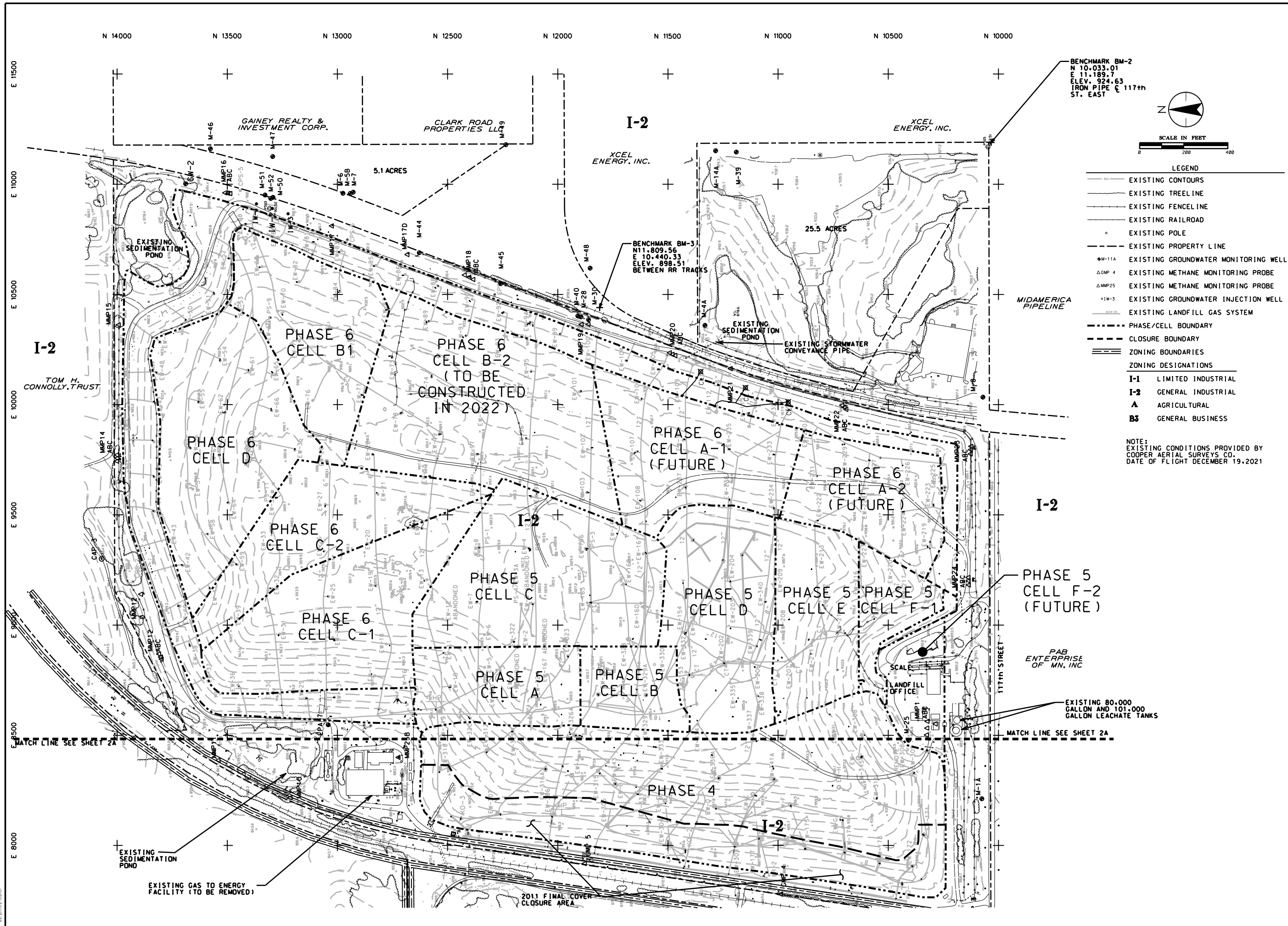
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Maple Plain, MN 55359

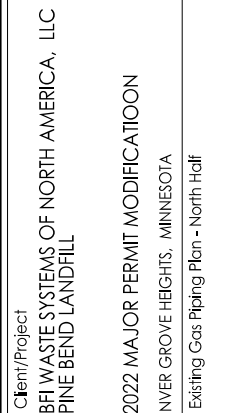
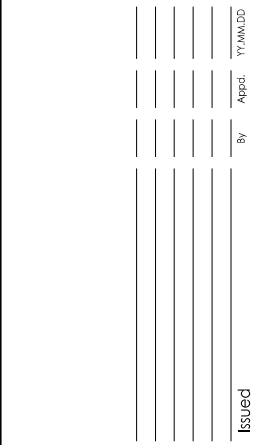
2022.02.21

PROJECT NUMBER: 22704791

INDEX

1. TITLE AND INDEX SHEET
2. EXISTING CONDITIONS MAP (EAST SIDE)
- 2A. EXISTING CONDITIONS MAP (WEST SIDE)
3. PHASING PLAN
4. PHASE 7-VERTICAL EXPANSION
FINAL COVER GRADING PLAN
5. PHASE 7-VERTICAL EXPANSION
SURFACE WATER MANAGEMENT PLAN
6. EXISTING GAS PIPING PLAN NORTH HALF
7. EXISTING GAS PIPING PLAN SOUTH HALF
8. PROPOSED GAS PIPING PLAN NORTH HALF
9. PROPOSED GAS PIPING PLAN SOUTH HALF
10. CROSS-SECTION A
11. CROSS-SECTION B
12. CROSS-SECTION C
13. LINER SYSTEM DETAILS
14. LEACHATE RISER MANHOLE DETAILS
15. SURFACE WATER MANAGEMENT DETAILS
16. GAS SYSTEM DETAILS
17. GAS SYSTEM DETAILS
18. GAS SYSTEM DETAILS





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PRINT NAME THOMAS J. SHUSTARICH

SIGNATURE _____

DATE yy/mm/dd LICENSE # 21210

Project Number: 227704791

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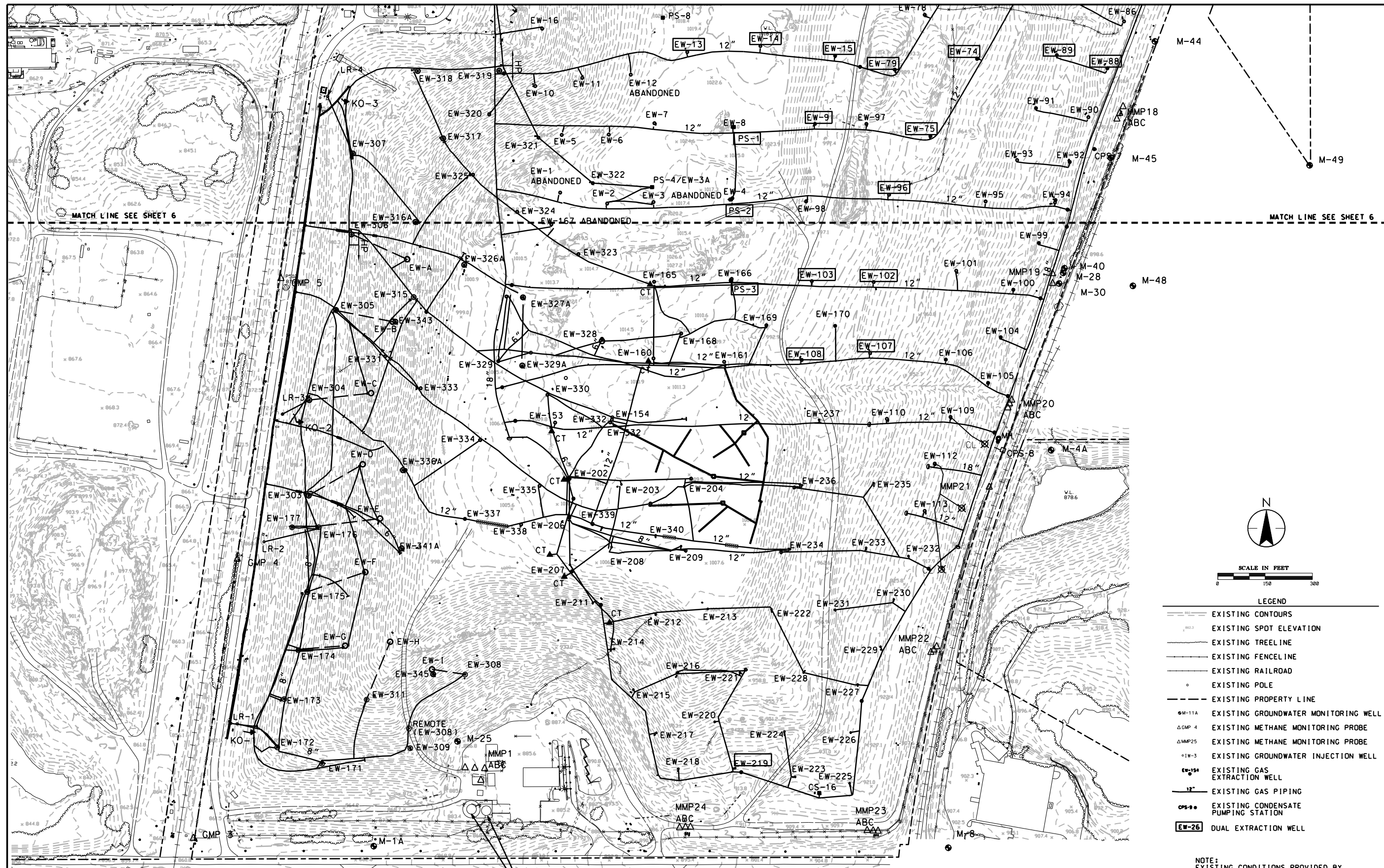
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0 0 0 10



NOTE:
EXISTING CONDITIONS PROVIDED BY
COOPER AERIAL SURVEYS CO.
DATE OF FLIGHT DECEMBER 19, 2021

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Drawing No. 7	
Revision	Sheet
0	7 of 18

HORIZONTAL COLLECTION SYSTEM TRENCH POINT	APPROXIMATE DEPTH (FT)
①	8
②	14
③	8
④	7
⑤	7
⑥	7
⑦	9
⑧	8



- LEGEND
- EXISTING CONTOURS
 - EXISTING SPOT ELEVATION
 - EXISTING TREELINE
 - EXISTING FENCELINE
 - EXISTING RAILROAD
 - EXISTING POLE
 - EXISTING PROPERTY LINE
 - EXISTING GROUNDWATER MONITORING WELL
 - EXISTING METHANE MONITORING PROBE
 - EXISTING METHANE MONITORING PROBE
 - EXISTING GROUNDWATER INJECTION WELL
 - EXISTING GAS EXTRACTION WELL
 - EXISTING GAS PIPING
 - EXISTING CONDENSATE PUMPING STATION
 - CURRENTLY PERMITTED CONTOURS
 - PROPOSED CONTOURS
 - PROPOSED 12" SUBHEADER
 - PROPOSED 6" SUBHEADER
 - PROPOSED GAS WELLS
 - PROPOSED CONTROL VALVE
 - PROPOSED HORIZONTAL COLLECTOR WELLHEAD
 - PROPOSED HORIZONTAL COLLECTOR PIPING (6" HDPE SDR 17)
 - PROPOSED LATERAL GAS SUBHEADER (8" HDPE SDR 17)
 - PROPOSED CONDENSATE SUMP
 - PROPOSED PUMPING STATION

NOTE:
EXISTING CONDITIONS PROVIDED BY
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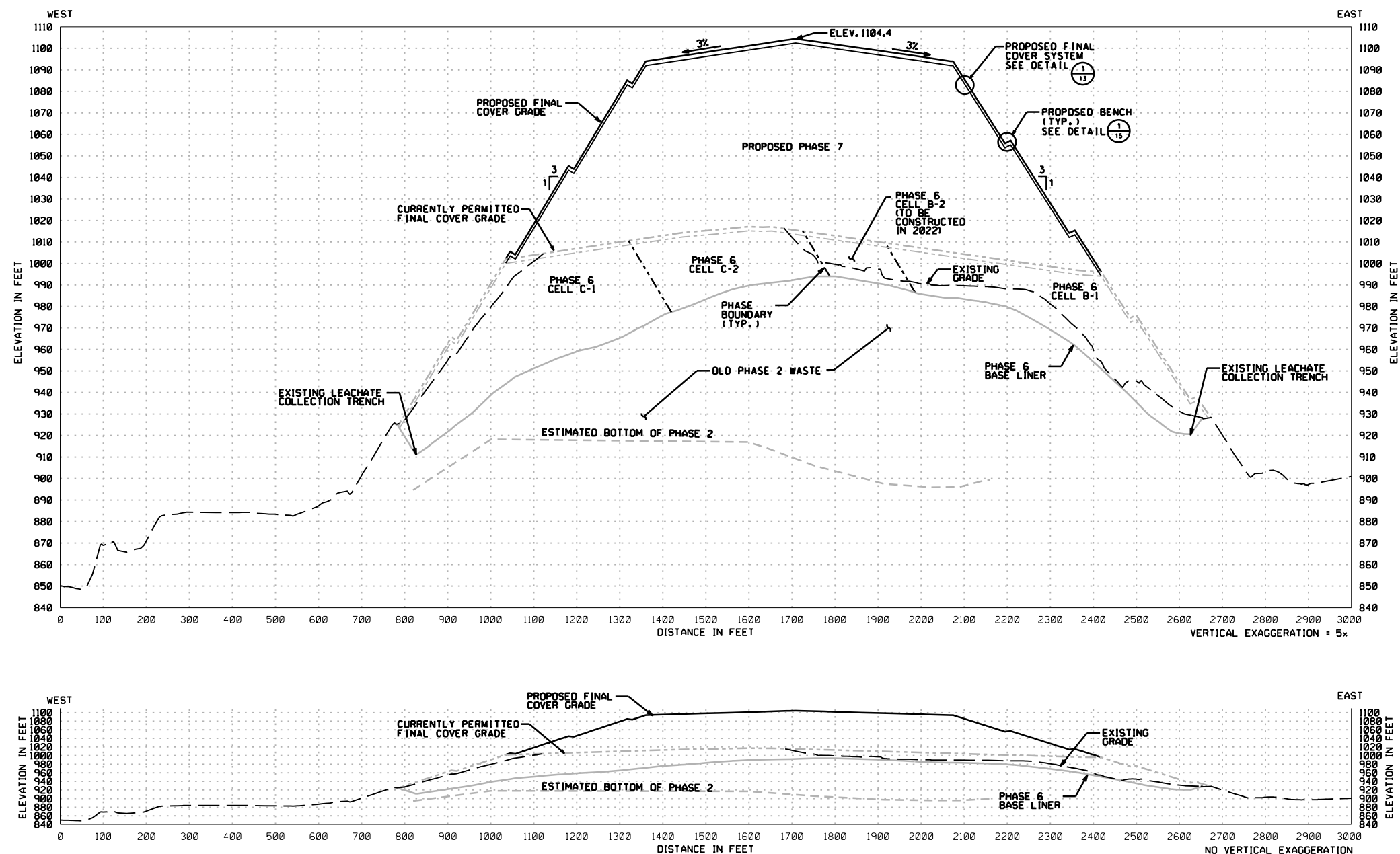
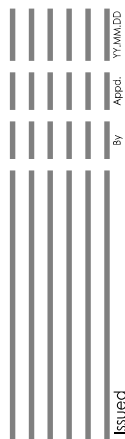
Client/Project
BH WASTE SYSTEMS OF NORTH AMERICA, LLC
PINE BEND LANDFILL

2022 MAJOR PERMIT MODIFICATION
INVER GROVE HEIGHTS, MINNESOTA
Proposed Gas Piping Plan - North Half

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Project Number: 227704791
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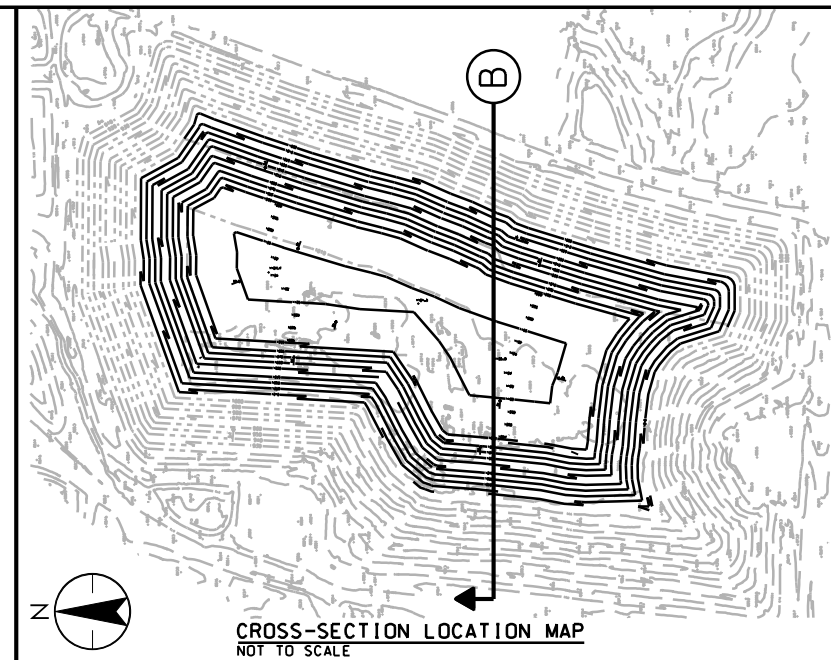
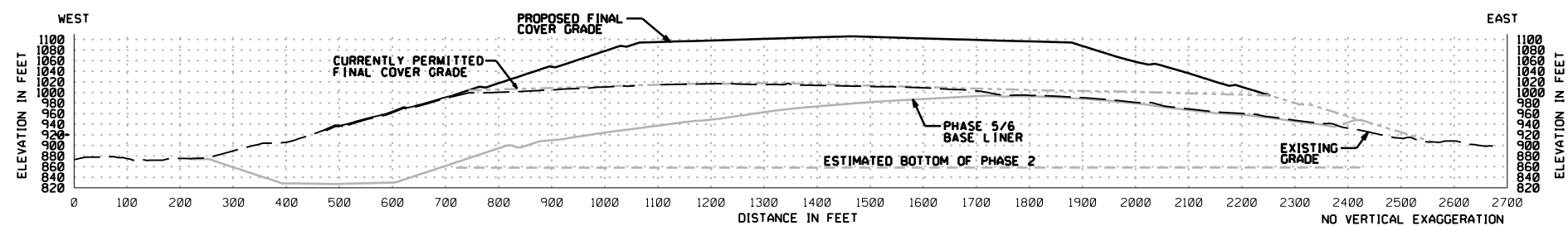
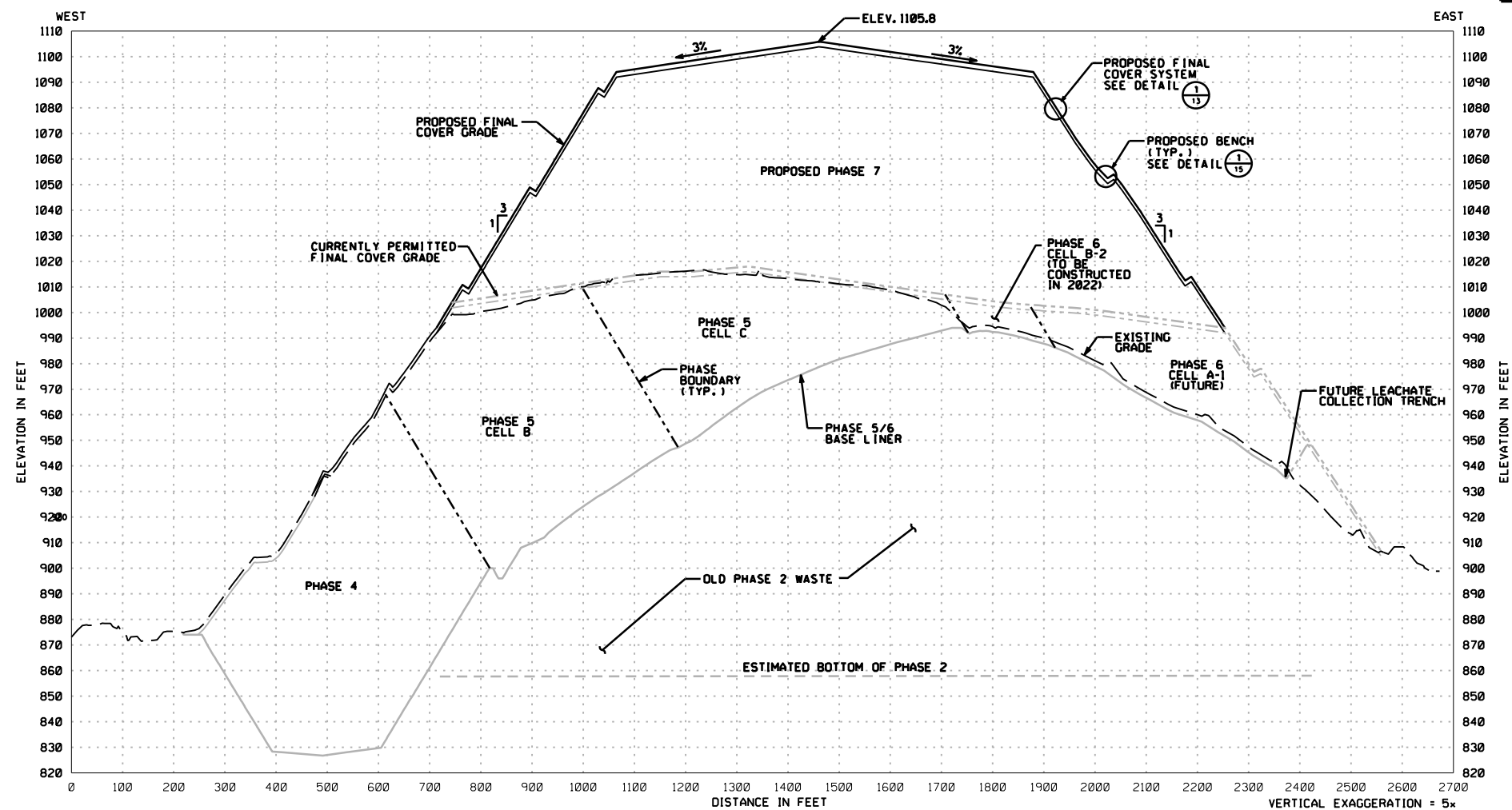
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Revision Sheet
0 8 of 18



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2022 MAJOR PERMIT MODIFICATION
NORVIG GROVE HEIGHTS, MINNESOTA

0 10pf 18

[illegible]

Client/Project
BFI WASTE SYSTEMS OF NORTH AMERICA, LLC
PINE BEND LANDFILL

2022 MAJOR PERMIT MODIFICATION
NORVUE GROVE HEIGHTS, MINNESOTA

Cross-section B

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Drawing No. 11

Revision Sheet

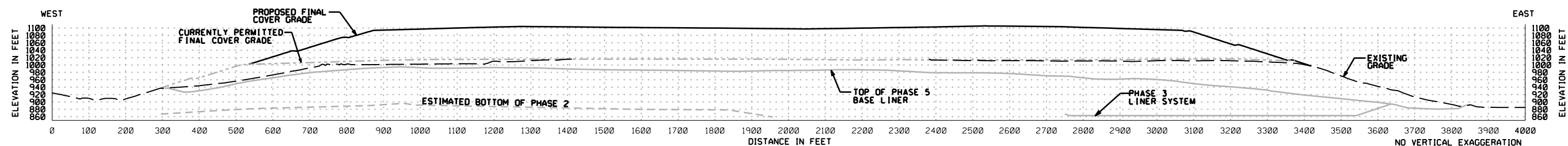
0 11 of 18

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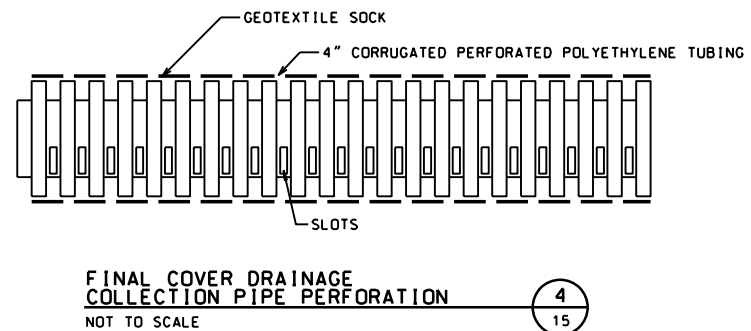
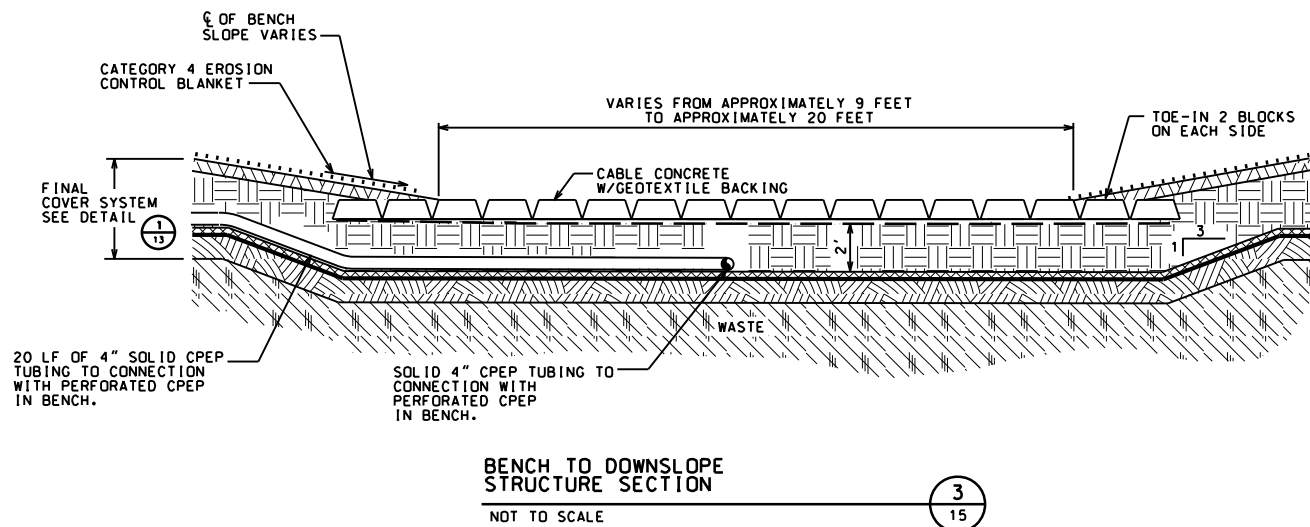
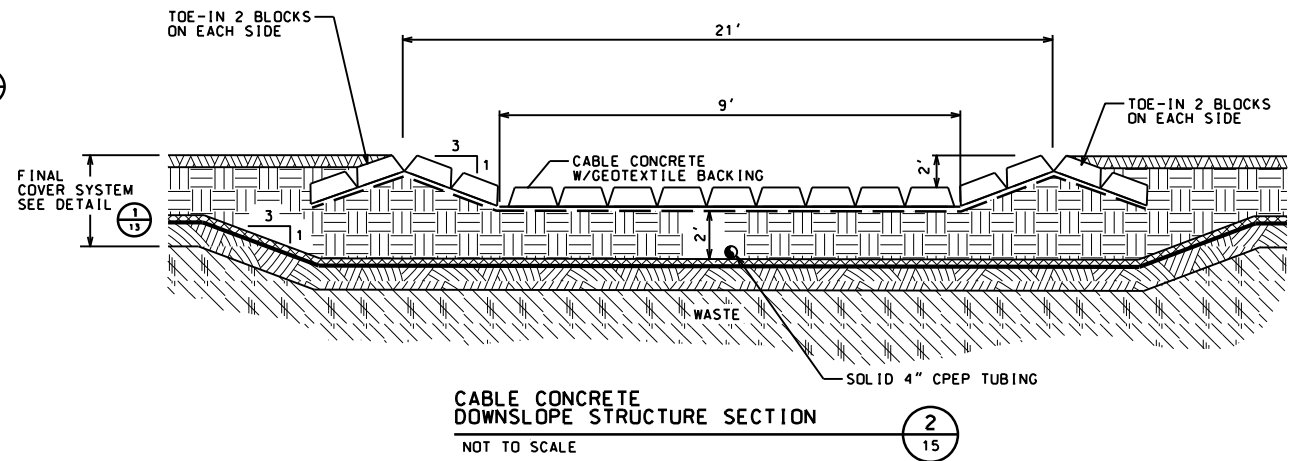
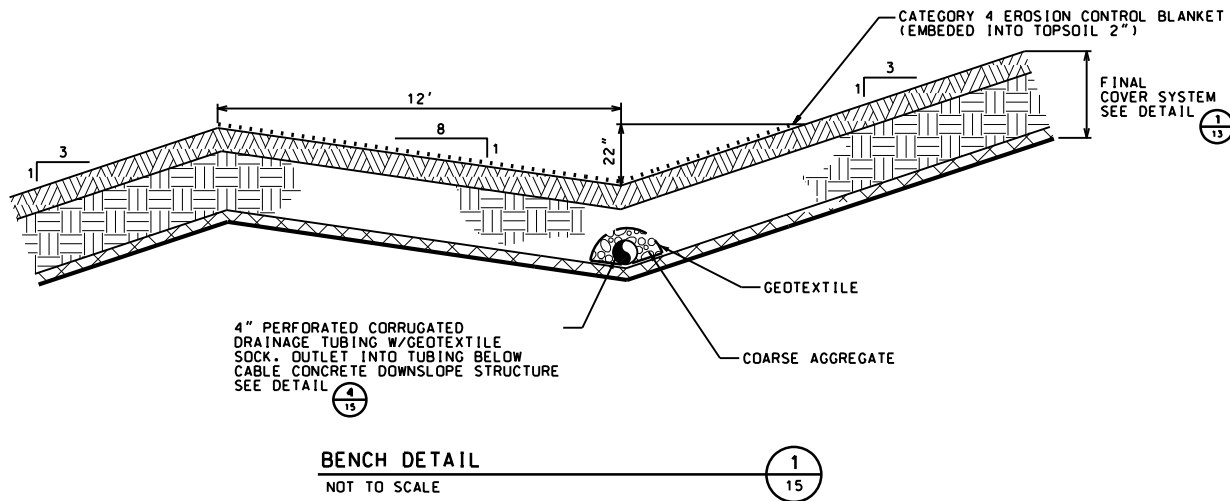
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By: jeffrey.tenfor



12 of 18



U:\22770479\1\drafting\04791e_xs_12.dgn



By	YJAW/DD
App'd	
Issued	

Client/Project
BH WASTE SYSTEMS OF NORTH AMERICA, LLC
PINE BEND LANDFILL

2022 MAJOR PERMIT MODIFICATION
INVER GROVE HEIGHTS, MINNESOTA
Surface Water Management Details

Permit-Seal
I HEREBY CERTIFY THAT THIS PLAN, SPECIFICATION, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PRINT NAME THOMAS J. SHUSTARICH

SIGNATURE

DATE yy/mm/dd LICENSE # 21210

Project Number: 227704791

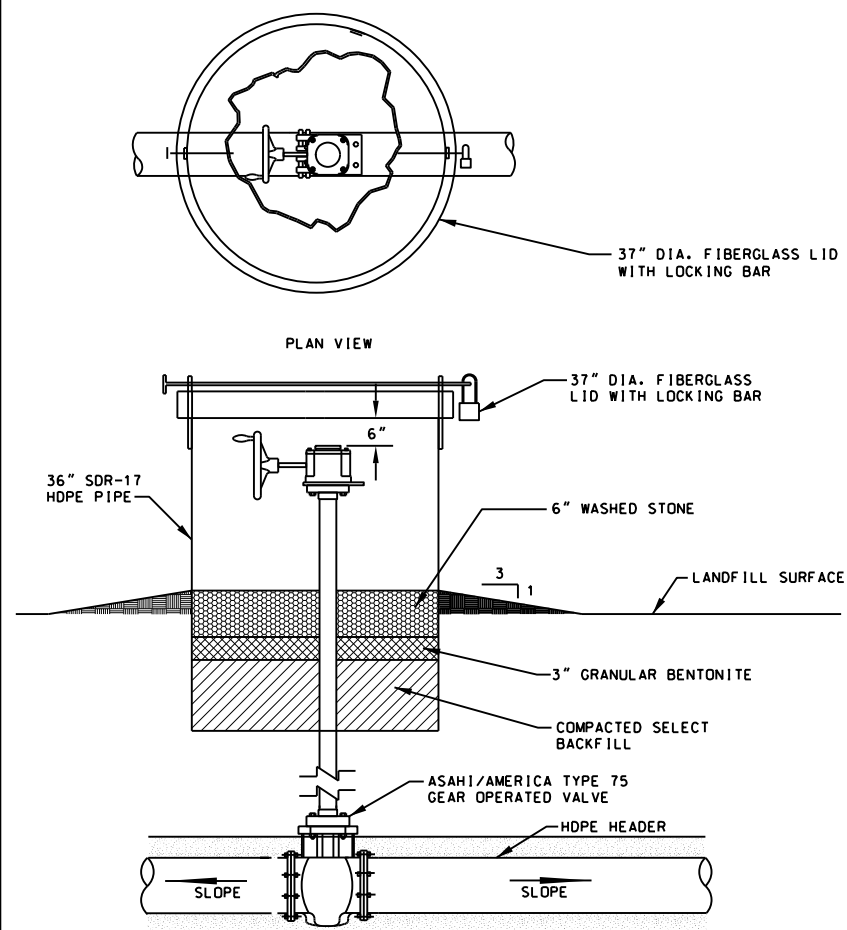
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JWT 2022.03.14

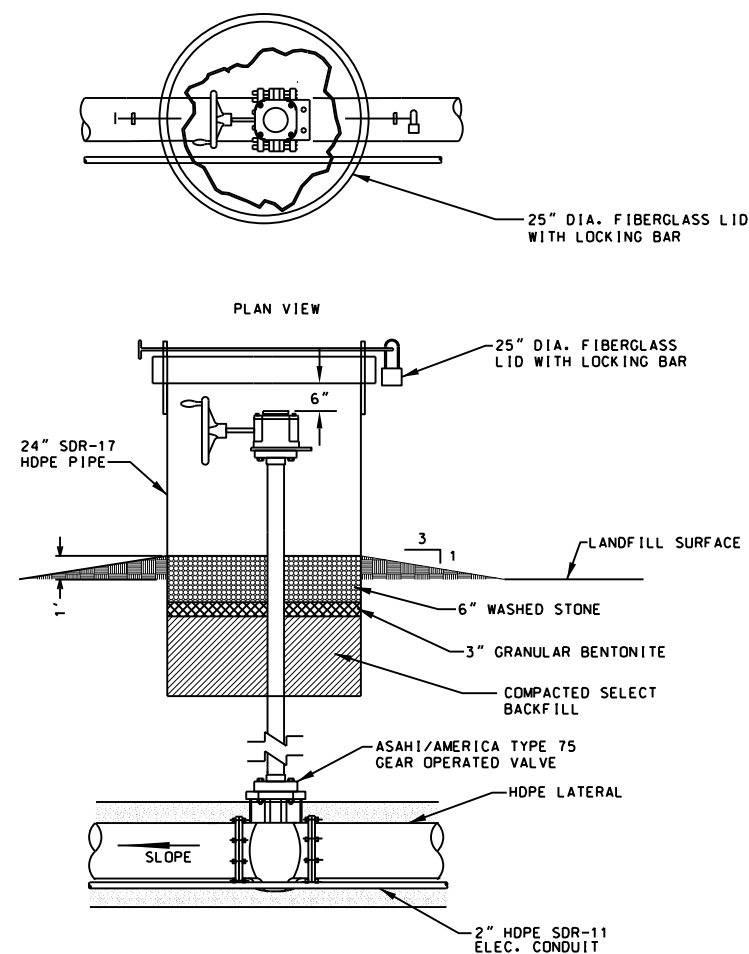
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Revision Sheet

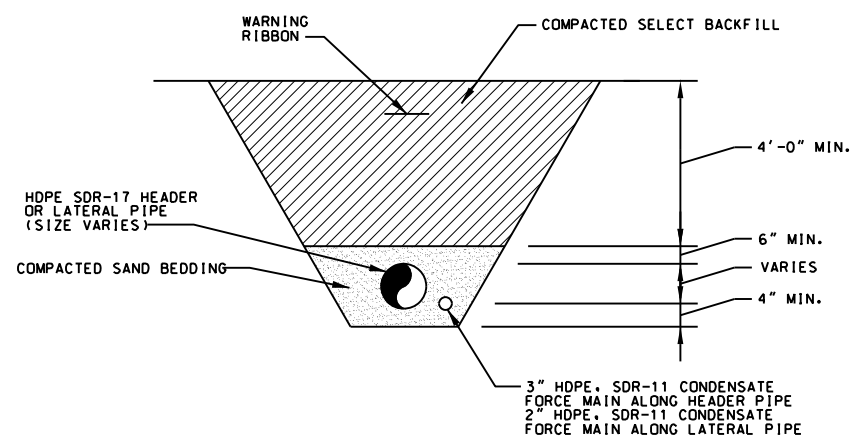
0 15 of 18



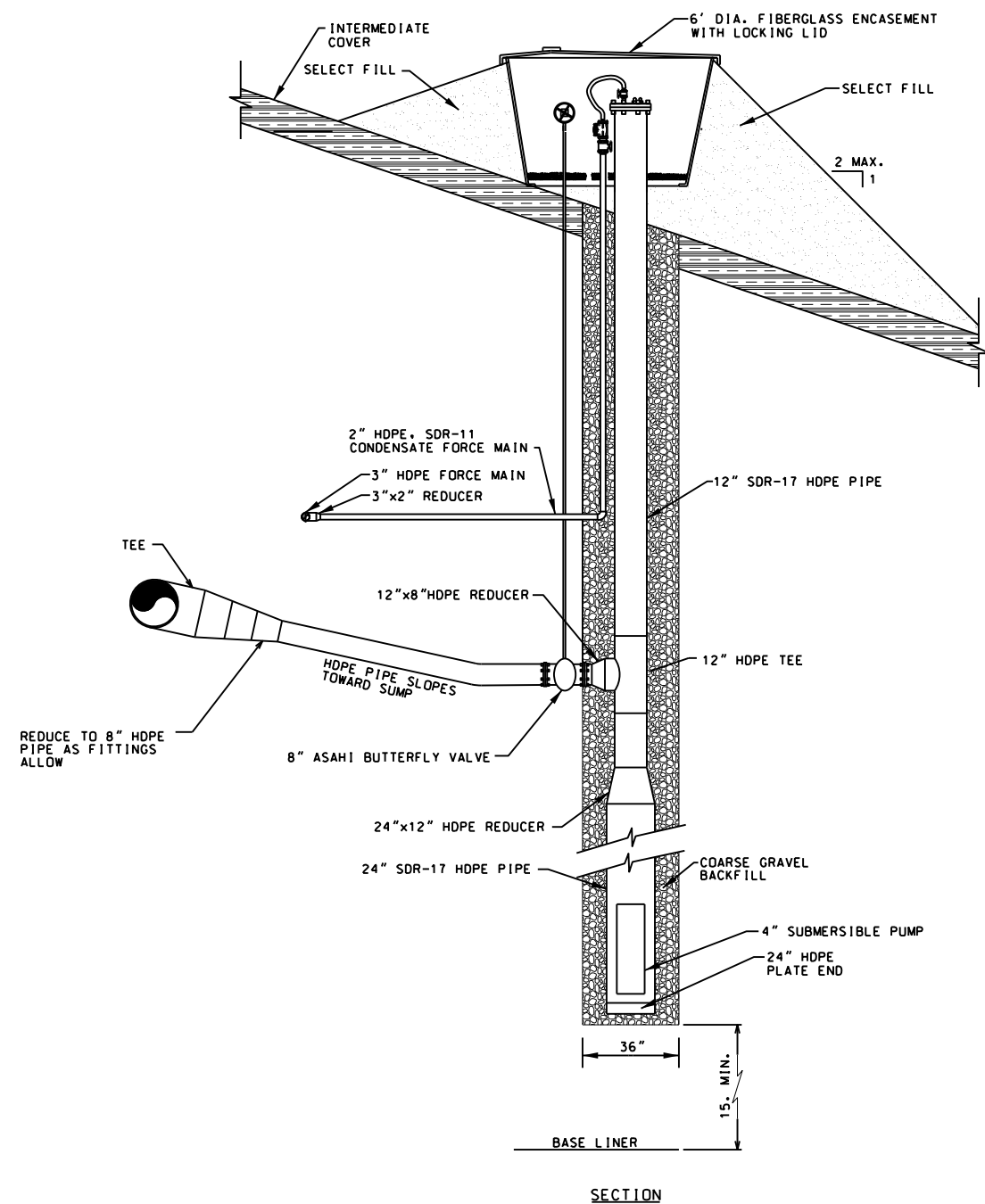
CONTROL VALVE DETAIL (GAS HEADER) 1
NOT TO SCALE 17



ISOLATION VALVE DETAIL (LATERAL) 2
NOT TO SCALE 17



TYPICAL PIPE TRENCH DETAIL
NOT TO SCALE



CONDENSATE SUMP DETAIL 3
NOT TO SCALE 17

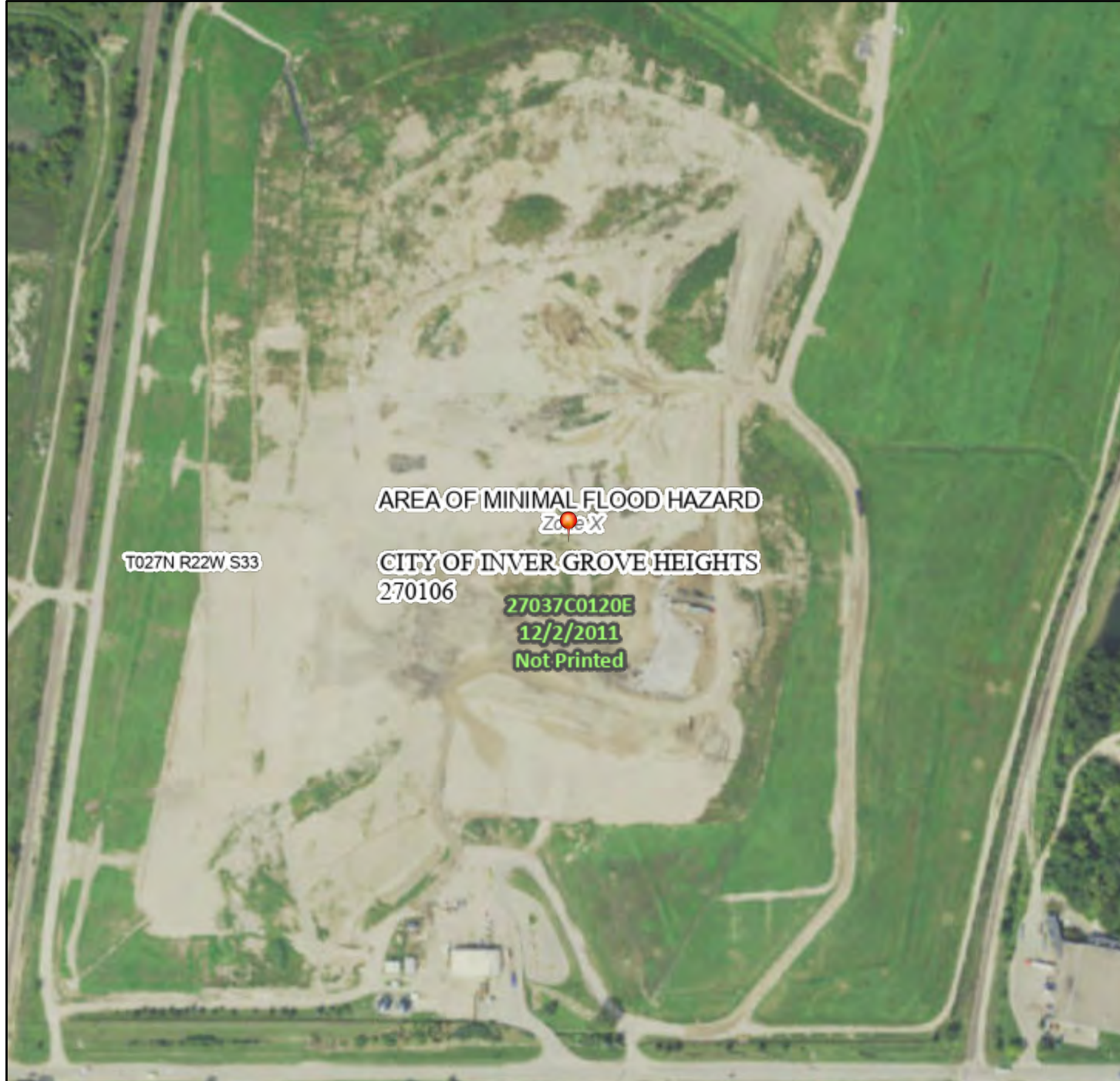
Appendix C

FEMA FIRMette

National Flood Hazard Layer FIRMMette



93°3'30"W 44°47'11"N



0 250 500 1,000 1,500 2,000 Feet 1:6,000

93°2'52"W 44°46'45"N

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) Zone A, V, A99
		With BFE or Depth Zone AE, AO, AH, VE, AR
		Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
		Future Conditions 1% Annual Chance Flood Hazard Zone X
		Area with Reduced Flood Risk due to Levee. See Notes. Zone X
		Area with Flood Risk due to Levee Zone D
OTHER AREAS		NO SCREEN Area of Minimal Flood Hazard Zone X
		Effective LOMRs
		Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
OTHER FEATURES		20.2 Cross Sections with 1% Annual Chance
		17.5 Water Surface Elevation
		Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
		Jurisdiction Boundary
		Coastal Transect Baseline
MAP PANELS		Digital Data Available
		No Digital Data Available
		Unmapped



The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on **4/26/2022 at 10:20 PM** and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

Appendix D
MDH Well Log Reports
2022 Water Quality Monitoring Report

100014

County Dakota
Quad Inver Grove
Quad ID 103D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 10/19/1990
Update Date 03/20/2020
Received Date

Well Name PHOENIX INC					Township 27		Range 22		Dir W		Section 33		Subsection DBCCCA		Well Depth 466 ft.			Depth Completed 466 ft.			Date Well Completed 11/22/1974																																																		
Elevation 875 ft.					Elev. Method 7.5 minute topographic map (+/- 5 feet)					Drill Method Non-specified Rotary						Drill Fluid																																																							
Address															Use commercial						Status Active																																																		
C/W 117 ST E ROSEMOUNT MN															Well Hydrofractured? Yes ☐ No ☐						From To																																																		
Stratigraphy Information															Casing Type Single casing						Joint Threaded																																																		
<table><tr><td>Geological Material</td><td>From</td><td>To (ft.)</td><td>Color</td><td>Hardness</td></tr><tr><td>SAND</td><td>0</td><td>90</td><td>BROWN</td><td>SOFT</td></tr><tr><td>CLAY & GRAVEL</td><td>90</td><td>105</td><td>GRY/BRN</td><td>SOFT</td></tr><tr><td>GRAVEL</td><td>105</td><td>122</td><td>BROWN</td><td>SOFT</td></tr><tr><td>SAND</td><td>122</td><td>168</td><td>BROWN</td><td>SOFT</td></tr><tr><td>SAND & CLAY</td><td>168</td><td>255</td><td>GRAY</td><td>HARD</td></tr><tr><td>SOFT SANDROCK</td><td>255</td><td>346</td><td>LT. BRN</td><td>HARD</td></tr><tr><td>LIMESTONE</td><td>346</td><td>354</td><td>WHITE</td><td>HARD</td></tr><tr><td>JORDAN SANDSTONE</td><td>354</td><td>466</td><td>YELLOW</td><td>HARD</td></tr></table>															Geological Material	From	To (ft.)	Color	Hardness	SAND	0	90	BROWN	SOFT	CLAY & GRAVEL	90	105	GRY/BRN	SOFT	GRAVEL	105	122	BROWN	SOFT	SAND	122	168	BROWN	SOFT	SAND & CLAY	168	255	GRAY	HARD	SOFT SANDROCK	255	346	LT. BRN	HARD	LIMESTONE	346	354	WHITE	HARD	JORDAN SANDSTONE	354	466	YELLOW	HARD	Drive Shoe? Yes ☒ No ☐						Above/Below					
Geological Material	From	To (ft.)	Color	Hardness																																																																			
SAND	0	90	BROWN	SOFT																																																																			
CLAY & GRAVEL	90	105	GRY/BRN	SOFT																																																																			
GRAVEL	105	122	BROWN	SOFT																																																																			
SAND	122	168	BROWN	SOFT																																																																			
SAND & CLAY	168	255	GRAY	HARD																																																																			
SOFT SANDROCK	255	346	LT. BRN	HARD																																																																			
LIMESTONE	346	354	WHITE	HARD																																																																			
JORDAN SANDSTONE	354	466	YELLOW	HARD																																																																			
<table><tr><td>Casing Diameter</td><td>Weight</td><td colspan="4"></td><td>Hole Diameter</td></tr><tr><td>6 in. To</td><td>372 ft. 19.8 lbs./ft.</td><td colspan="4"></td><td>6 in. To 466 ft.</td></tr></table>															Casing Diameter	Weight					Hole Diameter	6 in. To	372 ft. 19.8 lbs./ft.					6 in. To 466 ft.	Open Hole From 372 ft. To 466 ft.																																										
Casing Diameter	Weight					Hole Diameter																																																																	
6 in. To	372 ft. 19.8 lbs./ft.					6 in. To 466 ft.																																																																	
Screen? ☐															Type						Make																																																		
Static Water Level															120 ft. land surface						Measure 11/22/1974																																																		
Pumping Level (below land surface)															150 ft. 6 hrs. Pumping at						200 g.p.m.																																																		
Wellhead Completion															Pitless adapter manufacturer						Model																																																		
☐ Casing Protection															☐ 12 in. above grade																																																								
☐ At-grade (Environmental Wells and Borings ONLY)																																																																							
Grouting Information															Well Grouted? ☒ Yes ☐ No ☐ Not Specified																																																								
Material															Amount						From To																																																		
well grouted, type unknown															2 Cubic yards						0 ft. 372 ft.																																																		
Nearest Known Source of Contamination															250 feet						West Direction						Septic tank/drain field Type																																												
Well disinfected upon completion?															☒ Yes ☐ No																																																								
Pump ☐ Not Installed															Date Installed						02/10/1975																																																		
Manufacturer's name															GOULD																																																								
Model Number															HP 5						Volt																																																		
Length of drop pipe															189 ft						Capacity g.p. Typ Submersible																																																		
Abandoned															Does property have any not in use and not sealed well(s)?						☐ Yes ☐ No																																																		
Variance															Was a variance granted from the MDH for this well?						☐ Yes ☐ No																																																		
Miscellaneous															First Bedrock						Prairie Du Chien Group						Aquifer Jordan																																												
Last Strat															Jordan Sandstone						Depth to Bedrock 255 ft																																																		
Located by															Minnesota Geological Survey																																																								
Locate Method															Digitized - scale 1:24,000 or larger (Digitizing Table)																																																								
System															UTM - NAD83, Zone 15, Meters						X 495728 Y 4958476																																																		
Unique Number Verification																					Input Date 01/01/1990																																																		
Angled Drill Hole																																																																							
Well Contractor															Torgerson Well Co.						27056																																																		
Licensee Business															Lic. or Reg. No.						Name of Driller																																																		
Remarks										SHOP WELL																																																													

Minnesota Well Index Report

100014

Printed on 04/04/2022
HE-01205-15

149795

County

Dakota

Quad

Inver Grove

Quad ID

103D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date

06/20/1990

Update Date

12/04/2018

Received Date

Well Name WELL 7 A.W.					Township 27	Range 22	Dir W	Section 33	Subsection ABCB CD	Well Depth 152 ft.			Depth Completed 152 ft.			Date Well Completed 08/24/1978																													
Elevation 875 ft.					Elev. Method 7.5 minute topographic map (+/- 5 feet)					Drill Method Non-specified Rotary			Drill Fluid																																
Address										Use test well			Status Active																																
Stratigraphy Information <table><tr><td>Geological Material</td><td>From</td><td>To (ft.)</td><td>Color</td><td>Hardness</td></tr><tr><td>CLAY & GRAVEL</td><td>0</td><td>21</td><td>BROWN</td><td></td></tr><tr><td>GRAVEL</td><td>21</td><td>52</td><td>DARK</td><td></td></tr><tr><td>SAND</td><td>52</td><td>93</td><td>BROWN</td><td></td></tr><tr><td>GRAVEL & CLAY</td><td>93</td><td>97</td><td>YELLOW</td><td></td></tr><tr><td>SAND & GRAVEL</td><td>97</td><td>152</td><td>DARK</td><td></td></tr></table>										Geological Material	From	To (ft.)	Color	Hardness	CLAY & GRAVEL	0	21	BROWN		GRAVEL	21	52	DARK		SAND	52	93	BROWN		GRAVEL & CLAY	93	97	YELLOW		SAND & GRAVEL	97	152	DARK		Well Hydrofractured? Yes☐ No☐			From To		
										Geological Material	From	To (ft.)	Color	Hardness																															
										CLAY & GRAVEL	0	21	BROWN																																
										GRAVEL	21	52	DARK																																
										SAND	52	93	BROWN																																
										GRAVEL & CLAY	93	97	YELLOW																																
										SAND & GRAVEL	97	152	DARK																																
										Casing Type Single casing			Joint Threaded																																
										Drive Shoe? Yes ☐ No ☒			Above/Below 1 ft.																																
										Casing Diameter 4 in.						Weight 126 ft. 10.7 lbs./ft.																													
Open Hole From ft. To ft.																																													
Screen? Diameter			☒ Slot/Gauze			Type Length			plastic Set																																				
4 in.			12			21 ft.			123 ft. 147 ft.																																				
Static Water Level 110 ft. land surface									Measure			08/24/1978																																	
Pumping Level (below land surface)																																													
Wellhead Completion Pitless adapter manufacturer Model ☐ Casing Protection ☐ 12 in. above grade ☐ At-grade (Environmental Wells and Borings ONLY)																																													
Grouting Information Well Grouted? ☐ Yes ☐ No ☐ Not Specified																																													
Nearest Known Source of Contamination feet Direction Type Well disinfected upon completion? ☐ Yes ☐ No																																													
Pump ☒ Not Installed Date Installed Manufacturer's name Model Number HP <u>Q</u> Volt Length of drop pipe ft Capacity g.p. Typ																																													
Abandoned Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No																																													
Variance Was a variance granted from the MDH for this well? ☐ Yes ☐ No																																													
Miscellaneous First Bedrock Aquifer Quat. buried Last Strat sand +larger Depth to Bedrock ft Located by Minnesota Geological Survey Locate Method Digitization (Screen) - Map (1:24,000) (15 meters or System UTM - NAD83, Zone 15, Meters X 495702 Y 4959349 Unique Number Verification Input Date 06/02/2000																																													
Angled Drill Hole																																													
Well Contractor Renner E.H. & Sons 27015 BLACK, D. Licensee Business Lic. or Reg. No. Name of Driller																																													
Remarks WELL 7.																																													

Minnesota Well Index Report

149795

Printed on 04/04/2022
HE-01205-15

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date	10/19/1990
Update Date	12/04/2018
Received Date	

Well Name MW-3 PINE	Township 27	Range 22	Dir Section W 33	Subsection BADACD																																																																	
Elevation 868 ft.	Elev. Method 7.5 minute topographic map (+/- 5 feet)																																																																				
Address C/W 117 ST INVER GROVE HEIGHTS MN																																																																					
Stratigraphy Information <table><thead><tr><th>Geological Material</th><th>From</th><th>To (ft.)</th><th>Color</th><th>Hardness</th></tr></thead><tbody><tr><td>TOP SOIL</td><td>0</td><td>4</td><td></td><td></td></tr><tr><td>GRAVEL</td><td>4</td><td>42</td><td></td><td></td></tr><tr><td>CLAY</td><td>42</td><td>45</td><td></td><td></td></tr><tr><td>GRAVEL</td><td>45</td><td>60</td><td></td><td></td></tr><tr><td>CLAY</td><td>60</td><td>64</td><td></td><td></td></tr><tr><td>GRAVEL</td><td>64</td><td>105</td><td></td><td></td></tr><tr><td>CLAY</td><td>105</td><td>123</td><td></td><td></td></tr><tr><td>FINE SAND</td><td>123</td><td>162</td><td></td><td></td></tr><tr><td>CLAY</td><td>162</td><td>170</td><td></td><td></td></tr><tr><td>FINE DIRTY SAND</td><td>170</td><td>210</td><td></td><td></td></tr><tr><td>SANDSTONE</td><td>210</td><td>225</td><td></td><td></td></tr><tr><td>LIMESTONE</td><td>225</td><td>227</td><td></td><td></td></tr></tbody></table>					Geological Material	From	To (ft.)	Color	Hardness	TOP SOIL	0	4			GRAVEL	4	42			CLAY	42	45			GRAVEL	45	60			CLAY	60	64			GRAVEL	64	105			CLAY	105	123			FINE SAND	123	162			CLAY	162	170			FINE DIRTY SAND	170	210			SANDSTONE	210	225			LIMESTONE	225	227		
Geological Material	From	To (ft.)	Color	Hardness																																																																	
TOP SOIL	0	4																																																																			
GRAVEL	4	42																																																																			
CLAY	42	45																																																																			
GRAVEL	45	60																																																																			
CLAY	60	64																																																																			
GRAVEL	64	105																																																																			
CLAY	105	123																																																																			
FINE SAND	123	162																																																																			
CLAY	162	170																																																																			
FINE DIRTY SAND	170	210																																																																			
SANDSTONE	210	225																																																																			
LIMESTONE	225	227																																																																			
Well Depth 227 ft.																																																																					
Depth Completed 227 ft.																																																																					
Date Well Completed 05/10/1972																																																																					
Drill Method																																																																					
Drill Fluid																																																																					
Use monitor well Status Active																																																																					
Well Hydrofractured? Yes ☐ No ☐ From To																																																																					
Casing Type Single casing Joint																																																																					
Drive Shoe? Yes ☐ No ☐ Above/Below																																																																					
Casing Diameter Weight 2 in. To 223 ft. lbs./ft.																																																																					
Open Hole From ft. To ft.																																																																					
Screen? ☒ Type Make JOHNSON Diameter Slot/Gauze Length Set 1.3 in. 10 3.5 ft. 0 ft. ft.																																																																					
Static Water Level 73.7 ft. land surface Measure 05/10/1972																																																																					
Pumping Level (below land surface) ft. 2 hrs. Pumping at 2 g.p.m.																																																																					
Wellhead Completion Pitless adapter manufacturer Model ☐ Casing Protection ☐ 12 in. above grade ☐ At-grade (Environmental Wells and Borings ONLY)																																																																					
Grouting Information Well Grouted? ☐ Yes ☐ No ☐ Not Specified																																																																					
Nearest Known Source of Contamination feet Direction Type Well disinfected upon completion? ☐ Yes ☐ No																																																																					
Pump ☒ Not Installed Date Installed Manufacturer's name Model Number HP 0 Volt Length of drop pipe ft Capacity g.p. Typ																																																																					
Abandoned Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No																																																																					
Variance Was a variance granted from the MDH for this well? ☐ Yes ☐ No																																																																					
Miscellaneous First Bedrock Prairie Du Chien Group Aquifer Prairie Du Chien Last Strat Prairie Du Chien Group Depth to Bedrock 210 ft Located by Minnesota Geological Survey Locate Method Digitized - scale 1:24,000 or larger (Digitizing Table) System UTM - NAD83, Zone 15, Meters X 495574 Y 4959344 Unique Number Verification Input Date 01/01/1990																																																																					
Angled Drill Hole																																																																					
Well Contractor Aamot Well Co. 27062 Licensee Business Lic. or Reg. No. Name of Driller																																																																					
Remarks AT SANITARYLANDFILL MONITOR WELL 3																																																																					

Minnesota Well Index Report

207293

Printed on 04/04/2022
HE-01205-15

207294

County Dakota
Quad Inver Grove
Quad ID 103D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 10/19/1990
Update Date 06/16/2021
Received Date

Well Name PINE BEND					Township 27	Range 22	Dir W	Section 33	Subsection ACCCAD	Well Depth 377 ft.	Depth Completed 377 ft.	Date Well Completed 00/00/1972																																													
Elevation 970 ft.					Elev. Method 7.5 minute topographic map (+/- 5 feet)		Drill Method Drill Fluid																																																		
Address C/W 117TH ST INVER GROVE HEIGHTS MN										Use test well Status Active																																															
Stratigraphy Information										Well Hydrofractured? Yes ☐ No ☐ From To																																															
<table><tr><td>Geological Material</td><td>From</td><td>To (ft.)</td><td>Color</td><td>Hardness</td></tr><tr><td>GRAVEL</td><td>0</td><td>90</td><td></td><td></td></tr><tr><td>REDDISH CLAY</td><td>90</td><td>116</td><td>RED</td><td></td></tr><tr><td>FINE GRAY SAND</td><td>116</td><td>137</td><td>GRAY</td><td></td></tr><tr><td>FINE DIRTY SAND</td><td>137</td><td>310</td><td></td><td></td></tr><tr><td>BLACK CLAY</td><td>310</td><td>352</td><td>BLACK</td><td></td></tr><tr><td>FINE DIRTY SAND</td><td>352</td><td>368</td><td></td><td></td></tr><tr><td>GREEN STICKY SHALE</td><td>368</td><td>374</td><td>GREEN</td><td></td></tr><tr><td>LIMEROCK</td><td>374</td><td>377</td><td></td><td></td></tr></table>										Geological Material	From	To (ft.)	Color	Hardness	GRAVEL	0	90			REDDISH CLAY	90	116	RED		FINE GRAY SAND	116	137	GRAY		FINE DIRTY SAND	137	310			BLACK CLAY	310	352	BLACK		FINE DIRTY SAND	352	368			GREEN STICKY SHALE	368	374	GREEN		LIMEROCK	374	377			Casing Type Single casing Joint		
Geological Material	From	To (ft.)	Color	Hardness																																																					
GRAVEL	0	90																																																							
REDDISH CLAY	90	116	RED																																																						
FINE GRAY SAND	116	137	GRAY																																																						
FINE DIRTY SAND	137	310																																																							
BLACK CLAY	310	352	BLACK																																																						
FINE DIRTY SAND	352	368																																																							
GREEN STICKY SHALE	368	374	GREEN																																																						
LIMEROCK	374	377																																																							
										Drive Shoe? Yes ☐ No ☐ Above/Below																																															
										Casing Diameter Weight																																															
										2 in. To 374 ft. lbs./ft.																																															
										Open Hole From ft. To ft.																																															
										Screen? ☒ Type Make JOHNSON																																															
										Diameter Slot/Gauze Length Set																																															
										1.2 in. 10 3.5 ft. 0 ft. ft.																																															
										Static Water Level																																															
										128 ft. land surface Measure 00/00/1972																																															
										Pumping Level (below land surface)																																															
										ft. 7 hrs. Pumping at 1 g.p.m.																																															
										Wellhead Completion																																															
										Pitless adapter manufacturer Model																																															
										☐ Casing Protection ☐ 12 in. above grade																																															
										☐ At-grade (Environmental Wells and Borings ONLY)																																															
										Grouting Information Well Grouted? ☐ Yes ☐ No ☐ Not Specified																																															
										Nearest Known Source of Contamination																																															
										feet Direction Type																																															
										Well disinfected upon completion? ☐ Yes ☐ No																																															
										Pump ☒ Not Installed Date Installed																																															
										Manufacturer's name																																															
										Model Number HP Q Volt																																															
										Length of drop pipe ft Capacity g.p. Typ																																															
										Abandoned																																															
										Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No																																															
										Variance																																															
										Was a variance granted from the MDH for this well? ☐ Yes ☐ No																																															
										Miscellaneous																																															
										First Bedrock Cambrian Aquifer Cambrian,																																															
										Last Strat Cambrian Depth to Bedrock 368 ft																																															
										Located by Minnesota Geological Survey																																															
										Locate Method Digitization (Screen) - Map (1:24,000) (15 meters or																																															
										System UTM - NAD83, Zone 15, Meters X 495758 Y 4958899																																															
										Unique Number Verification Other, note in Input Date 01/01/1990																																															
										Angled Drill Hole																																															
										Well Contractor																																															
										Aamot Well Co. 27062																																															
										Licensee Business Lic. or Reg. No. Name of Driller																																															

235965

County Dakota
Quad Inver Grove
Quad ID 103D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date
Update Date 12/04/2018
Received Date 05/22/1996

Well Name MW-2A PINE	Township 27	Range 22	Dir Section W 33	Subsection CADDCEB	Well Depth 102.5 ft.	Depth Completed 102.5 ft.	Date Well Completed 10/24/1996
Elevation 865 ft.	Elev. Method LiDAR 1m DEM (MNDNR)	Drill Method				Drill Fluid	
Address C/W 2495 117TH ST E INVER GROVE HEIGHTS MN					Use abandoned	Status Sealed	
Stratigraphy Information					Well Hydrofractured? Yes ☐ No ☐	From	To
Geological Material GLACIAL DRIFT					Casing Type Single casing	Joint	
From 0					Drive Shoe? Yes ☐ No ☐	Above/Below	
To (ft.) 103					Casing Diameter 4 in.	Weight To 102. ft.	lbs./ft.
Color					Open Hole From ft. To ft.		
Hardness					Screen? ☐ Type Make		
Static Water Level 95 ft. land surface Measure 10/24/1996							
Pumping Level (below land surface)							
Wellhead Completion Pitless adapter manufacturer Model ☐ Casing Protection ☐ 12 in. above grade ☐ At-grade (Environmental Wells and Borings ONLY)							
Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified Material Amount From To neat cement 15 Sacks ft. 102.5 ft.							
Nearest Known Source of Contamination feet Direction Type Well disinfected upon completion? ☐ Yes ☐ No							
Pump ☒ Not Installed Date Installed Manufacturer's name Model Number HP Volt Length of drop pipe ft Capacity g.p. Typ							
Abandoned Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No							
Variance Was a variance granted from the MDH for this well? ☐ Yes ☐ No							
Miscellaneous First Bedrock Aquifer Quaternary Last Strat Quaternary deposit Depth to Bedrock ft Located by Minnesota Geological Survey Locate Method Digitization (Screen) - Map (1:12,000) (>15 meters) System UTM - NAD83, Zone 15, Meters X 495573 Y 4958450 Unique Number Verification Tag on well Input Date 03/08/2018							
Angled Drill Hole							
Well Contractor Boart Longyear 02653 BLUNT, C. Licensee Business Lic. or Reg. No. Name of Driller							

415942

County Dakota
Quad Inver Grove
Quad ID 103D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 08/27/2008
Update Date 12/04/2018
Received Date

Well Name PINE BEND	Township 27	Range 22	Dir Section W 33	Subsection ABAABA	Well Depth 160 ft.	Depth Completed 158 ft.	Date Well Completed 01/15/1986
Elevation 910 ft.	Elev. Method LiDAR 1m DEM (MNDNR)	Drill Method Non-specified Rotary				Drill Fluid	
Address Contact 2495 117TH ST E INVER GROVE HEIGHTS MN					Use test well Status Active		
Stratigraphy Information Geological Material From To (ft.) Color Hardness CLAY 0 1 BROWN CLAY & GRAVEL MIX 1 28 VARIED SAND 28 58 BROWN CLAY & GRAVEL & 58 160 VARIED					Well Hydrofractured? Yes ☐ No ☐ From To		
					Casing Type Single casing Joint Welded		
					Drive Shoe? Yes ☐ No ☒ Above/Below 2 ft.		
					Casing Diameter Weight 4 in. To 140 ft. 10.7 lbs./ft.		
					Open Hole From ft. To ft.		
					Screen? ☒ Type stainless Make JOHNSON Diameter Slot/Gauze Length Set 4 in. 10 10 ft. 148 ft. 158 ft.		
					Static Water Level 159 ft. land surface Measure 01/15/1986		
					Pumping Level (below land surface)		
					Wellhead Completion Pitless adapter manufacturer Model ☐ Casing Protection ☒ 12 in. above grade ☐ At-grade (Environmental Wells and Borings ONLY)		
					Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified Material Amount From To neat cement ft. 140 ft.		
Nearest Known Source of Contamination feet Direction Type Well disinfected upon completion? ☒ Yes ☐ No							
Pump ☒ Not Installed Date Installed Manufacturer's name Model Number HP Volt Length of drop pipe ft Capacity g.p. Typ							
Abandoned Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No							
Variance Was a variance granted from the MDH for this well? ☐ Yes ☐ No							
Miscellaneous First Bedrock Aquifer Quat. buried Last Strat pebbly sand/silt/clay Depth to Bedrock ft Located by Minnesota Geological Survey Locate Method Surveyed System UTM - NAD83, Zone 15, Meters X 496013 Y 4959630 Unique Number Verification Site Plan Input Date 03/08/2018							
Angled Drill Hole							
Well Contractor Renner E.H. Well 71015 HEISEL/SUTTON Licensee Business Lic. or Reg. No. Name of Driller							

426248

County Dakota
Quad Inver Grove
Quad ID 103D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 02/08/1989
Update Date 12/04/2018
Received Date

Well Name MW-25 PINE	Township 27	Range 22	Dir Section W 33	Subsection CADADA	Well Depth 113 ft.	Depth Completed 113 ft.	Date Well Completed 06/24/1986																																			
Elevation 887 ft.	Elev. Method LiDAR 1m DEM (MNDNR)					Drill Method Non-specified Rotary	Drill Fluid																																			
Address Contact 2495 117TH ST E INVER GROVE HEIGHTS MN					Use monitor well	Status Sealed																																				
Stratigraphy Information <table><tr><td>Geological Material</td><td>From</td><td>To (ft.)</td><td>Color</td><td>Hardness</td></tr><tr><td>SAND</td><td>0</td><td>12</td><td></td><td></td></tr><tr><td>COARSE SAND &</td><td>12</td><td>23</td><td></td><td></td></tr><tr><td>ALTERNATE SAND &</td><td>23</td><td>67</td><td></td><td></td></tr><tr><td>COBBLES &/OR</td><td>67</td><td>67</td><td></td><td></td></tr><tr><td>SAND W/ GRAVEL</td><td>67</td><td>103</td><td></td><td></td></tr><tr><td>VY. COARSE SAND &</td><td>103</td><td>113</td><td></td><td></td></tr></table>					Geological Material	From	To (ft.)	Color	Hardness	SAND	0	12			COARSE SAND &	12	23			ALTERNATE SAND &	23	67			COBBLES &/OR	67	67			SAND W/ GRAVEL	67	103			VY. COARSE SAND &	103	113			Well Hydrofractured? Yes ☐ No ☐	From	To
					Geological Material	From	To (ft.)	Color	Hardness																																	
					SAND	0	12																																			
					COARSE SAND &	12	23																																			
					ALTERNATE SAND &	23	67																																			
					COBBLES &/OR	67	67																																			
					SAND W/ GRAVEL	67	103																																			
					VY. COARSE SAND &	103	113																																			
					Casing Type Single casing			Joint Welded																																		
					Drive Shoe? Yes ☒ No ☐			Above/Below 2 ft.																																		
Casing Diameter 4 in. To 103 ft.			Weight lbs./ft.																																							
Open Hole From ft. To ft.																																										
Screen? ☒			Type stainless																																							
Diameter 4 in.			Make JOHNSON																																							
Slot/Gauze 12			Length 103 ft.																																							
Set 113 ft.																																										
Static Water Level																																										
Pumping Level (below land surface)																																										
Wellhead Completion Pitless adapter manufacturer					Model																																					
☐ Casing Protection					☒ 12 in. above grade																																					
☐ At-grade (Environmental Wells and Borings ONLY)																																										
Grouting Information Material neat cement					Well Grouted? ☒ Yes ☐ No ☐ Not Specified																																					
					Amount 1 Cubic yards																																					
					From ft.																																					
					To ft.																																					
Nearest Known Source of Contamination feet					Direction																																					
Well disinfected upon completion? ☐ Yes ☒ No					Type																																					
Pump ☒ Not Installed					Date Installed																																					
Manufacturer's name																																										
Model Number					HP																																					
Length of drop pipe ft					Volt																																					
					Capacity g.p. Typ																																					
Abandoned Does property have any not in use and not sealed well(s)?					☐ Yes ☐ No																																					
Variance Was a variance granted from the MDH for this well?					☐ Yes ☐ No																																					
Miscellaneous First Bedrock					Aquifer Quaternary																																					
Last Strat sand +larger					Depth to Bedrock ft																																					
Located by Minnesota Geological Survey																																										
Locate Method Digitization (Screen) - Map (1:12,000) (>15 meters)																																										
System UTM - NAD83, Zone 15, Meters					X 495648 Y 4958556																																					
Unique Number Verification Tag on well					Input Date 03/08/2018																																					
Angled Drill Hole																																										
Well Contractor Torgerson Well Co.					27056 OTTEN, D.																																					
Licensee Business					Lic. or Reg. No. Name of Driller																																					

Remarks
WELL SEALED 06-27-1996 BY 02653

426261

County Dakota
Quad Inver Grove
Quad ID 103D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 02/08/1989
Update Date 12/04/2018
Received Date

Well Name MW-28 PINE	Township 27	Range 22	Dir Section W 33	Subsection ADCAAC	Well Depth 144 ft.	Depth Completed 144 ft.	Date Well Completed 07/22/1986		
Elevation 904 ft.	Elev. Method LiDAR 1m DEM (MNDNR)					Drill Method Non-specified Rotary	Drill Fluid		
Address C/W 2495 117TH ST E INVER GROVE HEIGHTS MN					Use monitor well Status Active				
Stratigraphy Information Geological Material From To (ft.) Color Hardness SAND & COARSE 0 20 MED TO COARSE 20 55 FINE TO MED. CLEAN 55 144					Well Hydrofractured? Yes ☐ No ☐		From To		
					Casing Type Single casing		Joint Welded		
					Drive Shoe? Yes ☒ No ☐		Above/Below 2 ft.		
					Casing Diameter 4 in. To 134 ft.		Weight lbs./ft.		
					Open Hole From ft. To ft.				
					Screen? ☒ Type stainless Make JOHNSON				
					Diameter Slot/Gauze Length Set				
					4 in. 12 10 ft. 134 ft. 144 ft.				
					Static Water Level				
					Pumping Level (below land surface)				
Wellhead Completion Pitless adapter manufacturer Model ☐ Casing Protection ☒ 12 in. above grade ☐ At-grade (Environmental Wells and Borings ONLY)									
Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified									
Material Amount From To neat cement 1 Cubic yards ft. ft.									
Nearest Known Source of Contamination feet Direction Well disinfected upon completion? ☐ Yes ☒ No Type									
Pump ☒ Not Installed Date Installed Manufacturer's name Model Number HP Volt Length of drop pipe ft Capacity g.p. Typ									
Abandoned Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No									
Variance Was a variance granted from the MDH for this well? ☐ Yes ☐ No									
Miscellaneous First Bedrock Aquifer Quaternary Last Strat sand +larger Depth to Bedrock ft Located by Minnesota Geological Survey Locate Method Surveyed System UTM - NAD83, Zone 15, Meters X 496240 Y 4958993 Unique Number Verification Site Plan Input Date 03/08/2018									
Angled Drill Hole									
Well Contractor Torgerson Well Co. 27056 OTTEN, D. Licensee Business Lic. or Reg. No. Name of Driller									

426264

County Dakota
Quad Inver Grove
Quad ID 103D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 02/08/1989
Update Date 11/24/2020
Received Date

Well Name MW-30 PINE					Township 27	Range 22	Dir W	Section 33	Subsection ADBDDA	Well Depth 223 ft.		Depth Completed 223 ft.		Date Well Completed 09/30/1986			
Elevation 897 ft.					Elev. Method 7.5 minute topographic map (+/- 5 feet)					Drill Method Non-specified Rotary		Drill Fluid					
Address C/W 2495 117TH ST E INVER GROVE HEIGHTS MN 55075										Use monitor well		Status Active					
										Well Hydrofractured? Yes ☐ No ☐		From		To			
Stratigraphy Information										Casing Type Single casing		Joint Welded					
										Drive Shoe? Yes ☒ No ☐		Above/Below 2 ft.					
Geological Material SAND & GRAVEL, SAND & VERY COARSE FINE TO COARSE FINE TO MEDIUM										From 0 10 30 50	To (ft.) 10 30 50 223	Color	Hardness	Casing Diameter 4 in. To 218 ft. lbs./ft.			
										Open Hole From ft. To ft.							
										Screen? ☒		Type stainless		Make JOHNSON			
										Diameter 4 in.		Slot/Gauze 12		Length 5 ft.		Set 218 ft. 223 ft.	
Static Water Level																	
Pumping Level (below land surface)																	
Wellhead Completion Pitless adapter manufacturer Model ☐ Casing Protection ☒ 12 in. above grade ☐ At-grade (Environmental Wells and Borings ONLY)																	
Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified Material Amount From To neat cement 2 Cubic yards ft. ft.																	
Nearest Known Source of Contamination feet Direction Type Well disinfected upon completion? ☐ Yes ☒ No																	
Pump ☒ Not Installed Date Installed Manufacturer's name Model Number HP Volt Length of drop pipe ft Capacity g.p. Typ																	
Abandoned Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No																	
Variance Was a variance granted from the MDH for this well? ☐ Yes ☐ No																	
Miscellaneous First Bedrock Aquifer Quat. Water Last Strat sand Depth to Bedrock ft Located by Minnesota Geological Survey Locate Method Digitization (Screen) - Map (1:24,000) (15 meters or System UTM - NAD83, Zone 15, Meters X 496254 Y 4959070 Unique Number Verification Information from Input Date 06/02/2000																	
Angled Drill Hole																	
Well Contractor Torgerson Well Co. 27056 OTTEN, D. Licensee Business Lic. or Reg. No. Name of Driller																	

Remarks
GAMMA LOGGED 12-10-1986.

426270

County Dakota
Quad Inver Grove
Quad ID 103D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 02/08/1989
Update Date 06/16/2021
Received Date

Well Name MW-36 PINE					Township 27		Range 22		Dir Section W 33		Subsection ABAAAA	
Elevation 911 ft.		Elev. Method 7.5 minute topographic map (+/- 5 feet)										
Address Contact 2495 117TH ST E INVER GROVE HEIGHTS MN 55075												
Stratigraphy Information												
Geological Material		From		To (ft.)		Color		Hardness				
CLAY		0		10		YEL/BRN						
CLAY & GRAVEL		10		25		YEL/BRN						
SAND & FINE GRAVEL		25		50								
FINE TO COARSE		50		220								
FINE TO MED. SAND		220		235								
FINE SAND & BLUE-LT. BRN, SANDY CLAY		235		300								
SLIGHTLY SANDY		300		340		YEL/BRN						
CLAY (WEATHERED)		340		365		PNK/RED						
MISC. (WEATHERED)		365		370		VARIED						
DOLOMITE, SHALE ? & FINE, GREENISH-GRAY		370		385		YEL/BRN						
		385		392								
		392		395								
Well Depth 395 ft.												
Depth Completed 395 ft.												
Date Well Completed 10/31/1986												
Drill Method Non-specified Rotary			Drill Fluid									
Use monitor well										Status Active		
Well Hydrofractured? Yes ☐ No ☐ From To												
Casing Type Single casing Joint Welded												
Drive Shoe? Yes ☒ No ☐ Above/Below 2 ft.												
Casing Diameter Weight												
4 in. To 385 ft. lbs./ft.												
Open Hole From 385 ft. To 395 ft.												
Screen? ☐ Type Make												
Static Water Level												
169. ft. land surface Measure 11/17/1986												
Pumping Level (below land surface)												
Wellhead Completion												
Pitless adapter manufacturer Model												
☐ Casing Protection ☒ 12 in. above grade												
☐ At-grade (Environmental Wells and Borings ONLY)												
Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified												
Material Amount From To												
neat cement 4 Cubic yards ft. ft.												
Nearest Known Source of Contamination												
feet Direction Type												
Well disinfected upon completion? ☐ Yes ☒ No												
Pump ☒ Not Installed Date Installed												
Manufacturer's name												
Model Number HP Volt												
Length of drop pipe ft Capacity g.p. Typ												
Abandoned												
Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No												
Variance												
Was a variance granted from the MDH for this well? ☐ Yes ☐ No												
Miscellaneous												
First Bedrock Cambrian Aquifer Cambrian,												
Last Strat Cambrian Depth to Bedrock 364 ft												
Located by Minnesota Geological Survey												
Locate Method Digitization (Screen) - Map (1:24,000) (15 meters or												
System UTM - NAD83, Zone 15, Meters X 496053 Y 4959623												
Unique Number Verification Information from Input Date 06/02/2000												
Angled Drill Hole												
Well Contractor												
Torgerson Well Co. 27056 OTTEN, D.												
Licensee Business Lic. or Reg. No. Name of Driller												
Minnesota Well Index Report				426270				Printed on 04/04/2022 HE-01205-15				

447845

County Dakota
Quad Inver Grove
Quad ID 103D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 08/27/2008
Update Date 06/16/2021
Received Date

Well Name MW-40 PINE	Township 27	Range 22	Dir Section W 33	Subsection ADCAAC	Well Depth 341.5 ft.	Depth Completed 341.5 ft.	Date Well Completed 07/17/1987																																																								
Elevation 905 ft.	Elev. Method LiDAR 1m DEM (MNDNR)	Drill Method Non-specified Rotary				Drill Fluid																																																									
Address Contact 2495 117TH ST E INVER GROVE HEIGHTS MN					Use monitor well			Status Active																																																							
Stratigraphy Information					Well Hydrofractured? Yes ☐ No ☐ From To																																																										
<table><tr><td>Geological Material</td><td>From</td><td>To (ft.)</td><td>Color</td><td>Hardness</td></tr><tr><td>M-C SAND & GRAVEL</td><td>0</td><td>60</td><td></td><td></td></tr><tr><td>COARSE GRAVEL &</td><td>60</td><td>65</td><td></td><td></td></tr><tr><td>COARSE SAND &</td><td>65</td><td>130</td><td></td><td></td></tr><tr><td>F-M SAND W/ALT.</td><td>130</td><td>168</td><td>TAN</td><td></td></tr><tr><td>C SAND&GRAVEL ALT.</td><td>168</td><td>175</td><td>TAN</td><td></td></tr><tr><td>SILTY, SANDY CLAY</td><td>175</td><td>217</td><td>TAN</td><td></td></tr><tr><td>SILTY SANDY CLAY</td><td>217</td><td>290</td><td>VARIED</td><td></td></tr><tr><td>F-M GRAVEL,</td><td>290</td><td>325</td><td></td><td></td></tr><tr><td>COARSE SAND & FINE</td><td>325</td><td>330</td><td></td><td></td></tr><tr><td>RED MED SAND TO V.</td><td>330</td><td>341</td><td>RED</td><td></td></tr></table>					Geological Material	From	To (ft.)	Color	Hardness	M-C SAND & GRAVEL	0	60			COARSE GRAVEL &	60	65			COARSE SAND &	65	130			F-M SAND W/ALT.	130	168	TAN		C SAND&GRAVEL ALT.	168	175	TAN		SILTY, SANDY CLAY	175	217	TAN		SILTY SANDY CLAY	217	290	VARIED		F-M GRAVEL,	290	325			COARSE SAND & FINE	325	330			RED MED SAND TO V.	330	341	RED		Casing Type Step down			Joint Welded
Geological Material	From	To (ft.)	Color	Hardness																																																											
M-C SAND & GRAVEL	0	60																																																													
COARSE GRAVEL &	60	65																																																													
COARSE SAND &	65	130																																																													
F-M SAND W/ALT.	130	168	TAN																																																												
C SAND&GRAVEL ALT.	168	175	TAN																																																												
SILTY, SANDY CLAY	175	217	TAN																																																												
SILTY SANDY CLAY	217	290	VARIED																																																												
F-M GRAVEL,	290	325																																																													
COARSE SAND & FINE	325	330																																																													
RED MED SAND TO V.	330	341	RED																																																												
					Drive Shoe? Yes ☐ No ☐ Above/Below 2 ft.																																																										
					Casing Diameter 4 in. To 330 ft. lbs./ft.			Hole Diameter 8 in. To 332 ft.																																																							
					3 in. To 331. ft. lbs./ft.			3.8 in. To 341 ft.																																																							
					Open Hole From ft. To ft.																																																										
					Screen? ☒ Type stainless Make JOHNSON																																																										
					Diameter Slot/Gauze Length Set																																																										
					4 in. 12 10 ft. 331.5 ft. 341.5 ft.																																																										
					Static Water Level																																																										
					Pumping Level (below land surface) ft. 0.5 hrs. Pumping at 15 g.p.m.																																																										
					Wellhead Completion Pitless adapter manufacturer Model																																																										
					☐ Casing Protection ☒ 12 in. above grade																																																										
					☐ At-grade (Environmental Wells and Borings ONLY)																																																										
					Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified																																																										
					Material Amount From To																																																										
					neat cement 3.26 Cubic yards ft. 322 ft.																																																										
					Nearest Known Source of Contamination feet Direction Type																																																										
					Well disinfected upon completion? ☐ Yes ☐ No																																																										
					Pump ☒ Not Installed Date Installed																																																										
					Manufacturer's name																																																										
					Model Number HP Volt																																																										
					Length of drop pipe ft Capacity g.p. Typ																																																										
					Abandoned Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No																																																										
					Variance Was a variance granted from the MDH for this well? ☐ Yes ☐ No																																																										
					Miscellaneous First Bedrock Cambrian Aquifer Cambrian, Last Strat Cambrian Depth to Bedrock 217 ft																																																										
					Located by Minnesota Geological Survey																																																										
					Locate Method Surveyed																																																										
					System UTM - NAD83, Zone 15, Meters X 496241 Y 4958997																																																										
					Unique Number Verification Site Plan Input Date 03/08/2018																																																										
					Angled Drill Hole																																																										
					Well Contractor Torgerson Well Co. 27056 OTTEN, D. Licensee Business Lic. or Reg. No. Name of Driller																																																										

469296

County

Dakota

Quad

Inver Grove

Quad ID

103D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date

08/28/2008

Update Date

12/04/2018

Received Date

Well Name P-5 PINE BEND Township 27 Range 22 Dir Section W 33 Subsection AAADBA Elevation 894 ft. Elev. Method LiDAR 1m DEM (MNDNR)	Well Depth 185 ft. Depth Completed 185 ft. Date Well Completed 11/15/1989 Drill Method Non-specified Rotary Drill Fluid Use monitor well Status Active Well Hydrofractured? Yes ☐ No ☐ From To Casing Type Single casing Joint Drive Shoe? Yes ☐ No ☐ Above/Below Casing Diameter Weight 4 in. To 175 ft. lbs./ft.															
Address Well2495 117TH ST INVER GROVE HEIGHTS MN Stratigraphy Information <table><thead><tr><th>Geological Material</th><th>From</th><th>To (ft.)</th><th>Color</th><th>Hardness</th></tr></thead><tbody><tr><td>SAND & GRAVEL</td><td>0</td><td>178</td><td></td><td></td></tr><tr><td>COARSE GRAVEL</td><td>178</td><td>185</td><td></td><td></td></tr></tbody></table>	Geological Material	From	To (ft.)	Color	Hardness	SAND & GRAVEL	0	178			COARSE GRAVEL	178	185			Open Hole Fromft.Toft. Screen? ☒ Type stainless Make JOHNSON Diameter Slot/Gauze Length Set 4 in.1210 ft.175 ft.185 ft. Static Water Level Pumping Level (below land surface) Wellhead Completion Pitless adapter manufacturer Model ☐ Casing Protection ☒ 12 in. above grade ☐ At-grade (Environmental Wells and Borings ONLY) Grouting Information Well Grouted? ☒ Yes☐ No☐ Not Specified Material Amount From To neat cement1.4 Cubic yardsft.175 ft.
Geological Material	From	To (ft.)	Color	Hardness												
SAND & GRAVEL	0	178														
COARSE GRAVEL	178	185														

Nearest Known Source of Contamination

feet

Direction

Well disinfected upon completion?

☐ Yes☐ No

Type

Pump

☒ Not Installed

Date Installed

Manufacturer's name

Model Number

HP

Volt

Length of drop pipe

ft

Capacity

g.p.

Typ

Abandoned

Does property have any not in use and not sealed well(s)?

☐ Yes☐ No

Variance

Was a variance granted from the MDH for this well?

☐ Yes☐ No

Miscellaneous

First Bedrock

Aquifer

Quat. Water

Last Strat

gravel (+larger)

Depth to Bedrock

ft

Located by

Minnesota Geological Survey

Locate Method

Surveyed

System

UTM - NAD83, Zone 15, Meters

X

496426

Y

4959526

Unique Number Verification

Tag on well

Input Date

03/08/2018

Angled Drill Hole

Well Contractor

Torgerson Well Co.

27056

OTTEN, D.

Licensee Business

Lic. or Reg. No.

Name of Driller

469297

County

Dakota

Quad

Inver Grove

Quad ID

103D

MINNESOTA DEPARTMENT OF HEALTH

WELL AND BORING REPORT

Minnesota Statutes Chapter 1031

Entry Date

08/28/2008

Update Date

12/04/2018

Received Date

Well Name P-6 PINE BEND Township 27 Range 22 Dir Section W 33 Subsection AAADBA Elevation 895 ft. Elev. Method LiDAR 1m DEM (MNDNR)	Well Depth 185 ft. Depth Completed 185 ft. Date Well Completed 11/20/1989 Drill Method Non-specified Rotary Drill Fluid Use monitor well Status Active Well Hydrofractured? Yes ☐ No ☐ From To Casing Type Single casing Joint Drive Shoe? Yes ☐ No ☐ Above/Below Casing Diameter Weight 4 in. To 175 ft. lbs./ft. Open Hole From ft. To ft. Screen? ☒ Type stainless Make JOHNSON Diameter Slot/Gauze Length Set 4 in. 12 10 ft. 175 ft. 185 ft. Static Water Level Pumping Level (below land surface) Wellhead Completion Pitless adapter manufacturer Model ☐ Casing Protection ☒ 12 in. above grade ☐ At-grade (Environmental Wells and Borings ONLY) Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified Material Amount From To neat cement 1.4 Cubic yards ft. 175 ft. Nearest Known Source of Contamination feet Direction Type Well disinfected upon completion? ☐ Yes ☐ No Pump ☒ Not Installed Date Installed Manufacturer's name Model Number HP Volt Length of drop pipe ft Capacity g.p. Typ Abandoned Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No Variance Was a variance granted from the MDH for this well? ☐ Yes ☐ No Miscellaneous First Bedrock Aquifer Quat. Water Last Strat gravel (+larger) Depth to Bedrock ft Located by Minnesota Geological Survey Locate Method Surveyed System UTM - NAD83, Zone 15, Meters X 496421 Y 4959509 Unique Number Verification Tag on well Input Date 03/08/2018 Angled Drill Hole Well Contractor Torgerson Well Co. 27056 OTTEN, D. Licensee Business Lic. or Reg. No. Name of Driller															
Address Well 2495 117TH ST INVER GROVE HEIGHTS MN																
Stratigraphy Information <table><thead><tr><th>Geological Material</th><th>From</th><th>To (ft.)</th><th>Color</th><th>Hardness</th></tr></thead><tbody><tr><td>SAND & GRAVEL</td><td>0</td><td>178</td><td></td><td></td></tr><tr><td>COARSE GRAVEL</td><td>178</td><td>185</td><td></td><td></td></tr></tbody></table>	Geological Material	From	To (ft.)	Color	Hardness	SAND & GRAVEL	0	178			COARSE GRAVEL	178	185			
Geological Material	From	To (ft.)	Color	Hardness												
SAND & GRAVEL	0	178														
COARSE GRAVEL	178	185														
Remarks																

511918

County Dakota
Quad Inver Grove
Quad ID 103D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 08/28/2008
Update Date 09/05/2020
Received Date

Well Name P-4 PINE BEND	Township 27	Range 22	Dir Section W 33	Subsection AAAACD	Well Depth 183 ft.	Depth Completed 183 ft.	Date Well Completed 10/23/1989																				
Elevation 892 ft.	Elev. Method LiDAR 1m DEM (MNDNR)	Drill Method Non-specified Rotary				Drill Fluid																					
Address Well 2495 117TH ST INVER GROVE HEIGHTS MN					Use piezometer			Status Sealed																			
Stratigraphy Information <table><tr><td>Geological Material</td><td>From</td><td>To (ft.)</td><td>Color</td><td>Hardness</td></tr><tr><td>SAND & GRAVEL</td><td>0</td><td>5</td><td></td><td></td></tr><tr><td>GARBAGE</td><td>5</td><td>35</td><td></td><td></td></tr><tr><td>SAND & GRAVEL</td><td>35</td><td>183</td><td></td><td></td></tr></table>					Geological Material	From	To (ft.)	Color	Hardness	SAND & GRAVEL	0	5			GARBAGE	5	35			SAND & GRAVEL	35	183			Well Hydrofractured? Yes ☐ No ☐ From To		
					Geological Material	From	To (ft.)	Color	Hardness																		
					SAND & GRAVEL	0	5																				
					GARBAGE	5	35																				
					SAND & GRAVEL	35	183																				
Casing Type Single casing Joint																											
Drive Shoe? Yes ☐ No ☐ Above/Below																											
Casing Diameter 4 in. To 173 ft. lbs./ft.																											
Open Hole From ft. To ft.					Screen? ☒ Type stainless Make JOHNSON																						
Diameter 4 in.					Slot/Gauze 10 ft.																						
Length 173 ft.					Set 183 ft.																						
Static Water Level																											
Pumping Level (below land surface)																											
Wellhead Completion Pitless adapter manufacturer Model ☐ Casing Protection ☒ 12 in. above grade ☐ At-grade (Environmental Wells and Borings ONLY)																											
Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified																											
Material neat cement Amount 1.4 Cubic yards From To ft. ft.																											
Nearest Known Source of Contamination feet Direction Type Well disinfected upon completion? ☐ Yes ☐ No																											
Pump ☒ Not Installed Date Installed Manufacturer's name Model Number HP Volt Length of drop pipe ft Capacity g.p. Typ																											
Abandoned Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No																											
Variance Was a variance granted from the MDH for this well? ☐ Yes ☐ No																											
Miscellaneous First Bedrock Aquifer Quat. Water Last Strat sand +larger Depth to Bedrock ft Located by Minnesota Geological Survey Locate Method Digitization (Screen) - Map (1:12,000) (>15 meters) System UTM - NAD83, Zone 15, Meters X 496424 Y 4959540 Unique Number Verification Tag on well Input Date 03/08/2018																											
Angled Drill Hole																											
Well Contractor Torgerson Well Co. 27056 OTTEN, D. Licensee Business Lic. or Reg. No. Name of Driller																											

Remarks
DIDN'T HIT WATER
SEALED 10-14-2002 BY 86654

511919

County Dakota
Quad Inver Grove
Quad ID 103D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 08/28/2008
Update Date 12/04/2018
Received Date

Well Name GW-2 PINE	Township 27	Range 22	Dir W	Section 33	Subsection AAAACD	Well Depth 197 ft.	Depth Completed 193 ft.	Date Well Completed 10/17/1989																											
Elevation 892 ft.	Elev. Method LiDAR 1m DEM (MNDNR)	Drill Method Non-specified Rotary						Drill Fluid																											
Address Well 2495 117TH ST INVER GROVE HEIGHTS MN						Use monitor well			Status Active																										
Stratigraphy Information						Well Hydrofractured? Yes ☐ No ☐ From To																													
<table><tr><td>Geological Material</td><td>From</td><td>To (ft.)</td><td>Color</td><td>Hardness</td></tr><tr><td>SAND & GRAVEL,</td><td>0</td><td>5</td><td></td><td></td></tr><tr><td>GARBAGE-WOOD-</td><td>5</td><td>19</td><td></td><td></td></tr><tr><td>SAND & GRAVEL</td><td>19</td><td>178</td><td></td><td></td></tr><tr><td>COARSE GRAVEL,</td><td>178</td><td>197</td><td></td><td></td></tr></table>						Geological Material	From	To (ft.)	Color	Hardness	SAND & GRAVEL,	0	5			GARBAGE-WOOD-	5	19			SAND & GRAVEL	19	178			COARSE GRAVEL,	178	197			Casing Type Single casing				Joint Welded
Geological Material	From	To (ft.)	Color	Hardness																															
SAND & GRAVEL,	0	5																																	
GARBAGE-WOOD-	5	19																																	
SAND & GRAVEL	19	178																																	
COARSE GRAVEL,	178	197																																	
						Drive Shoe? Yes ☐ No ☐ Above/Below																													
						Casing Diameter 4 in. To 163 ft. lbs./ft.																													
						Open Hole From ft. To ft.																													
						Screen? ☒ Type stainless Make JOHNSON																													
						<table><tr><td>Diameter</td><td>Slot/Gauze</td><td>Length</td><td>Set</td></tr><tr><td>4 in.</td><td>20</td><td>30 ft.</td><td>163 ft. 193 ft.</td></tr></table>				Diameter	Slot/Gauze	Length	Set	4 in.	20	30 ft.	163 ft. 193 ft.																		
Diameter	Slot/Gauze	Length	Set																																
4 in.	20	30 ft.	163 ft. 193 ft.																																
						Static Water Level 153 ft. land surface Measure 10/17/1989																													
						Pumping Level (below land surface)																													
						Wellhead Completion Pitless adapter manufacturer Model																													
						☐ Casing Protection ☒ 12 in. above grade																													
						☐ At-grade (Environmental Wells and Borings ONLY)																													
						Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified																													
						<table><tr><td>Material</td><td>Amount</td><td>From</td><td>To</td></tr><tr><td>neat cement</td><td>1.4 Cubic yards</td><td>ft. 163</td><td>ft.</td></tr></table>				Material	Amount	From	To	neat cement	1.4 Cubic yards	ft. 163	ft.																		
Material	Amount	From	To																																
neat cement	1.4 Cubic yards	ft. 163	ft.																																
						Nearest Known Source of Contamination feet Direction Type																													
						Well disinfected upon completion? ☐ Yes ☒ No																													
						Pump ☒ Not Installed Date Installed																													
						Manufacturer's name																													
						<table><tr><td>Model Number</td><td>HP</td><td>Volt</td></tr><tr><td>Length of drop pipe</td><td>ft Capacity</td><td>g.p. Typ</td></tr></table>				Model Number	HP	Volt	Length of drop pipe	ft Capacity	g.p. Typ																				
Model Number	HP	Volt																																	
Length of drop pipe	ft Capacity	g.p. Typ																																	
						Abandoned Does property have any not in use and not sealed well(s)? ☐ Yes ☐ No																													
						Variance Was a variance granted from the MDH for this well? ☐ Yes ☐ No																													
						Miscellaneous First Bedrock																													
						Last Strat gravel (+larger) Aquifer Quat. Water																													
						Depth to Bedrock ft																													
						Located by Minnesota Geological Survey																													
						Locate Method Surveyed																													
						System UTM - NAD83, Zone 15, Meters X 496426 Y 4959538																													
						Unique Number Verification Site Plan Input Date 03/08/2018																													
						Angled Drill Hole																													
						Well Contractor Torgerson Well Co. 27056 OTTEN, D.																													
						Licensee Business Lic. or Reg. No. Name of Driller																													

529488

County Dakota
Quad Inver Grove
Quad ID 103D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 03/11/1994
Update Date 03/12/2020
Received Date 01/04/1994

Well Name MW-44 PINE	Township 27	Range 22	Dir Section W 33	Subsection ADABBA	Well Depth 178 ft.	Depth Completed 176 ft.	Date Well Completed 01/09/1996																																			
Elevation 900 ft.	Elev. Method LiDAR 1m DEM (MNDNR)	Drill Method Non-specified Rotary				Drill Fluid Bentonite																																				
Address C/W 2495 117TH ST E INVER GROVE HEIGHTS MN					Use monitor well	Status Active																																				
Stratigraphy Information <table><tr><td>Geological Material</td><td>From</td><td>To (ft.)</td><td>Color</td><td>Hardness</td></tr><tr><td>SILTY SAND</td><td>0</td><td>15</td><td>LT. BRN</td><td></td></tr><tr><td>CLAY</td><td>15</td><td>20</td><td>GRAY</td><td></td></tr><tr><td>SILTY SAND</td><td>20</td><td>35</td><td>LT. BRN</td><td></td></tr><tr><td>GRAVEL W/SILT TO</td><td>35</td><td>137</td><td>BROWN</td><td></td></tr><tr><td>SILTY SAND</td><td>137</td><td>153</td><td>LT. BRN</td><td></td></tr><tr><td>SAND (F-M)</td><td>153</td><td>173</td><td>BROWN</td><td></td></tr></table>					Geological Material	From	To (ft.)	Color	Hardness	SILTY SAND	0	15	LT. BRN		CLAY	15	20	GRAY		SILTY SAND	20	35	LT. BRN		GRAVEL W/SILT TO	35	137	BROWN		SILTY SAND	137	153	LT. BRN		SAND (F-M)	153	173	BROWN		Well Hydrofractured? Yes ☐ No ☐ From To		
					Geological Material	From	To (ft.)	Color	Hardness																																	
					SILTY SAND	0	15	LT. BRN																																		
					CLAY	15	20	GRAY																																		
					SILTY SAND	20	35	LT. BRN																																		
					GRAVEL W/SILT TO	35	137	BROWN																																		
					SILTY SAND	137	153	LT. BRN																																		
					SAND (F-M)	153	173	BROWN																																		
					Casing Type Single casing			Joint Threaded																																		
					Drive Shoe? Yes ☐ No ☒			Above/Below																																		
Casing Diameter 4 in. To 146 ft. 10.7 lbs./ft.			Hole Diameter 9.9 in. To 173 ft.																																							
Open Hole <table><tr><td>Screen? ☒</td><td>Type stainless</td><td>Make WIREWOUND</td></tr><tr><td>Diameter 4 in.</td><td>Slot/Gauze 10</td><td>Length 25 ft.</td></tr><tr><td></td><td></td><td>Set 146 ft.</td></tr><tr><td></td><td></td><td>171 ft.</td></tr></table>					Screen? ☒	Type stainless	Make WIREWOUND	Diameter 4 in.	Slot/Gauze 10	Length 25 ft.			Set 146 ft.			171 ft.																										
Screen? ☒	Type stainless	Make WIREWOUND																																								
Diameter 4 in.	Slot/Gauze 10	Length 25 ft.																																								
		Set 146 ft.																																								
		171 ft.																																								
Static Water Level 131 ft. land surface Measure 06/07/1993																																										
Pumping Level (below land surface)																																										
Wellhead Completion Pitless adapter manufacturer Model ☒ Casing Protection ☒ 12 in. above grade ☐ At-grade (Environmental Wells and Borings ONLY)																																										
Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified Material Amount From To neat cement 2.2 Cubic yards ft. 136 ft.																																										
Nearest Known Source of Contamination feet Direction Type Well disinfected upon completion? ☐ Yes ☒ No																																										
Pump ☒ Not Installed Date Installed Manufacturer's name Model Number HP Volt Length of drop pipe ft Capacity g.p. Typ																																										
Abandoned Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No																																										
Variance Was a variance granted from the MDH for this well? ☐ Yes ☐ No																																										
Miscellaneous First Bedrock Aquifer Quat. Water Last Strat sand-brown Depth to Bedrock ft Located by Minnesota Geological Survey Locate Method Surveyed System UTM - NAD83, Zone 15, Meters X 496329 Y 4959216 Unique Number Verification Site Plan Input Date 03/08/2018																																										
Angled Drill Hole																																										
Well Contractor Bergerson-Caswell 27058 SCHMIDT, L. Licensee Business Lic. or Reg. No. Name of Driller																																										

Remarks
TOP OF WELL EXTENDED 5 FEET DUE TO GRADE CHANGE 1-9-1996.
ORIGINALLY 173' DEEP

529489

County Dakota
Quad Inver Grove
Quad ID 103D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 03/11/1994
Update Date 12/04/2018
Received Date 01/05/1994

Well Name MW-45 PINE	Township 27	Range 22	Dir W	Section 33	Subsection ADACBB	Well Depth 168.5 ft.	Depth Completed 167.5 ft.	Date Well Completed 01/09/1996																														
Elevation 901 ft.	Elev. Method LiDAR 1m DEM (MNDNR)	Drill Method Non-specified Rotary Drill Fluid Bentonite																																				
Address C/W 2495 117TH ST E INVER GROVE HEIGHTS MN						Use monitor well	Status Active																															
Stratigraphy Information <table><tr><td>Geological Material</td><td>From</td><td>To (ft.)</td><td>Color</td><td>Hardness</td></tr><tr><td>SILTY SAND</td><td>0</td><td>15</td><td>LT. BRN</td><td></td></tr><tr><td>CLAY</td><td>15</td><td>20</td><td>GRAY</td><td></td></tr><tr><td>SILTY SAND</td><td>20</td><td>35</td><td>LT. BRN</td><td></td></tr><tr><td>GRAVEL W/SILT</td><td>35</td><td>137</td><td>BROWN</td><td></td></tr><tr><td>SILTY SAND</td><td>137</td><td>164</td><td>LT. BRN</td><td></td></tr></table>						Geological Material	From	To (ft.)	Color	Hardness	SILTY SAND	0	15	LT. BRN		CLAY	15	20	GRAY		SILTY SAND	20	35	LT. BRN		GRAVEL W/SILT	35	137	BROWN		SILTY SAND	137	164	LT. BRN		Well Hydrofractured? Yes ☐ No ☐	From	To
						Geological Material	From	To (ft.)	Color	Hardness																												
						SILTY SAND	0	15	LT. BRN																													
						CLAY	15	20	GRAY																													
						SILTY SAND	20	35	LT. BRN																													
						GRAVEL W/SILT	35	137	BROWN																													
						SILTY SAND	137	164	LT. BRN																													
						Casing Type Single casing		Joint Threaded																														
						Drive Shoe? Yes ☐ No ☒		Above/Below																														
						Casing Diameter 4 in. To 137. ft.		Weight 10.7 lbs./ft.																														
		Hole Diameter 9.9 in. To 163 ft.																																				
Open Hole From ft. To ft.																																						
Screen? ☒	Type stainless	Make WIREWOUND																																				
Diameter 4 in.	Slot/Gauze 10	Length 25 ft.	Set 137.5 ft. 162.5 ft.																																			
Static Water Level 129. ft. land surface Measure 06/02/1993																																						
Pumping Level (below land surface)																																						
Wellhead Completion Pitless adapter manufacturer Model ☒ Casing Protection ☒ 12 in. above grade ☐ At-grade (Environmental Wells and Borings ONLY)																																						
Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified Material Amount From To neat cement 1.6 Cubic yards ft. 129.5 ft.																																						
Nearest Known Source of Contamination feet Direction Type Well disinfected upon completion? ☐ Yes ☒ No																																						
Pump ☒ Not Installed Date Installed Manufacturer's name Model Number HP Volt Length of drop pipe ft Capacity g.p. Typ																																						
Abandoned Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No																																						
Variance Was a variance granted from the MDH for this well? ☐ Yes ☐ No																																						
Miscellaneous First Bedrock Aquifer Quat. Water Last Strat sand+silt-brown Depth to Bedrock ft Located by Minnesota Geological Survey Locate Method Surveyed System UTM - NAD83, Zone 15, Meters X 496286 Y 4959104 Unique Number Verification Site Plan Input Date 03/08/2018																																						
Angled Drill Hole																																						
Well Contractor Bergerson-Caswell 27058 SCHMIDT, L. Licensee Business Lic. or Reg. No. Name of Driller																																						

Remarks
TOP OF WELL EXTENDED 5' DUE TO CHANGE GRADE CHANGE. ANNULUS GROUTED.
ORIGINAL DEPTH 163.5, ORIGINAL COMPLETION DATE 6/02/93.

564058

County Dakota
Quad Inver Grove
Quad ID 103D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 08/28/2008
Update Date 12/04/2018
Received Date

Well Name MW-50 PINE	Township 27	Range 22	Dir Section W 33	Subsection AADABA	Well Depth 181 ft.	Depth Completed 173 ft.	Date Well Completed 11/09/1995
Elevation 898 ft.	Elev. Method LiDAR 1m DEM (MNDNR)					Drill Method Non-specified Rotary	Drill Fluid Bentonite
Address Well 2495 117TH ST INVER GROVE HEIGHTS MN					Use monitor well	Status Active	
Stratigraphy Information Geological Material From To (ft.) Color Hardness SAND & GRAVEL 0 181 BROWN					Well Hydrofractured? Yes ☐ No ☐ From To		
					Casing Type Single casing Joint		
					Drive Shoe? Yes ☐ No ☒ Above/Below		
					Casing Diameter Weight Hole Diameter 4 in. To 163 ft. lbs./ft. 12 in. To 181 ft.		
					Open Hole From ft. To ft.		
					Screen? ☒ Type stainless Make JOHNSON Diameter Slot/Gauze Length Set 4 in. 40 10 ft. 163 ft. 173 ft.		
					Static Water Level 165 ft. land surface Measure 11/09/1995		
					Pumping Level (below land surface)		
					Wellhead Completion Pitless adapter manufacturer Model ☐ Casing Protection ☒ 12 in. above grade ☐ At-grade (Environmental Wells and Borings ONLY)		
					Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified Material Amount From To high solids bentonite 156 ft. 161 ft. neat cement ft. 156 ft.		
					Nearest Known Source of Contamination feet Direction Type Well disinfected upon completion? ☐ Yes ☒ No		
					Pump ☒ Not Installed Date Installed Manufacturer's name Model Number HP Volt Length of drop pipe ft Capacity g.p. Typ		
					Abandoned Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No		
					Variance Was a variance granted from the MDH for this well? ☐ Yes ☐ No		
					Miscellaneous First Bedrock Aquifer Quat. Water Last Strat sand +larger-brown Depth to Bedrock ft Located by Minnesota Geological Survey Locate Method Surveyed System UTM - NAD83, Zone 15, Meters X 496406 Y 4959418 Unique Number Verification Site Plan Input Date 03/08/2018		
					Angled Drill Hole		
					Well Contractor Boart Longyear 02653 BLUNT, C. Licensee Business Lic. or Reg. No. Name of Driller		

564059

County Dakota
Quad Inver Grove
Quad ID 103D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 08/28/2008
Update Date 12/04/2018
Received Date

Well Name MW-51 PINE	Township 27	Range 22	Dir Section W 33	Subsection AADABA	Well Depth 180 ft.	Depth Completed 173 ft.	Date Well Completed 11/09/1995
Elevation 898 ft.	Elev. Method LiDAR 1m DEM (MNDNR)					Drill Method Non-specified Rotary	Drill Fluid Water
Address Well 2495 117TH ST INVER GROVE HEIGHTS MN					Use monitor well	Status Active	
Stratigraphy Information					Well Hydrofractured? Yes ☐ No ☐	From	To
					Casing Type Single casing	Joint	
					Drive Shoe? Yes ☐ No ☒	Above/Below	
Geological Material SAND & GRAVEL					From 0	To (ft.) 180	Color BROWN
					Hardness		
					Casing Diameter 4 in.	Weight 163 ft.	Hole Diameter 12 in.
					Open Hole	From	To
					Screen? ☒	Type stainless	Make JOHNSON
					Diameter 4 in.	Slot/Gauze 40	Length 10 ft.
						Set 163 ft.	ft. 173 ft.
					Static Water Level		
					165 ft.	land surface	Measure 11/09/1995
					Pumping Level (below land surface)		
					Wellhead Completion		
					Pitless adapter manufacturer Model		
					☐ Casing Protection ☒ 12 in. above grade		
					☐ At-grade (Environmental Wells and Borings ONLY)		
					Grouting Information	Well Grouted? ☒ Yes ☐ No ☐ Not Specified	
					Material	Amount	From To
					neat cement		0 ft. 156 ft.
					high solids bentonite		156 ft. 161 ft.
					Nearest Known Source of Contamination		
					feet	Direction	Type
					Well disinfected upon completion? ☐ Yes ☒ No		
					Pump ☒ Not Installed	Date Installed	
					Manufacturer's name		
					Model Number	HP	Volt
					Length of drop pipe	ft Capacity	g.p. Typ
					Abandoned		
					Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No		
					Variance		
					Was a variance granted from the MDH for this well? ☐ Yes ☐ No		
					Miscellaneous		
					First Bedrock	Aquifer	Quat. Water
					Last Strat	Depth to Bedrock	ft
					sand +larger-brown		
					Located by Minnesota Geological Survey		
					Locate Method Surveyed		
					System	UTM - NAD83, Zone 15, Meters	X 496409 Y 4959429
					Unique Number Verification	Site Plan	Input Date 03/08/2018
					Angled Drill Hole		
					Well Contractor		
					Boart Longyear	02653	BLUNT, C.
					Licensee Business	Lic. or Reg. No.	Name of Driller

568551

County Dakota
Quad Inver Grove
Quad ID 103D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 09/10/2002
Update Date 12/04/2018
Received Date

Well Name IW-1 PINE BEND	Township 27	Range 22	Dir W	Section 33	Subsection AAADCC
Elevation 902 ft.	Elev. Method LiDAR 1m DEM (MNDNR)				
Address C/W 2495 117TH ST E INVER GROVE HEIGHTS MN					
Stratigraphy Information Geological Material From To (ft.) Color Hardness SAND/GRAVEL 0 220					
Well Depth 220 ft.					
Depth Completed 220 ft.					
Date Well Completed 03/17/1996					
Drill Method Non-specified Rotary					
Drill Fluid Bentonite					
Use remedial					
Status Active					
Well Hydrofractured? Yes ☐ No ☐ From To					
Casing Type Single casing					
Joint					
Drive Shoe? Yes ☐ No ☒ Above/Below					
Casing Diameter 6 in. To 164 ft. lbs./ft.					
Weight 6 in. To 190 ft. lbs./ft.					
Hole Diameter 6 in. To 220 ft. lbs./ft.					
Open Hole From ft. To ft.					
Screen? ☒ Slot/Gauze ☐ Length					
Type stainless					
Make JOHNSON					
Diameter 6 in. 20 10 ft. 164 ft. 174 ft.					
6 in. 20 20 ft. 190 ft. 210 ft.					
Static Water Level 170 ft. land surface Measure 03/17/1996					
Pumping Level (below land surface)					
Wellhead Completion Pitless adapter manufacturer Model					
☐ Casing Protection ☒ 12 in. above grade					
☐ At-grade (Environmental Wells and Borings ONLY)					
Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified					
Material Amount From To					
neat cement 0 ft. 155 ft.					
high solids bentonite 177 ft. 183 ft.					
Nearest Known Source of Contamination feet Direction Type					
Well disinfected upon completion? ☐ Yes ☒ No					
Pump ☒ Not Installed Date Installed					
Manufacturer's name					
Model Number HP Volt					
Length of drop pipe ft Capacity g.p. Typ					
Abandoned Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No					
Variance Was a variance granted from the MDH for this well? ☒ Yes ☐ No					
Miscellaneous First Bedrock Aquifer Quat. Water					
Last Strat sand +larger Depth to Bedrock ft					
Located by Minnesota Geological Survey					
Locate Method Digitization (Screen) - Map (1:24,000) (15 meters or					
System UTM - NAD83, Zone 15, Meters X 496397 Y 4959442					
Unique Number Verification Tag on well Input Date 02/01/1998					
Angled Drill Hole					
Well Contractor Boart Longyear 49653 BLUNT, C.					
Licensee Business Lic. or Reg. No. Name of Driller					

568552

County Dakota
Quad Inver Grove
Quad ID 103D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 09/10/2002
Update Date 12/04/2018
Received Date

Well Name IW-2 PINE BEND	Township 27	Range 22	Dir Section W 33	Subsection AADABB	Well Depth 237 ft.	Depth Completed 237 ft.	Date Well Completed 03/13/1996
Elevation 902 ft.	Elev. Method LiDAR 1m DEM (MNDNR)					Drill Method Non-specified Rotary	Drill Fluid Bentonite
Address C/W 2495 117TH ST E INVER GROVE HEIGHTS MN					Use remedial	Status Active	
Stratigraphy Information Geological Material From To (ft.) Color Hardness SAND/GRAVEL 0 237					Well Hydrofractured? Yes ☐ No ☐ From To		
					Casing Type Single casing Joint		
					Drive Shoe? Yes ☐ No ☒ Above/Below		
					Casing Diameter 6 in. To 167 ft. lbs./ft. 14 in. To 237 ft.		
					Weight 6 in. To 207 ft. lbs./ft.		
					Hole Diameter 6 in. To 237 ft. lbs./ft.		
					Open Hole From ft. To ft.		
					Screen? ☒ Type stainless Make JOHNSON		
					Diameter Slot/Gauze Length Set		
					6 in. 20 10 ft. 167 ft. 177 ft.		
6 in. 20 20 ft. 207 ft. 227 ft.							
Static Water Level 170 ft. land surface Measure 03/13/1996							
Pumping Level (below land surface)							
Wellhead Completion Pitless adapter manufacturer Model ☐ Casing Protection ☒ 12 in. above grade ☐ At-grade (Environmental Wells and Borings ONLY)							
Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified Material Amount From To neat cement 0 ft. 159 ft. high solids bentonite 182 ft. 199 ft.							
Nearest Known Source of Contamination feet Direction Type Well disinfected upon completion? ☐ Yes ☒ No							
Pump ☒ Not Installed Date Installed Manufacturer's name Model Number HP Volt Length of drop pipe ft Capacity g.p. Typ							
Abandoned Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No							
Variance Was a variance granted from the MDH for this well? ☒ Yes ☐ No							
Miscellaneous First Bedrock Aquifer Quat. Water Last Strat sand +larger Depth to Bedrock ft Located by Minnesota Geological Survey Locate Method Digitization (Screen) - Map (1:24,000) (15 meters or System UTM - NAD83, Zone 15, Meters X 496390 Y 4959419 Unique Number Verification Tag on well Input Date 02/01/1998							
Angled Drill Hole							
Well Contractor Boart Longyear 49653 BLUNT, C. Licensee Business Lic. or Reg. No. Name of Driller							

568553

County Dakota
Quad Inver Grove
Quad ID 103D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 09/10/2002
Update Date 12/04/2018
Received Date

Well Name IW-3 PINE BEND	Township 27	Range 22	Dir Section W 33	Subsection AADBAD
Elevation 902 ft.	Elev. Method LiDAR 1m DEM (MNDNR)			
Address C/W 2495 117TH ST E INVER GROVE HEIGHTS MN				
Stratigraphy Information Geological Material From To (ft.) Color Hardness SAND/GRAVEL 0 218				
Well Depth 218 ft.				
Depth Completed 218 ft.				
Date Well Completed 03/24/1996				
Drill Method Non-specified Rotary				
Drill Fluid Bentonite				
Use remedial				
Status Active				
Well Hydrofractured? Yes ☐ No ☐ From To				
Casing Type Single casing				
Joint				
Drive Shoe? Yes ☐ No ☒ Above/Below				
Casing Diameter 6 in. To 169 ft. lbs./ft.				
Weight 6 in. To 188 ft. lbs./ft.				
Hole Diameter 6 in. To 218 ft. lbs./ft.				
Open Hole From ft. To ft.				
Screen? ☒ Slot/Gauze ☐ Length				
Type stainless				
Make JOHNSON				
Set 6 in. 20 5 ft. 169 ft. 174 ft.				
Static Water Level 170 ft. land surface Measure 03/24/1996				
Pumping Level (below land surface)				
Wellhead Completion Pitless adapter manufacturer Model				
☐ Casing Protection ☒ 12 in. above grade				
☐ At-grade (Environmental Wells and Borings ONLY)				
Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified				
Material neat cement				
Amount high solids bentonite				
From To 0 ft. 162 ft.				
176 ft. 180 ft.				
Nearest Known Source of Contamination feet Direction Type				
Well disinfected upon completion? ☐ Yes ☒ No				
Pump ☒ Not Installed Date Installed				
Manufacturer's name				
Model Number HP Volt				
Length of drop pipe ft Capacity g.p. Typ				
Abandoned Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No				
Variance Was a variance granted from the MDH for this well? ☒ Yes ☐ No				
Miscellaneous First Bedrock Aquifer Quat. Water				
Last Strat sand +larger Depth to Bedrock ft				
Located by Minnesota Geological Survey				
Locate Method Digitization (Screen) - Map (1:24,000) (15 meters or				
System UTM - NAD83, Zone 15, Meters X 496378 Y 4959399				
Unique Number Verification Tag on well Input Date 02/01/1998				
Angled Drill Hole				
Well Contractor Boart Longyear 49653 BLUNT, C.				
Licensee Business Lic. or Reg. No. Name of Driller				

591294

County Dakota
Quad Inver Grove
Quad ID 103D

MINNESOTA DEPARTMENT OF HEALTH
WELL AND BORING REPORT
Minnesota Statutes Chapter 1031

Entry Date 06/25/1997
Update Date 12/04/2018
Received Date

Well Name MW-52 PINE	Township 27	Range 22	Dir Section W 33	Subsection AADABB	Well Depth 185 ft.	Depth Completed 185 ft.	Date Well Completed 04/16/1997
Elevation 899 ft.	Elev. Method LiDAR 1m DEM (MNDNR)					Drill Method Vibracore/rotasonic	Drill Fluid
Address C/W 2495 117TH ST E INVER GROVE HEIGHTS MN					Use monitor well	Status Active	
Stratigraphy Information Geological Material From To (ft.) Color Hardness SAND/GRAVEL 0 185 BROWN MEDIUM					Well Hydrofractured? Yes ☐ No ☐ From To		
					Casing Type Single casing Joint Threaded		
					Drive Shoe? Yes ☒ No ☐ Above/Below		
					Casing Diameter Weight Hole Diameter 4 in. To 175 ft. lbs./ft. 6 in. To 185 ft.		
					Open Hole From ft. To ft.		
					Screen? ☒ Type stainless Make JOHNSON Diameter Slot/Gauze Length Set 4 in. 10 10 ft. 175 ft. 185 ft.		
					Static Water Level 176 ft. land surface Measure 04/16/1997		
					Pumping Level (below land surface)		
					Wellhead Completion Pitless adapter manufacturer Model ☐ Casing Protection ☒ 12 in. above grade ☐ At-grade (Environmental Wells and Borings ONLY)		
					Grouting Information Well Grouted? ☒ Yes ☐ No ☐ Not Specified Material Amount From To neat cement 53 Sacks 0 ft. 160 ft.		
Nearest Known Source of Contamination feet Direction Type Well disinfected upon completion? ☐ Yes ☒ No							
Pump ☒ Not Installed Date Installed Manufacturer's name Model Number HP Volt Length of drop pipe ft Capacity g.p. Typ							
Abandoned Does property have any not in use and not sealed well(s)? ☐ Yes ☒ No							
Variance Was a variance granted from the MDH for this well? ☐ Yes ☒ No							
Miscellaneous First Bedrock Aquifer Quat. Water Last Strat sand +larger-brown Depth to Bedrock ft Located by Minnesota Geological Survey Locate Method Digitization (Screen) - Map (1:24,000) (15 meters or System UTM - NAD83, Zone 15, Meters X 496404 Y 4959422 Unique Number Verification Information from Input Date 02/01/1998							
Angled Drill Hole							
Well Contractor Boart Longyear 02653 CZECH, M. Licensee Business Lic. or Reg. No. Name of Driller							

Remarks
GAMMA LOGGED 4-18-1997. M.G.S. NO. 3739.

L:\Projects\BFI\Inver Grove Heights MNGIS\Pine Bend Landfill_Basemap.mxd - Scale 1:8,245 - 9/3/2020 12:30:54 PM - GStewart - NAD 1983 StatePlane Minnesota South FIPS 2203 Feet

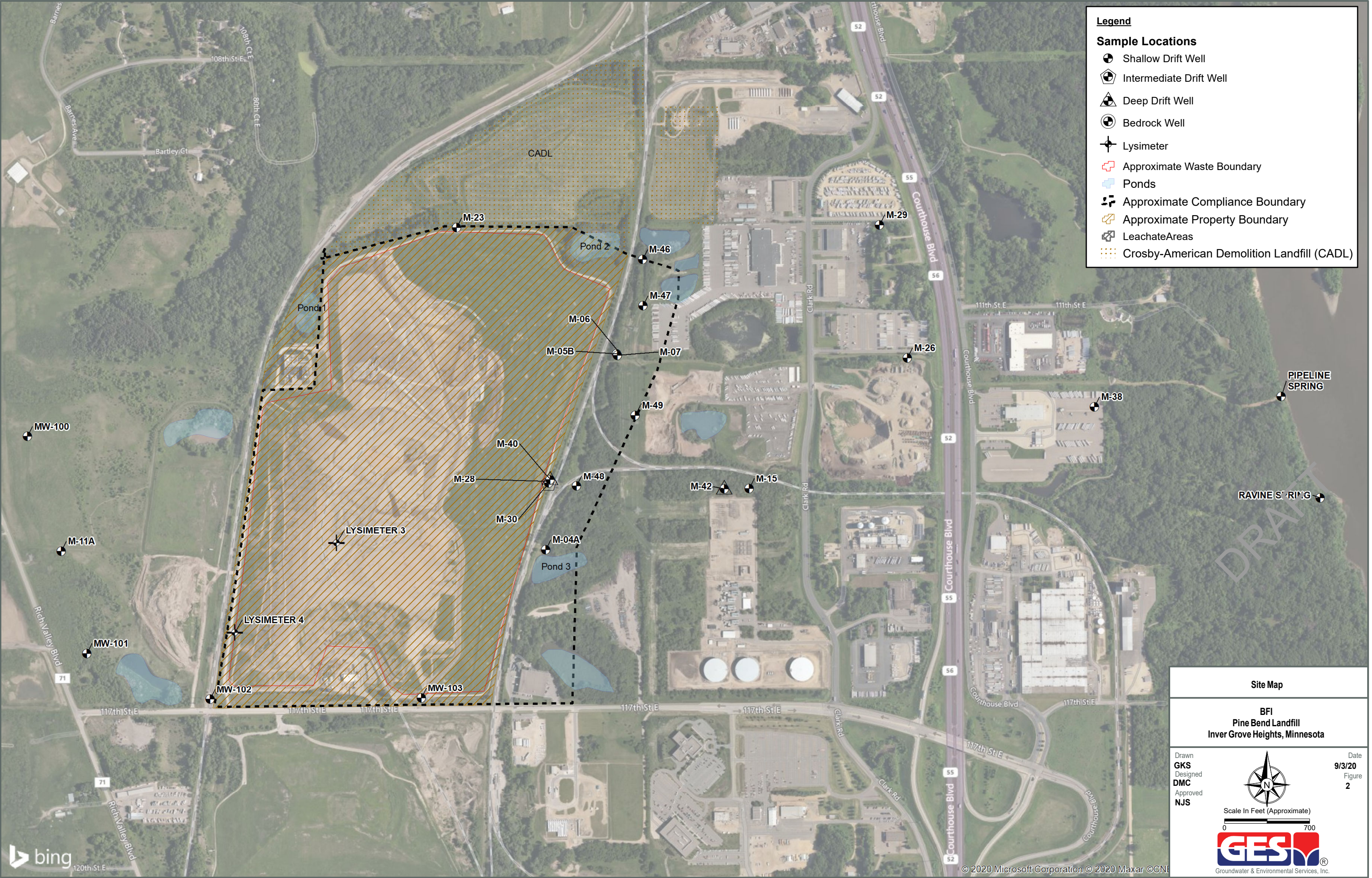


Table 1

Environmental Monitoring System Summary



Location	Classification	Total Well Depth (feet)	Top of Casing Elevation (feet)	Downgradient Distance* (feet)
Lysimeter 4	Lysimeter	-	-	-
Lysimeter 3	Lysimeter	-	-	-
M-11A	Shallow Drift	96.5	879.67	upgradient
M-15***	Shallow Drift	204.2	928.35	1,835
M-23	Shallow Drift	169.2	911.82	sidegradient
M-26	Shallow Drift	226.1	943.04	3,358
M-28	Shallow Drift	150.0	906.63	95
M-29	Shallow Drift	211.0	925.60	2,566
M-30	Intermediate Drift	228.0	900.25	80
M-38	Shallow Drift	229.1	931.22	5,400
M-40	Deep Drift	341.5	907.20	138
M-42***	Deep Drift	263.0	928.48	1,840
M-46	Shallow Drift	221.7	934.64	251
M-47	Shallow Drift	224.9	934.74	435
M-48	Shallow Drift	152.1	906.49	320
M-49	Shallow Drift	185.0	926.72	822
M-4A	Shallow Drift	131.9	906.77	325
M-5B**	Shallow Drift	184.4	898.09	254
M-6**	Bedrock	440.0	910.38	325
M-7**	Deep Drift	326.0	910.06	327
MW-100	Shallow Drift	93.3	880.67	upgradient
MW-101	Shallow Drift	74.6	865.63	upgradient
MW-102	Shallow Drift	77.2	863.96	sidegradient
MW-103	Shallow Drift	133.0	912.91	sidegradient
Pipeline Spring	Spring	-	-	7,009
Ravine Spring	Spring	-	-	7,008

Table 4

Summary of Groundwater Field Parameters for 2022

Location	Date	Classification	Top of Casing	Depth of Water	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (mV)	pH	Specific Conductance (mS/cm)	Temperature, (deg C)	Turbidity (NTU)
M-11A	3/31/2022	Shallow Drift	879.67	798.78	6.09	108	7.65	443	9.71	0
M-11A	7/26/2022	Shallow Drift	879.67	798.53	7.37	408	4.94	981	10.62	16
M-11A	11/16/2022	Shallow Drift	879.67	798.22	6.81	60	8.08	431	9.99	0.5
M-15	4/4/2022	Shallow Drift	928.35	738.38	0	87	7.19	1310	11.91	0
M-15	7/28/2022	Shallow Drift	928.35	738.2	0	57	6.8	1140	12.57	0.8
M-15	11/16/2022	Shallow Drift	928.35	737.72	0	23	6.26	1170	11.93	0
M-23	3/31/2022	Shallow Drift	911.82	752.52	0	30	7.33	702	10.62	0
M-23	7/27/2022	Shallow Drift	911.82	751.87	1.47	-94	7.34	668	11.43	1.3
M-23	11/16/2022	Shallow Drift	911.82	751.57	0	28	7.38	665	10.74	1.1
M-26	4/4/2022	Shallow Drift	943.04	734.55	0	44	7.37	1380	12.15	0
M-26	7/28/2022	Shallow Drift	943.04	733.94	0	34	6.57	1280	13.04	0
M-26	11/16/2022	Shallow Drift	943.04	733.85	0	60	6.53	1310	12.72	0
M-28	3/31/2022	Shallow Drift	906.63	770.6	0	-129	7.02	1380	14.74	0
M-28	7/27/2022	Shallow Drift	906.63	770.21	6.12	-188	6.87	1080	16.08	0
M-28	11/16/2022	Shallow Drift	906.63	770.13	0	-148	6.74	1280	15.12	0
M-29	4/4/2022	Shallow Drift	925.60	736.31	0	17	7.27	980	12.42	0
M-29	7/28/2022	Shallow Drift	925.60	735.72	0	-2.5	6.79	903	12.84	4.2
M-29	11/16/2022	Shallow Drift	925.60	735.63	0	1	6.78	913	12.48	3.2
M-30	3/31/2022	Intermediate Drift	900.25	717.25	0	-227	8.46	1080	15.5	0
M-30	7/27/2022	Intermediate Drift	900.25	737.02	4.75	-252	7.48	1060	17.56	25.8
M-30	11/16/2022	Intermediate Drift	900.25	737.27	0	-248	7.51	990	15.78	13
M-38	4/4/2022	Shallow Drift	931.22	729.81	0	-19	7.88	1540	11.38	0
M-38	8/1/2022	Shallow Drift	931.22	729.35	0	-70	6.47	1360	12.18	0
M-38	11/16/2022	Shallow Drift	931.22	729.3	0	-56	6.61	1410	11.3	0.2
M-40	3/30/2022	Deep Drift	907.20	744.55	0	-114	7.38	847	11.84	0
M-40	7/27/2022	Deep Drift	907.20	744.08	0.24	-221	7.26	807	16.77	8.9
M-40	11/16/2022	Deep Drift	907.20	743.96	0	-161	7.69	845	14.58	25.9
M-42	4/4/2022	Deep Drift	928.48	737.14	0	-47	8.29	1000	12.5	0
M-42	7/28/2022	Deep Drift	928.48	736.78	2.74	-97	6.85	889	12.84	9.4
M-42	11/16/2022	Deep Drift	928.48	736.57	1.14	-41	6.48	929	12.25	0
M-46	4/1/2022	Shallow Drift	934.64	742.69	0	-57	7.53	1580	13.78	0
M-46	7/29/2022	Shallow Drift	934.64	742.19	0	-84	6.71	1500	14.03	0
M-46	11/17/2022	Shallow Drift	934.64	742.08	0	-68	6.82	1470	13.51	0
M-47	4/1/2022	Shallow Drift	934.74	742.6	0	-59	7.24	1390	15.41	0
M-47	7/28/2022	Shallow Drift	934.74	742.09	0	-90	6.51	1340	15.66	0
M-47	11/17/2022	Shallow Drift	934.74	742.09	0	-75	6.73	1300	15.32	0.6
M-48	4/4/2022	Shallow Drift	906.49	770.59	0	-101	7.98	928	13.02	0
M-48	7/28/2022	Shallow Drift	906.49	770.21	3.93	-135	6.96	897	13.48	3.2
M-48	11/16/2022	Shallow Drift	906.49	770.07	0	-94	6.75	939	13.1	0.9

Table 4

Summary of Groundwater Field Parameters for 2022



Location	Date	Classification	Top of Casing	Depth of Water	Dissolved Oxygen (mg/L)	Oxidation-Reduction Potential (mV)	pH	Specific Conductance (mS/cm)	Temperature, (deg C)	Turbidity (NTU)
M-49	4/1/2022	Shallow Drift	926.72	745.47	2.72	101	7.51	787	9.19	0
M-49	7/29/2022	Shallow Drift	926.72	745.46	4.39	75	7.08	671	14.26	11.8
M-4A	3/31/2022	Shallow Drift	906.77	776.49	0	-195	9.06	628	12.79	0
M-4A	7/28/2022	Shallow Drift	906.77	776.01	2.15	-230	7.52	662	14.21	12.7
M-4A	11/16/2022	Shallow Drift	906.77	775.77	0	-194	7.14	782	12.17	31.3
M-5B	4/1/2022	Shallow Drift	910.38	746.59	0	-69	6.75	1020	14.1	0
M-5B	7/29/2022	Shallow Drift	910.38	745.91	2.44	-135	6.69	1020	18.83	2.2
M-5B	11/17/2022	Shallow Drift	910.38	745.79	0.26	-107	6.75	1030	17.33	1.6
M-6	4/1/2022	Bedrock	910.38	743.19	0	-145	7.72	552	14.16	0
M-6	7/29/2022	Bedrock	910.38	742.71	2.49	-202	7.43	520	14.42	0
M-6	11/17/2022	Bedrock	910.38	742.55	0	-172	7.5	532	14.27	0.8
M-7	4/1/2022	Deep Drift	910.06	742.57	0	-149	8.06	653	12.49	0
M-7	7/29/2022	Deep Drift	910.06	742.48	1.15	-179	7.44	600	12.84	10
M-7	11/17/2022	Deep Drift	910.06	742.32	0.8	-155	7.54	619	12.71	15
MW-100	3/30/2022	Deep Drift	880.67	797	5.14	133	7.24	744	8.5	0
MW-100	7/26/2022	Upgradient	880.67	796.825	9.17	318	3.62	1550	12.21	0.7
MW-100	11/16/2022	Upgradient	880.67	796.535	6.95	93	7.1	713	8.94	4.4
MW-101	3/30/2022	Upgradient	865.63	801.25	4.93	107	7.04	748	8.36	12.5
MW-101	7/26/2022	Upgradient	865.63	801.162	8.26	375	3.72	1500	11.99	33.5
MW-101	11/16/2022	Upgradient	865.63	800.932	7	100	6.97	727	8.98	42.2
MW-102	3/30/2022	Upgradient	863.96	798.43	0	95	7.05	1070	8.71	0
MW-102	7/27/2022	Side-gradient	863.96	797.013	1.09	153	6.85	1050	13.81	8.7
MW-102	11/16/2022	Side-gradient	864.96	796.713	1.66	111	6.65	1040	9.8	0

Table 3
PBL EMS Groundwater Elevation Data



Date	M-4A	M-5B	M-6	M-7	M-11A	M-15	M-23	M-26	M-28	M-29	M-30	M-38	M-40	M-42	M-46	M-47	M-48	M-49	MW-100	MW-101	MW-102	MW-103
8/8/1983	768.78																					
11/16/1983	771.13			743.30																		
10/4/1984	771.98																					
7/29/1985	773.00																					
11/7/1985	774.96																					
7/31/1986	773.88		738.23	734.31					769.41													
10/9/1986																						
10/27/1986	774.20		738.68	737.54				730.96	769.93	732.74												
4/8/1987	775.15							731.19	770.43	732.90												
7/30/1987								731.19		732.95												
7/14/1988	773.96		737.70	737.64					770.58													
12/1/1988	774.56		737.08	737.33				730.59	770.13	732.35												
4/6/1989	773.16		737.13	737.28			747.09		769.74													
7/19/1989	773.01		736.92	737.10			747.06		769.68													
6/29/1990	772.86		736.47	736.65			746.47		768.82													
10/23/1990																						
10/25/1990																						
11/6/1990																						
11/7/1990																						
3/22/1991	772.60		736.57	735.90	792.90		745.75		768.62													
4/17/1991			735.98																			
7/24/1991	772.21		736.06	736.25			746.00		767.97													
11/6/1991	772.04		735.69	735.85	792.48		745.75		768.00													
4/15/1992	772.11		733.41	738.52	792.06		745.84		768.10													
6/30/1992	772.38		735.99	736.18					768.37													
11/10/1992	772.51		736.28	736.64	792.31		746.39		768.40													
4/6/1993	772.70		736.02	736.31	792.57		746.32		768.76													
7/1/1993			736.51	736.67	792.80		746.39		768.73													
11/9/1993	773.59		737.10	737.26	793.66		747.50		769.45													
3/15/1994	773.82		737.83	737.89	793.82		747.44		769.51						738.53	738.37						
7/7/1994	774.15		737.79	737.95	794.08		748.16		769.94													
10/19/1994	774.08		737.76	737.89	794.35		748.39		769.84						738.92	738.76						
11/29/1994	774.18								769.84							738.57						
12/29/1994	774.31								770.03							738.83						
1/30/1995	774.41								770.53							738.93						
2/24/1995	774.41								770.53							739.06						
3/20/1995	774.34		738.28	738.48	794.77		748.42		770.60						739.35	739.12						
5/1/1995	774.47								770.63							739.25						
6/1/1995	774.44								770.57							739.28						
6/29/1995	774.31		738.55	738.71	794.61		748.58		770.60						739.38	739.12						
11/20/1995	774.28		738.58	738.74	794.71		748.81								739.81	739.58						
4/4/1996	774.28	744.41	738.38	738.54	794.77		748.88								739.74	739.55						
5/31/1996		744.56														739.13						
7/1/1996		744.58														739.55						
7/30/1996																						
8/5/1996	774.41	744.61	739.86	738.81	794.74		748.45		770.02													
11/25/1996	773.88	744.81	739.43	738.54	794.61		748.91		769.86							740.14						
12/5/1996																						
12/9/1996																						

Table 3
PBL EMS Groundwater Elevation Data



Date	M-4A	M-5B	M-6	M-7	M-11A	M-15	M-23	M-26	M-28	M-29	M-30	M-38	M-40	M-42	M-46	M-47	M-48	M-49	MW-100	MW-101	MW-102	MW-103
4/9/1997																						
4/16/1997	774.21	744.64	739.63	738.67	794.61		749.01		769.82													
7/9/1997	774.05	743.26	739.60	738.64	794.44		748.81		769.82													
7/23/1997																						
9/9/1997																						
11/17/1997	775.55	742.97	740.53	738.35	796.05	736.72	749.86	732.37	770.87	734.15		728.45	740.89		740.27		770.93	754.62				
12/4/1997																						
12/5/1997																						
2/3/1998		742.54													740.17	740.04						
3/3/1998		742.67													740.37	740.24						
4/6/1998	775.42	742.77		739.34	795.96	737.01	750.02	732.63	770.87	734.51		728.65			740.46	740.30	770.89	755.18				
4/13/1998																						
5/7/1998		743.10											742.18		740.63	740.53						
6/1/1998		743.72													740.73	740.63						
6/17/1998			741.10																			
7/1/1998		743.30													740.00	740.04						
7/14/1998	775.61	743.40	741.13	739.60	796.65	737.14	750.61	732.79	771.00	734.57		728.78	742.38		740.79	740.63	771.03	755.44				
8/4/1998																						
8/5/1998																						
9/3/1998		744.84													741.05	740.89						
10/13/1998																						
10/21/1998		744.84													740.96	740.83						
11/5/1998	776.14	745.26	741.36	739.89	796.95	737.44	750.87	732.96	771.36	734.77		729.04	742.61		741.35	741.22	771.35	755.11				
11/24/1998		745.07													741.12	741.06						
11/30/1998		744.87													740.99	740.86						
12/7/1998		744.97													741.02	740.86						
1/21/1999		745.19													741.22	741.09						
2/26/1999																						
4/2/1999	776.34	745.30	741.59	740.09	797.31	736.73	750.67	733.22	771.49	735.03		729.27	742.87		741.22	741.09	771.49	754.72				
7/12/1999	776.70	745.56	742.02	740.55	797.74	736.96	751.36	733.58	771.76	735.39		729.57	743.33		741.68	741.55	771.75	755.18				
8/12/1999																						
10/19/1999																						
10/20/1999	776.76	745.72	742.02	740.55	797.80	737.16	751.23	733.71	771.82	735.52		729.50	743.36		741.74	741.61	771.81	754.75				
1/11/2000		745.30														741.19						
3/30/2000																						
3/31/2000																						
4/5/2000	776.47	745.72	742.18	740.71	797.34	737.19	751.20	733.74	771.59	735.59		729.57	743.43		741.78	741.61	771.62	754.85				
7/5/2000	775.88	745.23	741.59	740.19	796.88	736.83	750.80	733.19	770.97	735.06		729.24	742.84		741.22	741.09	771.03	754.52				
7/26/2000																						
7/27/2000																						
10/5/2000																						
10/17/2000	776.43	745.66	741.95	740.48	797.70	737.03	751.13	733.35	771.40	735.20		729.40	743.17		741.51	741.38	771.39	754.62				
4/11/2001	775.65	745.30	741.56	740.12	797.15	736.60	750.87	733.15	770.84	735.00		729.20	742.81		741.15	741.02	770.83	754.55				
5/9/2001																						
5/10/2001																						
7/11/2001	776.11	745.89	742.28	740.71	797.60	736.83	751.69	733.74	771.17	735.59		729.73	743.53		741.91	741.74	771.12	754.78				
8/22/2001																						
10/17/2001	776.01	745.59	741.95	740.58	797.51	736.77	750.97	733.32	771.07	735.39		729.34	743.07		741.42	741.29	771.09	754.68				

Table 3

PBL EMS Groundwater Elevation Data



Date	M-4A	M-5B	M-6	M-7	M-11A	M-15	M-23	M-26	M-28	M-29	M-30	M-38	M-40	M-42	M-46	M-47	M-48	M-49	MW-100	MW-101	MW-102	MW-103
11/20/2001																						
11/21/2001																						
4/9/2002					797.25		750.72															
4/11/2002									770.86				743.18									
4/12/2002								732.56									770.69					
4/16/2002		745.44								735.24					741.39	741.26		754.76				
4/17/2002	775.35					736.61						729.24										
4/19/2002			741.45	741.55																		
7/8/2002					797.25																	
7/9/2002							750.89		770.60			729.31	742.53				770.17					
7/10/2002		745.28													741.23	741.10		754.66				
7/11/2002						736.67		736.45														
7/12/2002	775.74																					
7/15/2002			738.29	741.12																		
10/21/2002					797.75																	
10/22/2002							746.32		770.74				743.10									
10/23/2002						736.90											770.81					
10/24/2002	776.14							733.59		735.49					741.61	741.44						
10/25/2002		745.57	742.17	741.91																		
11/3/2002																						
11/7/2002																						
4/11/2003	776.02	745.64	737.99	741.78	797.88	737.12	751.22	733.49	771.35	733.20		729.54	743.21		741.59	741.44	770.88	755.06				
7/10/2003	776.30	745.77	741.27	742.08	798.12	737.25	751.53	733.68	771.14	735.48		729.68	743.59		741.88	741.71	771.14	755.17				
7/24/2003																						
10/7/2003																						
10/20/2003	776.40	745.79	740.67		797.95	737.38	751.36	733.79	771.24	734.28		729.68	743.65		741.91	741.75	771.24	755.33				
4/5/2004	775.91	745.48	741.93	739.81	797.38	737.10	751.08	733.55	770.80	735.34	736.14	728.32	743.18	736.58	741.59	741.16	770.82	755.32				
7/8/2004	775.51	745.21	741.7	741.25	796.79	736.84	750.89	732.1	770.34	735.11	736.04	729.34	743.02	736.05	741.32	741.16	770.39	754.96				
10/20/2004	775.58	744.98	740.13	740.63	796.92	736.61	750.42	733.04	770.13	734.85	735.68	727.86	742.56	733.76	741.03	740.87	769.97	755.03				
4/11/2005	774.66	744.79	739.14		796.33	736.45	750.17	732.89	769.49	734.81	735.45	727.83	742.4	733.72	740.8	739.75	769.87	754.63				
7/11/2005	774.79	744.59	741.03	741.14	796.12	736.3	750	732.9	769.08	734.06	735.45	727.77	742.37	733.38	740.71	740.68	769.7	755.13				
10/24/2005	773.39	743.18		742.5											737.64	739.24						
10/25/2005					794.89	735.75		732.04		732.1								754.22				
10/26/2005							750.12				735.1		734.52	733.28			768.64					
10/27/2005			739.77																			
4/10/2006	774.66	744.79													740.8			754.63				
4/11/2006					796.33	736.45		732.89		734.81						739.75	769.87					
4/12/2006									763.63		735.45		742.4									
4/13/2006			739.14	741.24			750.17					727.92		733.72								
7/11/2006	773.69	743.86	740.21	740.86	794.87	735.39	749.40	731.50	768.69	732.60	734.69	727.60	741.70	731.72	740.00	739.32	768.81	755.20				
10/23/2006	773.24	743.46	742.82	739.92	794.43	734.87	748.72	731.68	768.29	733.50	733.50	727.22	741.20	732.06	739.64	739.40	768.39	754.92				
4/13/2007	772.61	743.17	739.66	741.06	794.25	735.00	748.50	731.66	767.72	733.49	733.90	727.17	740.87	734.43	739.30	739.15	767.90	754.88				
7/9/2007	772.51	742.98	739.53	739.64	793.77	735.67	748.14	731.49	767.53	733.40	733.85	726.88	740.58	732.28	739.02	738.90	767.69	753.77				
10/22/2007	772.39	743.14	739.30	741.24	793.85	734.87	748.17	731.90	767.41	733.48	733.75	725.46	740.64	733.00	738.72	739.16	767.63	754.84				
4/4/2008	772.41	742.92	738.57	739.48	793.35	734.85	747.98	731.58	767.37	733.40	733.65	727.11	740.80	731.16	739.22	739.04	767.57	754.70				
7/11/2008	772.42	742.98	734.85	741.64	793.37	734.89	748.18	731.26	767.35	732.08	733.75	727.02	740.84	733.36	741.26	739.08	767.59	754.80				

Table 3
PBL EMS Groundwater Elevation Data



Date	M-4A	M-5B	M-6	M-7	M-11A	M-15	M-23	M-26	M-28	M-29	M-30	M-38	M-40	M-42	M-46	M-47	M-48	M-49	MW-100	MW-101	MW-102	MW-103
10/24/2008	772.33	742.82	739.27	739.16	793.05	734.80	747.82	731.56	767.33	734.33	733.55	726.98	740.79	729.28	739.08	738.94	767.49	754.16				
4/10/2009	768.97	739.86	738.77	738.58	789.99	734.25	744.84	731.04	766.53	733.04	733.15	726.70	739.90	-	738.49	735.84	764.07	751.57				
7/10/2009	771.39	742.28	738.77	741.06	792.17	734.63	747.28	731.04	766.53	733.30	733.05	726.62	740.08	731.46	738.44	738.30	766.77	754.14				
10/23/2009	770.76	742.17	740.77	-	791.82	733.95	747.06	730.91	766.31	732.65	732.74	726.54	739.95	-	738.33	738.15	766.26	753.91				
4/9/2010	770.59	741.98	738.67	741.06	791.27	716.16	747.52	730.44	768.43	732.50	742.45	726.52	739.60	732.78	738.14	737.94	766.09	754.12				
7/9/2010	770.19	741.58	737.97	741.00	791.07	733.55	740.73	730.44	765.93	732.20	732.25	726.22	739.30	733.48	737.64	737.54	765.79	753.92				
10/22/2010	770.47	741.8	741.16	741.06	791.31	733.75	746.64	730.84	772.43	732.37	732.05	726.38	739.5	733.48	737.62	740.07	766.27	754.02				
4/1/2011	770.49	741.68	738.17	741.06	791.37	733.65	746.62	730.54	765.53	732.30	732.55	726.32	739.50	733.48	737.94	737.64	765.89	754.12				
7/8/2011	770.90	742.28	738.80	741.06	791.87	744.15	714.97	731.14	766.03	732.80	732.95	726.82	740.10	733.48	737.84	-	766.29	754.52				
10/21/2011	771.52	742.55	738.93	-	792.12	731.31	-	733.04	726.82	738.59	738.44	766.80	754.89	733.15	738.59	740.14	766.80	738.93				
4/6/2012	770.99	742.28	739.47	741.06	791.77	734.05	746.82	730.94	766.63	732.70	732.85	726.72	739.80	733.48	738.24	738.14	766.39	754.72				
7/13/2012	771.09	742.18	738.97	741.06	790.97	734.25	747.02	731.14	766.03	732.40	734.52	726.82	739.90	733.48	738.44	738.24	766.39	754.52				
10/26/2012	770.70	741.88	738.57	-	791.37	733.75	746.42	730.54	765.63	732.50	732.45	726.52	739.40	733.48	737.84	737.24	766.09	754.22				
4/15/2013	770.39	741.60	747.47	-	791.17	733.45	-	730.34	765.33	732.00	732.35	726.42	739.30	735.28	737.44	737.44	765.69	753.72				
7/15/2013	770.89	742.08	747.57	738.16	791.57	736.55	-	730.24	765.63	732.40	732.55	726.72	739.70	733.58	738.34	736.64	766.39	753.32				
10/25/2013	770.99	742.28	747.47	738.06	791.57	736.25	-	730.44	765.83	732.20	732.65	726.42	739.70	734.18	738.44	736.74	766.19	753.52				
7/15/2014	771.69	742.58	747.87	738.46	791.77	736.05	747.62	730.74	766.03	732.80	732.55	727.22	739.90	734.58	738.64	736.94	766.69	753.62				
4/14/2014	770.69	741.98	747.07	738.26	791.37	735.95	-	730.34	766.33	732.00	733.15	726.22	739.30	733.88	738.14	736.44	765.69	753.22				
10/24/2014	771.99	743.08	748.87	738.86	792.87	736.45	747.62	730.64	766.93	732.90	733.45	727.22	741.10	735.88	738.94	738.44	767.39	754.02				
4/13/2015	769.19	742.58	749.47	741.86	791.77	738.05	-	731.64	765.83	732.8	733.55	727.02	739.9	734.58	738.34	735.94	765.29	752.62				
7/22/2015	769.99	743.08	749.87	741.36	793.17	737.85	747.42	732.44	765.43	733.3	733.15	726.72	739.8	735.28	737.94	735.64	763.89	753.02				
10/28/2015	769.69	742.98	749.37	741.76	792.27	738.55	747.52	731.94	766.33	733.1	733.05	727.22	739.5	734.78	738.64	736.14	764.39	752.82				
3/29/2016	769.49	743.28	748.17	740.16	791.87	737.75	-	732.14	765.93	732.8	732.85	727.62	739.9	734.28	738.94	736.44	764.09	752.32				
7/14/2016	772.3	743.19	747.67	739.04	793.22	734.91	747.87	731.56	768.15	733.17	733.61	727.24	740.7	733.74	739.08	738.64	767.49	745.42				
10/26/2016	772.39	743.36	739.77	739.18	794.09	734.96	748.17	732.61	767.1	733.24	733.94	727.68	740.71	733.87	739.21	739.06	767.43	-				
4/5-7/2017	773.22	743.89	740.15	739.71	794.46	735.54	748.67	732.02	767.92	733.91	734.53	727.73	741.36	734.42	739.7	739.55	768.16	-				
7/11-14/2017	773.59	744.36	740.72	740.89	795.05	735.9	749.27	732.48	768.16	734.1	734.91	728.04	741.83	734.83	740.25	740.09	768.48	745.97				
10/31 - 11/2/2017	774.06	744.64	751.07	740.61	795.68	736.36	749.56	732.79	768.67	734.45	735.3	728.37	742.27	735.22	740.61	740.49	768.89	745.46				
04/10 - 4/20/2018	773.9	744.64	740.93	740.51	795.58	736.23	749.61	732.66	768.54	734.35	735.26	728.26	742.15	735.1	740.51	740.37	768.77	745.15				
07/10 - 7/12/2018	774.09	744.65	746.97	740.75	795.94	736.43	749.79	732.84	768.63	734.56	735.38	728.46	742.35	735.37	740.71	740.56	768.89	745.5				
10/30/2018	774.33	744.83	741.48	741.06	796.27	736.4	749.99	733.01	768.84	734.76	735.59	728.56	742.6	735.47	740.95	740.79	769.04	744.39				
04/15 - 4/16/2019	774.67	746.24	741.52	741.21	797.13	736.88	750.69	733.21	769.15	734.9	735.87	728.66	742.84	735.8	741.16	741.06	769.36	747.47				
07/29-08/01/2019	775.69	745.81	742.43	742	797.97	737.57	751.24	733.85	769.8	735.58	736.66	729.29	743.57	736.43	741.99	741.82	770.46	744.91				
10/30 - 11/4/2019	798.46	738.09	751.91	734.29	770.28	736	737.05	729.69	744.1	736.88	742.42	742.3	770.41	745.64	776.2	746.28	770.41	742.24				
4/16/2020	776.73	746.63	743.29	740.38	798.87	738.5	753.4	734.66	770.78	736.24	737.57	729.91	744.57	737.32	742.84	742.74	771.8	746.08				
8/10/2020	777.17	746.96	743.66	750.42	799.72	738.77	752.96	734.84	771.03	736.6	738	730.08	744.97	737.58	743.21	742.99	771.08	746.02				
10/29/2020	777.52	747.05	743.89	749.46	799.84	738.99	753.08	735.04	773.41	736.8	738.2	730.22	745.18	737.8	743.38	743.28	771.41	746.16	798.11	802.55	798.44	741.74
4/1/2021	777.25	747	743.66	743.5	799.64	738.94	753.12	734.98	771.23	736.75	738.13	730.18	745.25	737.76	743.36	743.32	771.19	745.92	797.85	802.47	798.41	741.57
7/1/2021	777.1	747.11	743.62	743.24	799.5	738.7	752.78	734.78	771.1	736.55	737.86	730.02	745.02	737.51	743.09	743.01	771.02	745.59	797.73	802.35	798.12	741.36
10/1/2021	776.84	746.63	743.51	742.93	799.22	738.52	752.54	734.63	770.76	736.37	737.67	729.87	744.75	736.51	742.89	742.8	770.85	745.3	797.475	801.742	797.813	741.083
3/31/2022	776.49	746.59	743.19	742.57	798.78	738.38	752.52	734.55	770.6	736.31	717.25	729.81	744.55	737.14	742.69	742.6	770.59	745.47	797	801.25	798.43	740.893
7/26/2022	776.01	745.91	742.71	742.48	798.53	738.2	751.87	733.94	770.21	735.72	737.02	729.35	744.08	736.78	742.19	742.09	770.21	745.46	796.825	801.162	797.013	740.163
11/16/2022	775.77	745.79	742.55	742.32	798.22	737.72	751.57	733.85	770.13	735.63	737.27	729.3	743.96	736.57	742.08	742.09	770.07	**	796.535	800.932	796.713	739.883

- = Unable to obtain a groundwater elevation with electronic probe.
dry = Groundwater was not present at base of well.

Appendix E

NHIS and IPaC Queries



Minnesota Department of Natural Resources
Division of Ecological & Water Resources
500 Lafayette Road, Box 25
St. Paul, MN 55155-4025

May 18, 2023

Correspondence # MCE 2023-00368

Kevin Mueller
Stantec

RE: Natural Heritage Review of the proposed Pine Bend Landfill Airspace Expansion Project 2,
T27N R22W Section 33; Dakota County

Dear Kevin Mueller,

As requested, the [Minnesota Natural Heritage Information System](#) has been reviewed to determine if the proposed project has the potential to impact any rare species or other significant natural features. Based on the project details provided with the request, the following rare features may be impacted by the proposed project:

Federally Protected Species

- The area of interest overlaps with a Rusty Patched Bumble Bee *High Potential Zone*. The rusty patched bumble bee (*Bombus affinis*) is federally listed as endangered and is likely to be present in suitable habitat within *High Potential Zones*. From April through October this species uses underground nests in upland grasslands, shrublands, and forest edges, and forages where nectar and pollen are available. From October through April the species overwinters under tree litter in upland forests and woodlands. The rusty patched bumble bee may be impacted by a variety of land management activities including, but not limited to, prescribed fire, tree-removal, haying, grazing, herbicide use, pesticide use, land-clearing, soil disturbance or compaction, or use of non-native bees. The [USFWS rusty patched bumble bee guidance](#) provides guidance on avoiding impacts to rusty patched bumble bee and a key for determining if actions are likely to affect the species; the determination key can be found in the appendix. If applicable, the DNR also recommends reseeding disturbed soils with native species of grasses and forbs using [BWSR Seed Mixes](#) or [MnDOT Seed Mixes](#). Please visit the [USFWS Rusty Patched Bumble Bee Map](#) for the most current locations of *High Potential Zones*.

- To ensure compliance with federal law, conduct a federal regulatory review using the U.S. Fish and Wildlife Service's (USFWS) online [Information for Planning and Consultation \(IPaC\) tool](#).

Environmental Review and Permitting

- The Environmental Assessment Worksheet should address whether the proposed project has the potential to adversely affect the above rare features and, if so, it should identify specific measures that will be taken to avoid or minimize disturbance. Sufficient information should be provided so the DNR can determine whether a takings permit will be needed for any of the above protected species.
- Please include a copy of this letter and the MCE-generated Final Project Report in any state or local license or permit application. Please note that measures to avoid or minimize disturbance to the above rare features may be included as restrictions or conditions in any required permits or licenses.

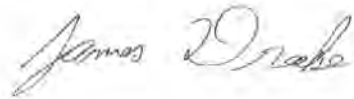
The Natural Heritage Information System (NHIS), a collection of databases that contains information about Minnesota's rare natural features, is maintained by the Division of Ecological and Water Resources, Department of Natural Resources. The NHIS is continually updated as new information becomes available, and is the most complete source of data on Minnesota's rare or otherwise significant species, native plant communities, and other natural features. However, the NHIS is not an exhaustive inventory and thus does not represent all of the occurrences of rare features within the state. Therefore, ecologically significant features for which we have no records may exist within the project area. If additional information becomes available regarding rare features in the vicinity of the project, further review may be necessary.

For environmental review purposes, the results of this Natural Heritage Review are valid for one year; the results are only valid for the project location and project description provided with the request. If project details change or the project has not occurred within one year, please resubmit the project for review within one year of initiating project activities.

The Natural Heritage Review does not constitute project approval by the Department of Natural Resources. Instead, it identifies issues regarding known occurrences of rare features and potential impacts to these rare features. Visit the [Natural Heritage Review website](#) for additional information regarding this process, survey guidance, and other related information. For information on the environmental review process or other natural resource concerns, you may contact your [DNR Regional Environmental Assessment Ecologist](#).

Thank you for consulting us on this matter and for your interest in preserving Minnesota's rare natural resources.

Sincerely,

A handwritten signature in cursive script that reads "James Drake". The signature is written in dark ink and is positioned above the printed name and title.

James Drake
Natural Heritage Review Specialist
James.F.Drake@state.mn.us

Cc: Melissa Collins



Minnesota Department of Natural Resources
Division of Ecological & Water Resources
500 Lafayette Road, Box 25
St. Paul, MN 55155-4025

June 2, 2022

Correspondence # MCE 2022-00192

Erin Sejkora
Stantec

RE: Natural Heritage Review of the proposed Pine Bend Landfill Airspace Expansion Project,
T27N R22W Section 33; Dakota County

Dear Erin Sejkora,

As requested, the Minnesota Natural Heritage Information System has been reviewed to determine if the proposed project has the potential to impact any rare species or other significant natural features. Based on the project details provided with the request, the following rare features may be impacted by the proposed project:

Federally Protected Species

- The area of interest overlaps with a Rusty Patched Bumble Bee *High Potential Zone*. The rusty patched bumble bee (*Bombus affinis*) is federally listed as endangered and is likely to be present in suitable habitat within *High Potential Zones*. From April through October this species uses underground nests in upland grasslands, shrublands, and forest edges, and forages where nectar and pollen are available. From October through April the species overwinters under tree litter in upland forests and woodlands. The rusty patched bumble bee may be impacted by a variety of land management activities including, but not limited to, prescribed fire, tree-removal, haying, grazing, herbicide use, pesticide use, land-clearing, soil disturbance or compaction, or use of non-native bees. The [USFWS rusty patched bumble bee guidance](#) provides guidance on avoiding impacts to rusty patched bumble bee and a key for determining if actions are likely to affect the species; the determination key can be found in the appendix. If applicable, the DNR also recommends reseeding disturbed soils with native species of grasses and forbs using [BWSR Seed Mixes](#) or [MnDOT Seed Mixes](#). Please visit the [USFWS Rusty Patched Bumble Bee Map](#) for the most current locations of *High Potential Zones*.

- To ensure compliance with federal law, conduct a federal regulatory review using the U.S. Fish and Wildlife Service's (USFWS) online [Information for Planning and Consultation \(IPaC\) tool](#).

Environmental Review and Permitting

- The Environmental Assessment Worksheet should address whether the proposed project has the potential to adversely affect the above rare features and, if so, it should identify specific measures that will be taken to avoid or minimize disturbance. Sufficient information should be provided so the DNR can determine whether a takings permit will be needed for any of the above protected species.
- Please include a copy of this letter and the MCE-generated Final Project Report in any state or local license or permit application. Please note that measures to avoid or minimize disturbance to the above rare features may be included as restrictions or conditions in any required permits or licenses.

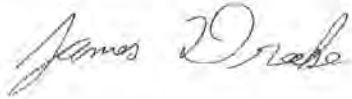
The Natural Heritage Information System (NHIS), a collection of databases that contains information about Minnesota's rare natural features, is maintained by the Division of Ecological and Water Resources, Department of Natural Resources. The NHIS is continually updated as new information becomes available, and is the most complete source of data on Minnesota's rare or otherwise significant species, native plant communities, and other natural features. However, the NHIS is not an exhaustive inventory and thus does not represent all of the occurrences of rare features within the state. Therefore, ecologically significant features for which we have no records may exist within the project area. If additional information becomes available regarding rare features in the vicinity of the project, further review may be necessary.

For environmental review purposes, the results of this Natural Heritage Review are valid for one year; the results are only valid for the project location and project description provided with the request. If project details change or the project has not occurred within one year, please resubmit the project for review within one year of initiating project activities.

The Natural Heritage Review does not constitute project approval by the Department of Natural Resources. Instead, it identifies issues regarding known occurrences of rare features and potential impacts to these rare features. For information on the environmental review process or other natural resource concerns, you may contact your [DNR Regional Environmental Assessment Ecologist](#).

Thank you for consulting us on this matter, and for your interest in preserving Minnesota's rare natural resources.

Sincerely,

A handwritten signature in cursive script that reads "James Drake". The signature is written in dark ink and is positioned above the printed name.

James Drake
Natural Heritage Review Specialist
James.F.Drake@state.mn.us

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Location

Minnesota-Wisconsin Ecological Services Field Office

 (952) 646-2873

1/14 f

Bloomington, MN 55425-1659

NOT FOR CONSULTATION

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species¹ and their critical habitats are managed by the [Ecological Services Program](#) of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries²).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact [NOAA Fisheries](#) for [species under their jurisdiction](#).

-
1. Species listed under the Endangered Species Act are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the [listing status page](#) for more information. IPaC only shows species that are regulated by USFWS (see FAQ).

2. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Mammals

NAME	STATUS
Northern Long-eared Bat <i>Myotis septentrionalis</i> Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9045	Endangered
Tricolored Bat <i>Perimyotis subflavus</i> Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/10515	Proposed Endangered

Birds

NAME	STATUS
Whooping Crane <i>Grus americana</i> No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/758	EXPN

Insects

NAME	STATUS
Monarch Butterfly <i>Danaus plexippus</i> Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9743	Candidate
Rusty Patched Bumble Bee <i>Bombus affinis</i> Wherever found No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/9383	Endangered

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

There are no critical habitats at this location.

You are still required to determine if your project(s) may have effects on all above listed species.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act¹ and the Bald and Golden Eagle Protection Act².

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described [below](#).

1. The [Migratory Birds Treaty Act](#) of 1918.
2. The [Bald and Golden Eagle Protection Act](#) of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern <https://www.fws.gov/program/migratory-birds/species>
- Measures for avoiding and minimizing impacts to birds
<https://www.fws.gov/library/collections/avoiding-and-minimizing-incidental-take-migratory-birds>
- Nationwide conservation measures for birds
<https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf>

The birds listed below are birds of particular concern either because they occur on the [USFWS Birds of Conservation Concern](#) (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ [below](#). This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the [E-bird data mapping tool](#) (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your

list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found [below](#).

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON
Bald Eagle <i>Haliaeetus leucocephalus</i> This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.	Breeds Dec 1 to Aug 31
Black Tern <i>Chlidonias niger</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/3093	Breeds May 15 to Aug 20
Black-billed Cuckoo <i>Coccyzus erythrophthalmus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9399	Breeds May 15 to Oct 10
Bobolink <i>Dolichonyx oryzivorus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 20 to Jul 31
Canada Warbler <i>Cardellina canadensis</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds May 20 to Aug 10
Chimney Swift <i>Chaetura pelagica</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.	Breeds Mar 15 to Aug 25

Golden Eagle *Aquila chrysaetos*

Breeds elsewhere

This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities.

<https://ecos.fws.gov/ecp/species/1680>

Golden-winged Warbler *Vermivora chrysoptera*

Breeds May 1 to Jul 20

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

<https://ecos.fws.gov/ecp/species/8745>

Lesser Yellowlegs *Tringa flavipes*

Breeds elsewhere

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

<https://ecos.fws.gov/ecp/species/9679>

Red-headed Woodpecker *Melanerpes erythrocephalus*

Breeds May 10 to Sep 10

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Rusty Blackbird *Euphagus carolinus*

Breeds elsewhere

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

Short-billed Dowitcher *Limnodromus griseus*

Breeds elsewhere

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

<https://ecos.fws.gov/ecp/species/9480>

Upland Sandpiper *Bartramia longicauda*

Breeds May 1 to Aug 31

This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA

<https://ecos.fws.gov/ecp/species/9294>

Wood Thrush *Hylocichla mustelina*

Breeds May 10 to Aug 31

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is $0.25/0.25 = 1$; at week 20 it is $0.05/0.25 = 0.2$.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

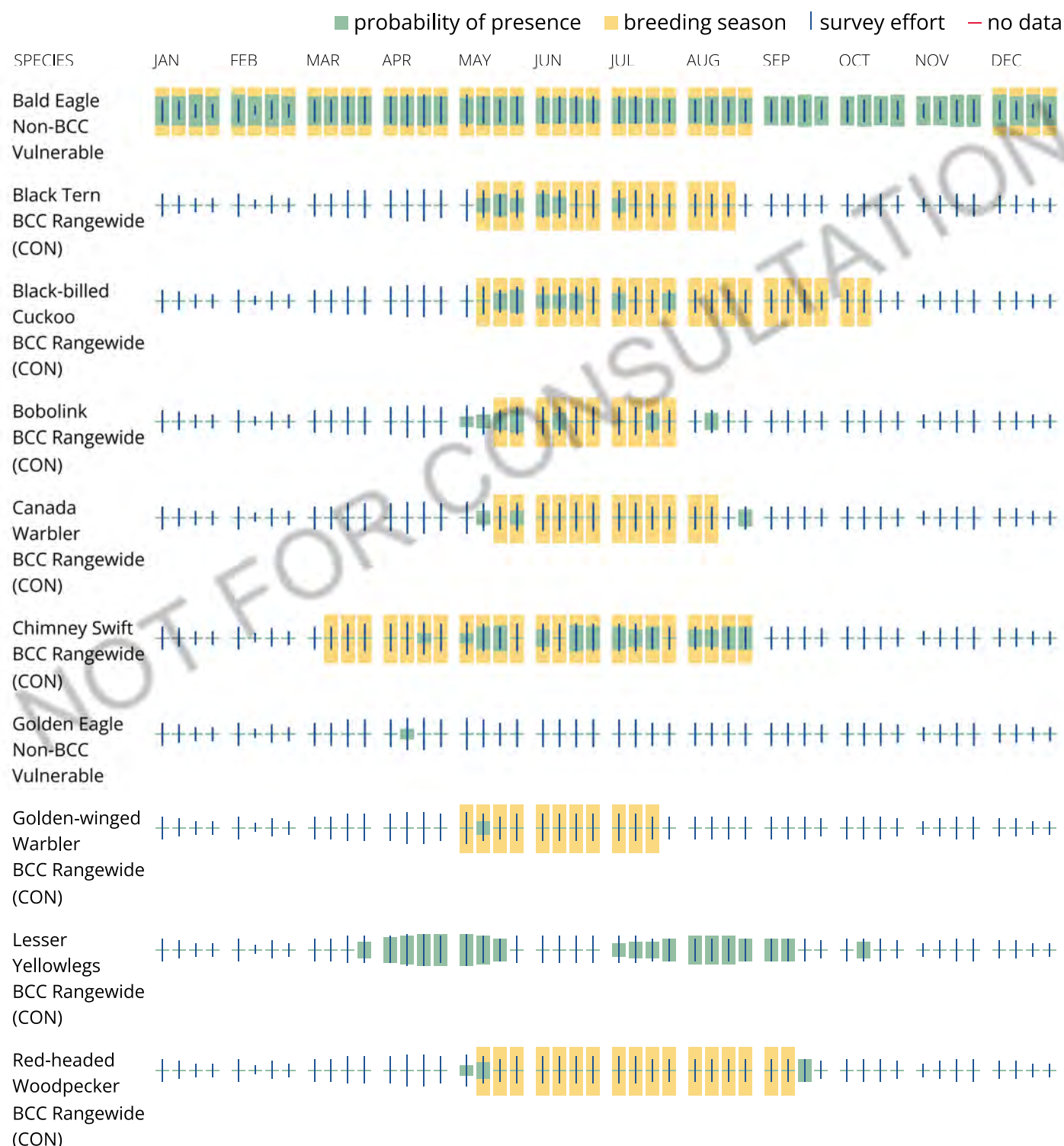
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

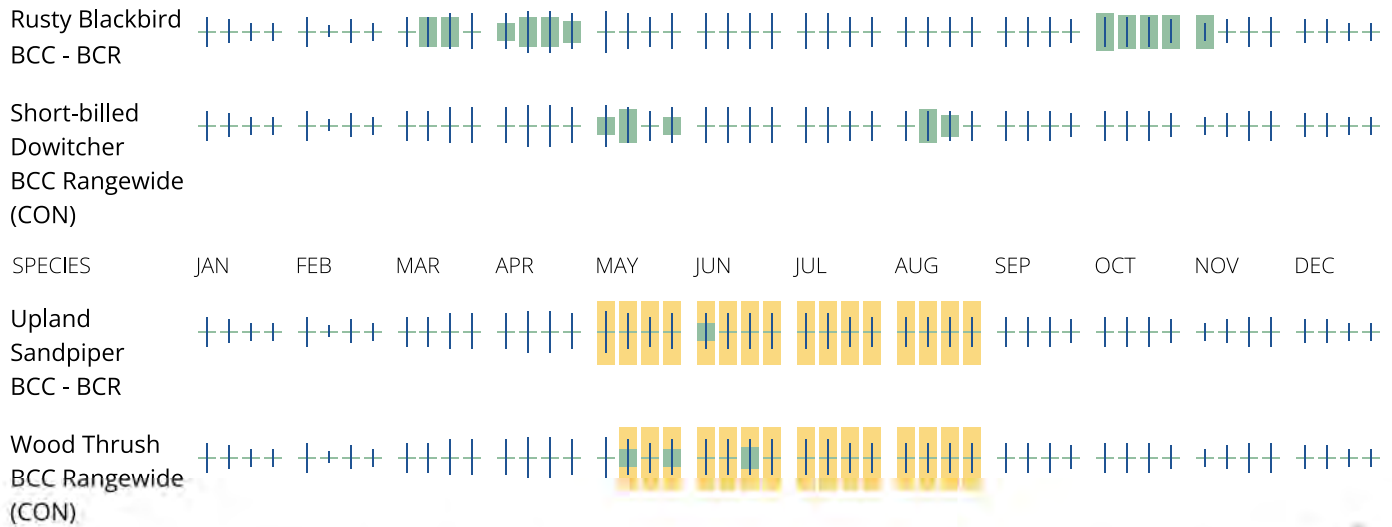
No Data (—)

A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.





Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

[Nationwide Conservation Measures](#) describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. [Additional measures](#) or [permits](#) may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of USFWS [Birds of Conservation Concern \(BCC\)](#) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle ([Eagle Act](#) requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the [Rapid Avian Information Locator \(RAIL\) Tool](#).

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the [Avian Knowledge Network \(AKN\)](#). This data is derived from a growing collection of [survey, banding, and citizen science datasets](#).

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the [RAIL Tool](#) and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are [Birds of Conservation Concern](#) (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the [Eagle Act](#) requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the [Northeast Ocean Data Portal](#). The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the [NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf](#) project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the [Diving Bird Study](#) and the [nanotag studies](#) or contact [Caleb Spiegel](#) or [Pam Loring](#).

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to [obtain a permit](#) to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

National Wildlife Refuge lands

Any activity proposed on lands managed by the [National Wildlife Refuge](#) system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

There are no refuge lands at this location.

Fish hatcheries

There are no fish hatcheries at this location.

Wetlands in the National Wetlands Inventory

(NWI)

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

Wetland information is not available at this time

This can happen when the National Wetlands Inventory (NWI) map service is unavailable, or for very large projects that intersect many wetland areas. Try again, or visit the [NWI map](#) to view wetlands at this location.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tubercid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should

seek the advice of appropriate Federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

NOT FOR CONSULTATION

Appendix F

SHPO Query

Sejkora, Erin

From: MN_MNIT_Data Request SHPO <DataRequestSHPO@state.mn.us>
Sent: Thursday, March 17, 2022 7:32 PM
To: Sejkora, Erin
Subject: RE: Pine Bend Landfill - Request for State Inventory Database Query
Attachments: History.xls

Hello Erin,

Please see attached. Our database has no archaeological records for the given project area.

Jim



SHPO Data Requests
Minnesota State Historic Preservation Office
50 Sherburne Avenue, Suite 203
Saint Paul, MN 55155
(651) 201-3299
datarequestshpo@state.mn.us

Notice: This email message simply reports the results of the cultural resources database search you requested. The database search is only for previously known archaeological sites and historic properties. **IN NO CASE DOES THIS DATABASE SEARCH OR EMAIL MESSAGE CONSTITUTE A PROJECT REVIEW UNDER STATE OR FEDERAL PRESERVATION LAWS** – please see our website at <https://mn.gov/admin/shpo/protection/> for further information regarding our Environmental Review Process.

Because the majority of archaeological sites in the state and many historic/architectural properties have not been recorded, important sites or properties may exist within the search area and may be affected by development projects within that area. Additional research, including field surveys, may be necessary to adequately assess the area's potential to contain historic properties or archaeological sites.

Properties that are listed in the National Register of Historic Places (NRHP) or have been determined eligible for listing in the NRHP are indicated on the reports you have received, if any. The following codes may be on those reports:

NR – National Register listed. The properties may be individually listed or may be within the boundaries of a National Register District.

CEF – Considered Eligible Findings are made when a federal agency has recommended that a property is eligible for listing in the National Register and MN SHPO has accepted the recommendation for the purposes of the Environmental Review Process. These properties need to be further assessed before they are officially listed in the National Register.

SEF – Staff eligible Findings are those properties the MN SHPO staff considers eligible for listing in the National Register, in circumstances other than the Environmental Review Process.

DOE – Determination of Eligibility is made by the National Park Service and are those properties that are eligible for listing in the National Register, but have not been officially listed.

CNEF – Considered Not Eligible Findings are made during the course of the Environmental Review Process. For the purposes of the review a property is considered not eligible for listing in the National Register. These properties may need to be reassessed for eligibility under additional or alternate contexts.

Properties without NR, CEF, SEF, DOE, or CNEF designations in the reports may not have been evaluated and therefore no assumption to their eligibility can be made. Integrity and contexts change over time, therefore any eligibility determination made ten (10) or more years from the date of the current survey are considered out of date and the property will need to be reassessed. If you require a comprehensive assessment of a project's potential to impact archaeological sites or historic/architectural properties, you may need to hire a qualified archaeologist and/or historian. If you need assistance with a project review, please contact Kelly Gragg-Johnson, Environmental Review Specialist @ 651-201-3285 or by email at kelly.graggjohnson@state.mn.us.

The Minnesota SHPO Archaeology and Historic/Architectural Survey Manuals can be found at <https://mn.gov/admin/shpo/identification-evaluation/>.

Given the Governor's implementation of [Stay Safe MN](#), SHPO staff will continue to work remotely and be available via [phone and email](#), and the SHPO office will be closed to visitors and unable to accommodate in-person research and deliveries. Mail is being delivered to the office via USPS, FedEx and UPS, however, staff have limited weekly access to sort and process mail. Our office will continue to take file search requests via DataRequestSHPO@state.mn.us. Check [SHPO's webpage](#) for the latest updates and we thank you for your continued patience.



From: Sejkora, Erin <Erin.Sejkora@stantec.com>
Sent: Tuesday, March 15, 2022 3:38 PM
To: MN_MNIT_Data Request SHPO <DataRequestSHPO@state.mn.us>
Subject: Pine Bend Landfill - Request for State Inventory Database Query

This message may be from an external email source.

Do not select links or open attachments unless verified. Report all suspicious emails to Minnesota IT Services Security Operations Center.

Good afternoon,

Stantec, on behalf of BFI Waste Systems of North America, LLC (BFI), is assisting with preparing an Environmental Assessment Worksheet (EAW) for the proposed Pine Bend Landfill Airspace Expansion Project in the City of Inver Grove Heights, Dakota County, Minnesota. The MPCA is the assigned Responsible Governmental Unit (RGU) for the EAW.

Attached, please find a request for a query of the state database of cultural resources and history properties. The information received will be used in preparation of the EAW.

The Project Area is located in Township 27 North, Range 22 West, Section 33. Project location figures are included in the attached request.

Please do not hesitate to contact me if you have any questions or require additional information to complete this database review request.

Thank you!

Erin Sejkora, AICP
Project Manager,
Senior Environmental Planner
She/Her

Direct: 763.252.6802
Mobile: 612.258.6937
Erin.Sejkora@stantec.com

Stantec
7500 Olson Memorial Highway Suite 300
Golden Valley MN 55427-4886



Appendix G

Phase 7 Air Emissions Evaluation Memorandum

To: Aaron Janusz

From: Ray Ramos
Tom Shustarich

File: 227705420

Date: July 31, 2023

Reference: Air Emissions Evaluation for the Pine Bend Landfill Phase 7 Expansion

Stantec has evaluated whether potential emission increases are expected as a result of the Phase 7 expansion for the Pine Bend Landfill to support the Environmental Assessment Worksheet (EAW). This memo updates the April 14, 2023 memo, summarizing air permitting and air dispersion modeling requirements for the expansion. The revised memo evaluates potential to emit (PTE) before and after the Phase 7 expansion based on maximum combustion capacity for the landfill gas combustion sources and an estimate of landfill gas generation for fugitive emissions.

Landfill Gas Combustion Sources

Pine Bend Landfill operates a Renewable Natural Gas (RNG) Plant (capacity of 3,200 standard cubic feet per minute (scfm) landfill gas), thermal oxidizer (capacity of 2,235 scfm), and open flare (capacity of 4,000 scfm). PTE calculations assume that each combustion source operates at capacity for 8,760 hours per year. There are no changes in annual flare use or Renewable Natural Gas Plant waste gas emissions expected as a result of the project.

Fugitive Emissions

Fugitive emissions from the landfill were presented in the renewed and amended Air Emissions Permit applications for Pine Bend Landfill. Those calculations assume that 85 percent of the landfill gas generated is collected by the landfill gas collection and control system (GCCS) and 15 percent is available for fugitive emissions.

EPA's LandGEM landfill gas model was used to identify landfill gas generation rates for the landfill before and after the expansion. Based on facility projections, no change in maximum annual landfill gas generation rates is expected. The expansion would maintain current landfill gas generation rates for an additional twenty five years compared to existing waste capacity, as described below.

For both scenarios (with and without the expansion), actual waste acceptance rates through calendar year 2022 were entered into LandGEM. EPA's emission inventory assumptions for decay rate and methane generation potential for Municipal Solid Waste were selected. For the expansion, a projected waste acceptance rate of 310,000 ton/yr of degradable solid waste for calendar year 2023 through Phase 7 closure (anticipated in calendar year 2048) was entered into LandGEM. The baseline (without expansion) scenario also assumes a 310,000 ton/yr projected waste acceptance for 2023 through 2027, with no additional waste accepted beyond 2027.

The maximum landfill gas generation rate without the expansion is 3799 standard cubic feet per minute (scfm), expected to occur in 2023. With the expansion, the maximum landfill gas generation is also 3799 scfm, expected in calendar year 2023, with landfill gas remaining relatively constant through closure in 2048. Please see Attachment A for LandGEM inputs and results.

Since waste acceptance is not expected to increase, no change if fugitive dust emissions is expected. Therefore, emission estimates submitted for the facility's recent minor air permit amendment application for RNG plant and Title V air permit renewal application for fugitive dust are accurate.

Reference: Air Emission Increases for the Pine Bend Landfill Phase 7 Expansion

The MPCA's "Environmental Review Unit Environmental Assessment Worksheet Air Assessment Practices," guidance, EAW air assessment guidance dated May 2022 ([Environmental Review Unit EAW air assessment practices \(state.mn.us\)](https://www.mn.gov/Portals/0/Environmental%20Review%20Unit%20EAW%20air%20assessment%20practices%20state.mn.us)) indicates that if no increase in air emissions is expected that the air assessment results should be submitted to MPCA, and that no further assessment is required. Therefore, no additional criteria pollutant air dispersion modeling or Air Emissions Risk Analysis is proposed for the project.

Pine Bend RNG, LLC will evaluate air permit application requirements and obtain any required permits for the Phase 7 expansion before beginning construction.



Raymond Ramos

Senior Air Quality Professional
920-918-1755
ray.ramos@stantec.com

Attachment A

LandGEM Model Inputs and Results

USER INPUTS

Landfill Name or Identifier: Pine Bend Landfill - Phases 1 through 7

Clear ALL Non-Parameter
Inputs/Selections

1: PROVIDE LANDFILL CHARACTERISTICS

Landfill Open Year	1971	Waste Design Capacity entered is not used by the model unless 'Have Model Calculate Closure Year?' option is Yes.
Landfill Closure Year	2048	
Have Model Calculate Closure Year?	☐ Yes ☒ No	
Waste Design Capacity	20,590,386	short tons ▼

Restore Default Model
Parameters

2: DETERMINE MODEL PARAMETERS

Methane Generation Rate, k (year^{-1})	
Inventory Conventional - 0.04 ▼	
Potential Methane Generation Capacity, L_0 (m^3/Mg)	
Inventory Conventional - 100 ▼	
NMOC Concentration (ppmv as hexane)	
User-specified ▼	User-specified value: 595
Methane Content (% by volume)	
CAA - 50% by volume ▼	

3: SELECT GASES/POLLUTANTS

Gas / Pollutant #1	User-specified pollutant parameters are currently being used by model.
Total landfill gas ▼	Edit Existing or Add New Pollutant Parameters
Gas / Pollutant #2	
Methane ▼	Restore Default Pollutant Parameters
Gas / Pollutant #3	
Carbon dioxide ▼	
Gas / Pollutant #4	
NMOC ▼	

Description/Comments:

--

4: ENTER WASTE ACCEPTANCE RATES

Input Units:

Year	Input Units (short tons/year)	Calculated Units (Mg/year)
1971	171,270	155,700
1972	171,270	155,700
1973	219,450	199,500
1974	351,340	319,400
1975	405,570	368,700
1976	108,900	99,000
1977	104,500	95,000
1978	482,900	439,000
1979	533,500	485,000
1980	586,300	533,000
1981	492,800	448,000
1982	466,400	424,000
1983	481,800	438,000
1984	554,400	504,000
1985	596,200	542,000
1986	716,100	651,000
1987	894,300	813,000
1988	735,900	669,000
1989	782,100	711,000
1990	431,200	392,000
1991	315,700	287,000
1992	177,100	161,000
1993	181,500	165,000
1994	201,300	183,000
1995	173,800	158,000
1996	214,500	195,000
1997	250,800	228,000
1998	287,100	261,000
1999	231,000	210,000
2000	286,000	260,000
2001	434,242	394,765
2002	495,805	450,732
2003	293,192	266,538
2004	222,914	202,649
2005	236,771	215,246
2006	259,458	235,871
2007	306,390	278,536
2008	215,599	195,999
2009	246,503	224,094
2010	323,940	294,491

4: ENTER WASTE ACCEPTANCE RATES

Input Units: *short tons/year* ▼

Year	Input Units (short tons/year)	Calculated Units (Mg/year)
2011	430,928	391,753
2012	322,540	293,218
2013	355,571	323,246
2014	470,438	427,671
2015	283,774	257,976
2016	294,134	267,395
2017	311,262	282,965
2018	310,042	281,856
2019	357,340	324,855
2020	369,593	335,994
2021	493,036	448,215
2022	401,914	365,376
2023	310,000	281,818
2024	310,000	281,818
2025	310,000	281,818
2026	310,000	281,818
2027	310,000	281,818
2028	310,000	281,818
2029	310,000	281,818
2030	310,000	281,818
2031	310,000	281,818
2032	310,000	281,818
2033	310,000	281,818
2034	310,000	281,818
2035	310,000	281,818
2036	310,000	281,818
2037	310,000	281,818
2038	310,000	281,818
2039	310,000	281,818
2040	310,000	281,818
2041	310,000	281,818
2042	310,000	281,818
2043	310,000	281,818
2044	310,000	281,818
2045	310,000	281,818
2046	310,000	281,818
2047	310,000	281,818
2048	70,000	63,636
2049		
2050		

RESULTS

Landfill Name or Identifier: Pine Bend Landfill - Phases 1 through 7

Please choose a third unit of measure to represent all of the emission rates below.

Closure Year (with 80-year limit) = 2048

Methane = 50 % by volume

User-specified Unit: av ft³/3/min

Year	Waste Accepted		Waste-In-Place		Total landfill gas			Methane			Carbon dioxide			NMOC		
	(Mg/year)	(short tons/year)	(Mg)	(short tons)	(Mg/year)	(m³ /year)	(av ft³/3/min)	(Mg/year)	(m³ /year)	(av ft³/3/min)	(Mg/year)	(m³ /year)	(av ft³/3/min)	(Mg/year)	(m³ /year)	(av ft³/3/min)
1971	155,700	171,270	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1972	155,700	171,270	155,700	171,270	1,528E+03	1.223E+06	8.220E+01	4.081E+02	6.117E+05	4.110E+01	1.120E+03	6.117E+05	4.110E+01	2.609E+00	7.280E+02	4.891E-02
1973	199,500	219,450	311,400	342,540	2.996E+03	2.399E+06	1.612E+02	8.002E+02	1.199E+06	8.059E+01	2.196E+03	1.199E+06	8.059E+01	5.116E+00	1.427E+03	9.591E-02
1974	319,400	351,340	510,900	561,990	4.836E+03	3.873E+06	2.602E+02	1.292E+03	1.936E+06	1.301E+02	3.544E+03	1.936E+06	1.301E+02	8.259E+00	2.304E+03	1.548E-01
1975	368,700	405,570	830,300	913,330	7.781E+03	6.230E+06	4.186E+02	2.078E+03	3.115E+06	2.093E+02	5.702E+03	3.115E+06	2.093E+02	1.329E+01	3.707E+03	2.491E-01
1976	99,000	108,900	1,199,000	1,318,900	1.109E+04	8.883E+06	5.969E+02	2.963E+03	4.442E+06	2.984E+02	8.130E+03	4.442E+06	2.984E+02	1.895E+01	5.286E+03	3.551E-01
1977	95,000	104,500	1,298,000	1,427,800	1.163E+04	9.313E+06	6.257E+02	3.107E+03	4.656E+06	3.129E+02	8.524E+03	4.656E+06	3.129E+02	1.986E+01	5.541E+03	3.723E-01
1978	439,000	482,900	1,393,000	1,532,300	1.211E+04	9.694E+06	6.514E+02	3.234E+03	4.847E+06	3.257E+02	8.873E+03	4.847E+06	3.257E+02	2.068E+01	5.768E+03	3.876E-01
1979	485,000	533,500	1,832,000	2,015,200	1.594E+04	1.276E+07	8.576E+02	4.258E+03	6.382E+06	4.288E+02	1.168E+04	6.382E+06	4.288E+02	2.722E+01	7.594E+03	5.103E-01
1980	533,000	586,300	2,317,000	2,548,700	2.007E+04	1.607E+07	1.080E+03	5.362E+03	8.037E+06	5.400E+02	1.471E+04	8.037E+06	5.400E+02	3.428E+01	9.564E+03	6.426E-01
1981	448,000	492,800	2,850,000	3,135,000	2.452E+04	1.963E+07	1.319E+03	6.549E+03	9.816E+06	6.595E+02	1.797E+04	9.816E+06	6.595E+02	4.187E+01	1.168E+04	7.849E-01
1982	424,000	466,400	3,298,000	3,627,800	2.795E+04	2.238E+07	1.504E+03	7.466E+03	1.119E+07	7.519E+02	2.049E+04	1.119E+07	7.519E+02	4.774E+01	1.332E+04	8.948E-01
1983	438,000	481,800	3,722,000	4,094,200	3.102E+04	2.484E+07	1.669E+03	8.285E+03	1.242E+07	8.344E+02	2.273E+04	1.242E+07	8.344E+02	5.297E+01	1.478E+04	9.929E-01
1984	504,000	554,400	4,160,000	4,576,000	3.410E+04	2.730E+07	1.835E+03	9.108E+03	1.365E+07	9.173E+02	2.499E+04	1.365E+07	9.173E+02	5.823E+01	1.625E+04	1.092E+00
1985	542,000	596,200	4,664,000	5,130,400	3.771E+04	3.019E+07	2.029E+03	1.007E+04	1.510E+07	1.014E+03	2.764E+04	1.510E+07	1.014E+03	6.440E+01	1.797E+04	1.207E+00
1986	651,000	716,100	5,206,000	5,726,600	4.155E+04	3.327E+07	2.235E+03	1.110E+04	1.663E+07	1.118E+03	3.045E+04	1.663E+07	1.118E+03	7.096E+01	1.980E+04	1.330E+00
1987	813,000	894,300	5,857,000	6,442,700	4.631E+04	3.708E+07	2.491E+03	1.237E+04	1.854E+07	1.246E+03	3.394E+04	1.854E+07	1.246E+03	7.908E+01	2.206E+04	1.482E+00
1988	669,000	735,900	6,670,000	7,337,000	5.247E+04	4.201E+07	2.823E+03	1.402E+04	2.101E+07	1.411E+03	3.845E+04	2.101E+07	1.411E+03	8.961E+01	2.500E+04	1.680E+00
1989	711,000	782,100	7,339,000	8,072,900	5.698E+04	4.562E+07	3.065E+03	1.522E+04	2.281E+07	1.533E+03	4.176E+04	2.281E+07	1.533E+03	9.731E+01	2.715E+04	1.824E+00
1990	392,000	431,200	8,050,000	8,855,000	6.172E+04	4.942E+07	3.321E+03	1.649E+04	2.471E+07	1.660E+03	4.523E+04	2.471E+07	1.660E+03	1.054E+02	2.941E+04	1.976E+00
1991	287,000	315,700	8,442,000	9,286,200	6.315E+04	5.056E+07	3.397E+03	1.687E+04	2.528E+07	1.699E+03	4.628E+04	2.528E+07	1.699E+03	1.078E+02	3.009E+04	2.021E+00
1992	161,000	177,100	8,729,000	9,601,900	6.349E+04	5.084E+07	3.416E+03	1.696E+04	2.542E+07	1.708E+03	4.653E+04	2.542E+07	1.708E+03	1.084E+02	3.025E+04	2.032E+00
1993	165,000	181,500	8,890,000	9,779,000	6.258E+04	5.011E+07	3.367E+03	1.672E+04	2.505E+07	1.683E+03	4.586E+04	2.505E+07	1.683E+03	1.069E+02	2.981E+04	2.003E+00
1994	183,000	201,300	9,055,000	9,960,500	6.174E+04	4.944E+07	3.322E+03	1.649E+04	2.472E+07	1.661E+03	4.525E+04	2.472E+07	1.661E+03	1.054E+02	2.942E+04	1.977E+00
1995	158,000	173,800	9,238,000	10,161,800	6.112E+04	4.894E+07	3.288E+03	1.633E+04	2.447E+07	1.644E+03	4.479E+04	2.447E+07	1.644E+03	1.044E+02	2.912E+04	1.957E+00
1996	195,000	214,500	9,396,000	10,335,600	6.027E+04	4.826E+07	3.243E+03	1.610E+04	2.413E+07	1.621E+03	4.417E+04	2.413E+07	1.621E+03	1.029E+02	2.872E+04	1.929E+00
1997	228,000	250,800	9,591,000	10,550,100	5.982E+04	4.790E+07	3.219E+03	1.598E+04	2.395E+07	1.609E+03	4.384E+04	2.395E+07	1.609E+03	1.022E+02	2.850E+04	1.915E+00
1998	261,000	287,100	9,819,000	10,800,900	5.971E+04	4.782E+07	3.213E+03	1.595E+04	2.391E+07	1.606E+03	4.376E+04	2.391E+07	1.606E+03	1.020E+02	2.845E+04	1.912E+00
1999	210,000	231,000	10,080,000	11,088,000	5.993E+04	4.799E+07	3.225E+03	1.601E+04	2.400E+07	1.612E+03	4.392E+04	2.400E+07	1.612E+03	1.024E+02	2.856E+04	1.919E+00
2000	260,000	286,000	10,290,000	11,319,000	5.964E+04	4.776E+07	3.209E+03	1.593E+04	2.388E+07	1.604E+03	4.371E+04	2.388E+07	1.604E+03	1.019E+02	2.842E+04	1.909E+00
2001	394,765	434,242	10,550,000	11,605,000	5.986E+04	4.793E+07	3.220E+03	1.599E+04	2.397E+07	1.610E+03	4.387E+04	2.397E+07	1.610E+03	1.022E+02	2.852E+04	1.916E+00
2002	450,732	495,805	10,944,765	12,039,242	6.138E+04	4.915E+07	3.303E+03	1.640E+04	2.458E+07	1.651E+03	4.499E+04	2.458E+07	1.651E+03	1.048E+02	2.925E+04	1.965E+00
2003	266,538	293,192	11,395,497	12,535,047	6.340E+04	5.077E+07	3.411E+03	1.693E+04	2.538E+07	1.706E+03	4.646E+04	2.538E+07	1.706E+03	1.083E+02	3.021E+04	2.030E+00
2004	202,649	222,914	11,662,035	12,828,239	6.353E+04	5.087E+07	3.418E+03	1.697E+04	2.544E+07	1.709E+03	4.656E+04	2.544E+07	1.709E+03	1.085E+02	3.027E+04	2.034E+00
2005	215,246	236,771	11,864,685	13,051,153	6.303E+04	5.047E+07	3.391E+03	1.684E+04	2.523E+07	1.696E+03	4.619E+04	2.523E+07	1.696E+03	1.076E+02	3.003E+04	2.018E+00
2006	235,871	259,458	12,079,931	13,287,924	6.267E+04	5.018E+07	3.372E+03	1.674E+04	2.509E+07	1.686E+03	4.593E+04	2.509E+07	1.686E+03	1.070E+02	2.986E+04	2.006E+00
2007	278,536	306,390	12,315,802	13,547,382	6.253E+04	5.007E+07	3.364E+03	1.670E+04	2.503E+07	1.682E+03	4.582E+04	2.503E+07	1.682E+03	1.068E+02	2.979E+04	2.002E+00
2008	195,999	215,599	12,594,338	13,853,772	6.281E+04	5.029E+07	3.379E+03	1.678E+04	2.515E+07	1.690E+03	4.603E+04	2.515E+07	1.690E+03	1.073E+02	2.992E+04	2.011E+00
2009	224,094	246,503	12,790,337	14,069,371	6.227E+04	4.986E+07	3.350E+03	1.663E+04	2.493E+07	1.675E+03	4.564E+04	2.493E+07	1.675E+03	1.063E+02	2.967E+04	1.993E+00
2010	294,491	323,940	13,014,431	14,315,874	6.202E+04	4.967E+07	3.337E+03	1.657E+04	2.483E+07	1.669E+03	4.546E+04	2.483E+07	1.669E+03	1.059E+02	2.955E+04	1.986E+00
2011	391,753	430,928	13,308,922	14,639,814	6.248E+04	5.003E+07	3.362E+03	1.669E+04	2.502E+07	1.681E+03	4.579E+04	2.502E+07	1.681E+03	1.067E+02	2.977E+04	2.000E+00
2012	293,218	322,540	13,700,675	15,070,742	6.388E+04	5.115E+07	3.437E+03	1.706E+04	2.557E+07	1.718E+03	4.681E+04	2.557E+07	1.718E+03	1.091E+02	3.043E+04	2.045E+00
2013	323,246	355,571	13,993,893	15,393,282	6.425E+04	5.145E+07	3.457E+03	1.716E+04	2.572E+07	1.728E+03	4.709E+04	2.572E+07	1.728E+03	1.097E+02	3.061E0	

USER INPUTS

Landfill Name or Identifier: Pine Bend Landfill - Phases 1 through 6

**Clear ALL Non-Parameter
Inputs/Selections**

1: PROVIDE LANDFILL CHARACTERISTICS

Landfill Open Year	1971	
Landfill Closure Year	2027	
Have Model Calculate Closure Year?	☐ Yes ☐ No	
Waste Design Capacity		short tons ▼

**Restore Default Model
Parameters**

2: DETERMINE MODEL PARAMETERS

Methane Generation Rate, k (year⁻¹)	
Inventory Conventional - 0.04 ▼	
Potential Methane Generation Capacity, L₀ (m³/Mg)	
Inventory Conventional - 100 ▼	
NMOC Concentration (ppmv as hexane)	
User-specified ▼	User-specified value: 595
Methane Content (% by volume)	
CAA - 50% by volume ▼	

3: SELECT GASES/POLLUTANTS

Gas / Pollutant #1	Default pollutant parameters are currently being used by model.
Total landfill gas ▼	
Gas / Pollutant #2	
Methane ▼	
Gas / Pollutant #3	
Carbon dioxide ▼	
Gas / Pollutant #4	
NMOC ▼	

**Edit Existing or
Add New Pollutant
Parameters****Restore Default
Pollutant
Parameters****Description/Comments:**

4: ENTER WASTE ACCEPTANCE RATES

Input Units:

Year	Input Units (short tons/year)	Calculated Units (Mg/year)
1971	171,270	155,700
1972	171,270	155,700
1973	219,450	199,500
1974	351,340	319,400
1975	405,570	368,700
1976	108,900	99,000
1977	104,500	95,000
1978	482,900	439,000
1979	533,500	485,000
1980	586,300	533,000
1981	492,800	448,000
1982	466,400	424,000
1983	481,800	438,000
1984	554,400	504,000
1985	596,200	542,000
1986	716,100	651,000
1987	894,300	813,000
1988	735,900	669,000
1989	782,100	711,000
1990	431,200	392,000
1991	315,700	287,000
1992	177,100	161,000
1993	181,500	165,000
1994	201,300	183,000
1995	173,800	158,000
1996	214,500	195,000
1997	250,800	228,000
1998	287,100	261,000
1999	231,000	210,000
2000	286,000	260,000
2001	434,242	394,765
2002	495,805	450,732
2003	293,192	266,538
2004	222,914	202,649
2005	236,771	215,246
2006	259,458	235,871
2007	306,390	278,536
2008	215,599	195,999
2009	246,503	224,094
2010	323,940	294,491

4: ENTER WASTE ACCEPTANCE RATES

Input Units:

Year	Input Units (short tons/year)	Calculated Units (Mg/year)
2011	430,928	391,753
2012	322,540	293,218
2013	355,571	323,246
2014	470,438	427,671
2015	283,774	257,976
2016	294,134	267,395
2017	311,262	282,965
2018	310,042	281,856
2019	357,340	324,855
2020	369,593	335,994
2021	493,036	448,215
2022	401,914	365,376
2023	310,000	281,818
2024	310,000	281,818
2025	310,000	281,818
2026	310,000	281,818
2027	310,000	281,818
2028		
2029		
2030		
2031		
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2049		
2050		

RESULTS

Landfill Name or Identifier: Pine Bend Landfill - Phases 1 through 6

Closure Year (with 80-year limit) = 2027
 Methane = 50 % by volume
 Please choose a third unit of measure to represent all of the emission rates below.
 User-specified Unit:

Year	Waste Accepted		Waste-In-Place		Total landfill gas			Methane			Carbon dioxide			NMOC		
	(Mg/year)	(short tons/year)	(Mg)	(short tons)	(Mg/year)	(m ³ /year)	(av ft ³ /min)	(Mg/year)	(m ³ /year)	(av ft ³ /min)	(Mg/year)	(m ³ /year)	(av ft ³ /min)	(Mg/year)	(m ³ /year)	(av ft ³ /min)
1971	155,700	171,270	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1972	155,700	171,270	155,700	171,270	1.528E+03	1.223E+06	8.220E+01	4.081E+02	6.117E+05	4.110E+01	1.120E+03	6.117E+05	4.110E+01	2.609E+00	7.280E+02	4.891E-02
1973	199,500	219,450	311,400	342,540	2.996E+03	2.399E+06	1.612E+02	8.002E+02	1.199E+06	8.059E+01	2.196E+03	1.199E+06	8.059E+01	5.116E+00	1.427E+03	9.591E-02
1974	319,400	351,340	510,900	561,990	4.836E+03	3.873E+06	2.602E+02	1.292E+03	1.936E+06	1.301E+02	3.544E+03	1.936E+06	1.301E+02	8.259E+00	2.304E+03	1.548E-01
1975	368,700	405,570	830,300	913,330	7.781E+03	6.230E+06	4.186E+02	2.078E+03	3.115E+06	2.093E+02	5.702E+03	3.115E+06	2.093E+02	1.329E+01	3.707E+03	2.491E-01
1976	99,000	108,900	1,199,000	1,318,900	1.109E+04	8.883E+06	5.969E+02	2.963E+03	4.442E+06	2.984E+02	8.130E+03	4.442E+06	2.984E+02	1.895E+01	5.286E+03	3.551E-01
1977	95,000	104,500	1,298,000	1,427,800	1.163E+04	9.313E+06	6.257E+02	3.107E+03	4.656E+06	3.129E+02	8.524E+03	4.656E+06	3.129E+02	1.986E+01	5.541E+03	3.723E-01
1978	439,000	482,900	1,393,000	1,532,300	1.211E+04	9.694E+06	6.514E+02	3.234E+03	4.847E+06	3.257E+02	8.873E+03	4.847E+06	3.257E+02	2.068E+01	5.768E+03	3.876E-01
1979	485,000	533,500	1,832,000	2,015,200	1.594E+04	1.276E+07	8.576E+02	4.258E+03	6.382E+06	4.288E+02	1.168E+04	6.382E+06	4.288E+02	2.722E+01	7.594E+03	5.103E-01
1980	533,000	586,300	2,317,000	2,548,700	2.007E+04	1.607E+07	1.080E+03	5.362E+03	8.037E+06	5.400E+02	1.471E+04	8.037E+06	5.400E+02	3.428E+01	9.564E+03	6.426E-01
1981	448,000	492,800	2,850,000	3,135,000	2.452E+04	1.963E+07	1.319E+03	6.549E+03	9.816E+06	6.595E+02	1.797E+04	9.816E+06	6.595E+02	4.187E+01	1.168E+04	7.849E-01
1982	424,000	466,400	3,298,000	3,627,800	2.795E+04	2.238E+07	1.504E+03	7.466E+03	1.119E+07	7.519E+02	2.049E+04	1.119E+07	7.519E+02	4.774E+01	1.332E+04	8.948E-01
1983	438,000	481,800	3,722,000	4,094,200	3.102E+04	2.484E+07	1.669E+03	8.285E+03	1.242E+07	8.344E+02	2.273E+04	1.242E+07	8.344E+02	5.297E+01	1.478E+04	9.929E-01
1984	504,000	554,400	4,160,000	4,576,000	3.410E+04	2.730E+07	1.835E+03	9.108E+03	1.365E+07	9.173E+02	2.499E+04	1.365E+07	9.173E+02	5.823E+01	1.625E+04	1.092E+00
1985	542,000	596,200	4,664,000	5,130,400	3.771E+04	3.019E+07	2.029E+03	1.007E+04	1.510E+07	1.014E+03	2.764E+04	1.510E+07	1.014E+03	6.440E+01	1.797E+04	1.207E+00
1986	651,000	716,100	5,206,000	5,726,600	4.155E+04	3.327E+07	2.235E+03	1.110E+04	1.663E+07	1.118E+03	3.045E+04	1.663E+07	1.118E+03	7.096E+01	1.980E+04	1.330E+00
1987	813,000	894,300	5,857,000	6,442,700	4.631E+04	3.708E+07	2.491E+03	1.237E+04	1.854E+07	1.246E+03	3.394E+04	1.854E+07	1.246E+03	7.908E+01	2.206E+04	1.482E+00
1988	669,000	735,900	6,670,000	7,337,000	5.247E+04	4.201E+07	2.823E+03	1.402E+04	2.101E+07	1.411E+03	3.845E+04	2.101E+07	1.411E+03	8.961E+01	2.500E+04	1.680E+00
1989	711,000	782,100	7,339,000	8,072,900	5.698E+04	4.562E+07	3.065E+03	1.522E+04	2.281E+07	1.533E+03	4.176E+04	2.281E+07	1.533E+03	9.731E+01	2.715E+04	1.824E+00
1990	392,000	431,200	8,050,000	8,855,000	6.172E+04	4.942E+07	3.321E+03	1.649E+04	2.471E+07	1.660E+03	4.523E+04	2.471E+07	1.660E+03	1.054E+02	2.941E+04	1.976E+00
1991	287,000	315,700	8,442,000	9,286,200	6.315E+04	5.056E+07	3.397E+03	1.687E+04	2.528E+07	1.699E+03	4.628E+04	2.528E+07	1.699E+03	1.078E+02	3.009E+04	2.021E+00
1992	161,000	177,100	8,729,000	9,601,900	6.349E+04	5.084E+07	3.416E+03	1.696E+04	2.542E+07	1.708E+03	4.653E+04	2.542E+07	1.708E+03	1.084E+02	3.025E+04	2.032E+00
1993	165,000	181,500	8,890,000	9,779,000	6.258E+04	5.011E+07	3.367E+03	1.672E+04	2.505E+07	1.683E+03	4.586E+04	2.505E+07	1.683E+03	1.069E+02	2.981E+04	2.003E+00
1994	183,000	201,300	9,055,000	9,960,500	6.174E+04	4.944E+07	3.322E+03	1.649E+04	2.472E+07	1.661E+03	4.525E+04	2.472E+07	1.661E+03	1.054E+02	2.942E+04	1.977E+00
1995	158,000	173,800	9,238,000	10,161,800	6.112E+04	4.894E+07	3.288E+03	1.633E+04	2.447E+07	1.644E+03	4.479E+04	2.447E+07	1.644E+03	1.044E+02	2.912E+04	1.957E+00
1996	195,000	214,500	9,396,000	10,335,600	6.027E+04	4.826E+07	3.243E+03	1.610E+04	2.413E+07	1.621E+03	4.417E+04	2.413E+07	1.621E+03	1.029E+02	2.872E+04	1.929E+00
1997	228,000	250,800	9,591,000	10,550,100	5.982E+04	4.790E+07	3.219E+03	1.598E+04	2.395E+07	1.609E+03	4.384E+04	2.395E+07	1.609E+03	1.022E+02	2.850E+04	1.915E+00
1998	261,000	287,100	9,819,000	10,800,900	5.971E+04	4.782E+07	3.213E+03	1.595E+04	2.391E+07	1.606E+03	4.376E+04	2.391E+07	1.606E+03	1.020E+02	2.845E+04	1.912E+00
1999	210,000	231,000	10,080,000	11,088,000	5.993E+04	4.799E+07	3.225E+03	1.601E+04	2.400E+07	1.612E+03	4.392E+04	2.400E+07	1.612E+03	1.024E+02	2.856E+04	1.919E+00
2000	260,000	286,000	10,290,000	11,319,000	5.964E+04	4.776E+07	3.209E+03	1.593E+04	2.388E+07	1.604E+03	4.371E+04	2.388E+07	1.604E+03	1.019E+02	2.842E+04	1.909E+00
2001	394,765	434,242	10,550,000	11,605,000	5.986E+04	4.793E+07	3.220E+03	1.599E+04	2.397E+07	1.610E+03	4.387E+04	2.397E+07	1.610E+03	1.022E+02	2.852E+04	1.916E+00
2002	450,732	495,805	10,944,765	12,039,242	6.138E+04	4.915E+07	3.303E+03	1.640E+04	2.458E+07	1.651E+03	4.499E+04	2.458E+07	1.651E+03	1.048E+02	2.925E+04	1.965E+00
2003	266,538	293,192	11,395,497	12,535,047	6.340E+04	5.077E+07	3.411E+03	1.693E+04	2.538E+07	1.706E+03	4.646E+04	2.538E+07	1.706E+03	1.083E+02	3.021E+04	2.030E+00
2004	202,649	222,914	11,662,035	12,828,239	6.353E+04	5.087E+07	3.418E+03	1.697E+04	2.544E+07	1.709E+03	4.656E+04	2.544E+07	1.709E+03	1.085E+02	3.027E+04	2.034E+00
2005	215,246	236,771	11,864,685	13,051,153	6.303E+04	5.047E+07	3.391E+03	1.684E+04	2.523E+07	1.696E+03	4.619E+04	2.523E+07	1.696E+03	1.076E+02	3.003E+04	2.018E+00
2006	235,871	259,458	12,079,931	13,287,924	6.267E+04	5.018E+07	3.372E+03	1.674E+04	2.509E+07	1.686E+03	4.593E+04	2.509E+07	1.686E+03	1.070E+02	2.986E+04	2.006E+00
2007	278,536	306,390	12,315,802	13,547,382	6.253E+04	5.007E+07	3.364E+03	1.670E+04	2.503E+07	1.682E+03	4.582E+04	2.503E+07	1.682E+03	1.068E+02	2.979E+04	2.002E+00
2008	195,999	215,599	12,594,338	13,853,772	6.281E+04	5.029E+07	3.379E+03	1.678E+04	2.515E+07	1.690E+03	4.603E+04	2.515E+07	1.690E+03	1.073E+02	2.992E+04	2.011E+00
2009	224,094	246,503	12,790,337	14,069,371	6.227E+04	4.986E+07	3.350E+03	1.663E+04	2.493E+07	1.675E+03	4.564E+04	2.493E+07	1.675E+03	1.063E+02	2.967E+04	1.993E+00
2010	294,491	323,940	13,014,431	14,315,874	6.202E+04	4.967E+07	3.337E+03	1.657E+04	2.483E+07	1.669E+03	4.546E+04	2.483E+07	1.669E+03	1.059E+02	2.955E+04	1.986E+00
2011	391,753	430,928	13,308,922	14,639,814	6.248E+04	5.003E+07	3.362E+03	1.669E+04	2.502E+07	1.681E+03	4.579E+04	2.502E+07	1.681E+03	1.067E+02	2.977E+04	2.000E+00
2012	293,218	322,540	13,700,675	15,070,742	6.388E+04	5.115E+07	3.437E+03	1.706E+04	2.557E+07	1.718E+03	4.681E+04	2.557E+07	1.718E+03	1.091E+02	3.043E+04	2.045E+00
2013	323,246	355,571	13,993,893	15,393,282	6.425E+04	5.145E+07	3.457E+03	1.716E+04	2.572E+07	1.728E+03	4.709E+04	2				

Appendix H

Greenhouse Gas Assessment Report

Pine Bend Landfill – Expansion Greenhouse Gas Emission Environmental Assessment

Pine Bend Landfill
2495 E 117th St
Inver Grove Heights, MN 55077
651-450-2153

SCS ENGINEERS

01221296.05 | July 18, 2023

6100 S Maple Ave. Ste 118
Tempe, AZ 85283
602-840-2596

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Appendices

Appendix A	GHG Emission Summary
Appendix B	GHG Emission Calculations

1.0 INTRODUCTION AND PURPOSE

Pine Bend Landfill (PBL) is planning to expand their current 33,937,400 cubic yard waste disposal facility by 8.1 million cubic yards. The Minnesota Pollution Control Agency (MPCA) requires certain projects to prepare and submit an environmental assessment (EA); this expansion triggers these EA requirements. The MPCA requires the amount of greenhouse gas (GHG) emissions from the proposed project be determined as well as an assessment on how future GHG emissions will affect the future goal of reducing GHG emissions in Minnesota. PBL submitted an assessment of GHG emissions in March 2022, and the MPCA has provided questions and comments on the assessment. Additionally, PBL has changed operations at the landfill that process of the generated landfill gas (LFG) for beneficial reuse. This report provides the revised GHG calculations that reflect the new operations at the landfill, construction of the expansion, and future operations of PBL after the expansion. Additionally, the report addresses the MPCA's questions over the March 2022 GHG Assessment.

1.1 OPERATIONS BEFORE CONSTRUCTION

Appendix A summarizes the GHG emissions from the operations before expansion. Current sources that emit GHG emissions at PBL include primary stationary sources, waste disposal operations, insignificant operations, and indirect operations. Primary stationary sources that emit GHG include the thermal oxidizer of the Renewable Natural Gas (RNG) Plant, the open flare, and the landfill. As shown in the calculations, the operation of the thermal oxidizer and the open flare generate the majority of the GHG emissions prior to construction. Combined, the RNG plant and the open flare have a capacity of processing 7,200 standard cubic feet per minute (scfm) of fuel. The thermal oxidizer has a design capacity of 2,235 scfm and the open flare has a design capacity of 4,000 scfm. Maximum GHG emissions from operations occur when these units operate at maximum capacity and operated 24 hours per day, seven (7) days per week, and 365 days per year; thus, the calculations in Appendix A are based upon these values.

Fugitive LFG emissions reflect the emissions as included in the renewed and amended Air Emissions Permit for PBL that is expected to be issued in late 2023. The calculations assume an 85 percent (%) collection efficiency; thus, PBL estimates 15% of the generated LFG is fugitive. Fugitive LFG emissions occur 24 hours per day, seven (7) days per week, and 365 days per year. Maximum fugitive emissions occur during peak generation of LFG which is estimated to occur in 2023.

Waste disposal operations as well as insignificant operations only generate GHG emissions when operated. PBL typically is open for operation 260 days per year and opened for 10 hours per day. It is assumed the devices used for waste disposal operations will only operate for 2600 hours per year. Equipment associated with waste disposal operations include two (2) landfill compactors, 2 tippers, one (1) bull dozer, and 16,410 waste disposal trucks.

Insignificant sources are smaller sources that are periodically operated through the year. These sources include heaters, small mobile sources, light plants, power washer, air compressors, and a forklift. For the assessment, it is assumed these devices only operate 130 days a year and eight (8) hours per day.

Electrical usage is considered an indirect operation since the source of the electricity is offsite. The GHG emissions from electrical usage is based upon previous usage at the site.

Emissions were calculated using standard and accepted methods. GHG emissions from sources using LFG as fuel was taken from the United States Environmental Protection Agency (USEPA) AP 42 emission factors for municipal solid waste landfills and 40 code of federal regulations (CFR) 98 Mandatory Reporting Rule (MRR) for GHG emissions. Sources associated with waste disposal and insignificant operations were assumed to be fueled by diesel and gasoline engines, and emission factors from 40 CFR 98 subpart C were used. Emission factors from the USEPA “Emission Factors for Greenhouse Gas Inventories” was used to determine the emissions from electrical usage. See Appendix B for emission calculations.

1.2 CONSTRUCTION

Appendix A contains the emissions generated from construction. Activities that generate GHG emissions from construction of the expansion include emissions from diesel engines used in equipment to excavate soil, install two culverts, place soils and geosynthetic materials, haul materials, compact soils, and personal vehicles for transportation around construction site. Equipment include an excavator, 2 bulldozers, grader, 2 scrapers, a vibratory roller, a sheepsfoot compactor, front loader and backhoe, 2 off-road dump trucks, four (4) dump trucks, and passenger trucks. Emission factors from 40 CFR 98 Part C of the MRR for GHG were used, and it was assumed construction would last 130 days a year and 10 hours per day. See Appendix B for emission calculations.

1.3 OPERATIONS AFTER CONSTRUCTION

Appendix A summarizes the GHG emissions from the operations after construction. Since the purpose of the expansion is to extend the life of the landfill, waste disposal, and indirect and insignificant operations will remain the same as before construction. See Appendix B for further details and emission calculations.

1.4 GHG EMISSIONS ASSESSMENT

Municipal solid waste landfills are natural producers of methane and carbon dioxide. To manage GHG emissions from the new expansion, PBL will collect the generated LFG as required by federal and state air quality regulations for municipal solid waste landfills with a gas collection and control system. Additionally, PBL will maintain the gas collection and control system in good operating condition. Lastly, as discussed in Section 1.3, GHG emissions remain the same as those prior to expansion.

GHG emissions from construction are from diesel operated engines. PBL will make efforts to reduce emissions from these engines by only operating these engines as needed. If these engines are not used, the engines will not be started up to stand idol in the case they will be used. The engines will be started when they will be used.

Lifetime emissions are found in Appendix A. These emissions assumed the life of the project will be 24 years, the period between the estimated calendar year of initial operation, 2024, and closure year, 2048. Since emissions do not change, the operations of PBL helps to achieve goals of the Minnesota Next Generation Energy Act.

2.0 RESPONSE TO MPCA QUESTIONS

MPCA provided comments and questions on the previously submitted EA for the expansion. The following are the questions associated with the GHG emissions.

1. The March 2022 GHG assessment identifies a 10-year lifespan which is inconsistent with the April 14, 2023 memo provided by Stantec.
2. MPCA requests that emissions from the installation of the two culverts be included in the emission calculations.
3. Additional details of GHG emissions after closure.

2.1 RESPONSES TO COMMENTS 1 AND 2

The following provides responses to the first two responses.

1. The March 2022 GHG assessment identifies a 10-year lifespan which is inconsistent with the April 14, 2023 memo provided by Stantec.

PBL estimates operation of the expansion will occur in the 2024 calendar year. Closure year is estimated to occur in 2048. As a result, the lifespan is estimated to be 24 years.

2. MPCA requests that emissions from the installation of the two culverts be included in the emission calculations.

As noted the in Section 1.2, the two culverts are included in the calculations.

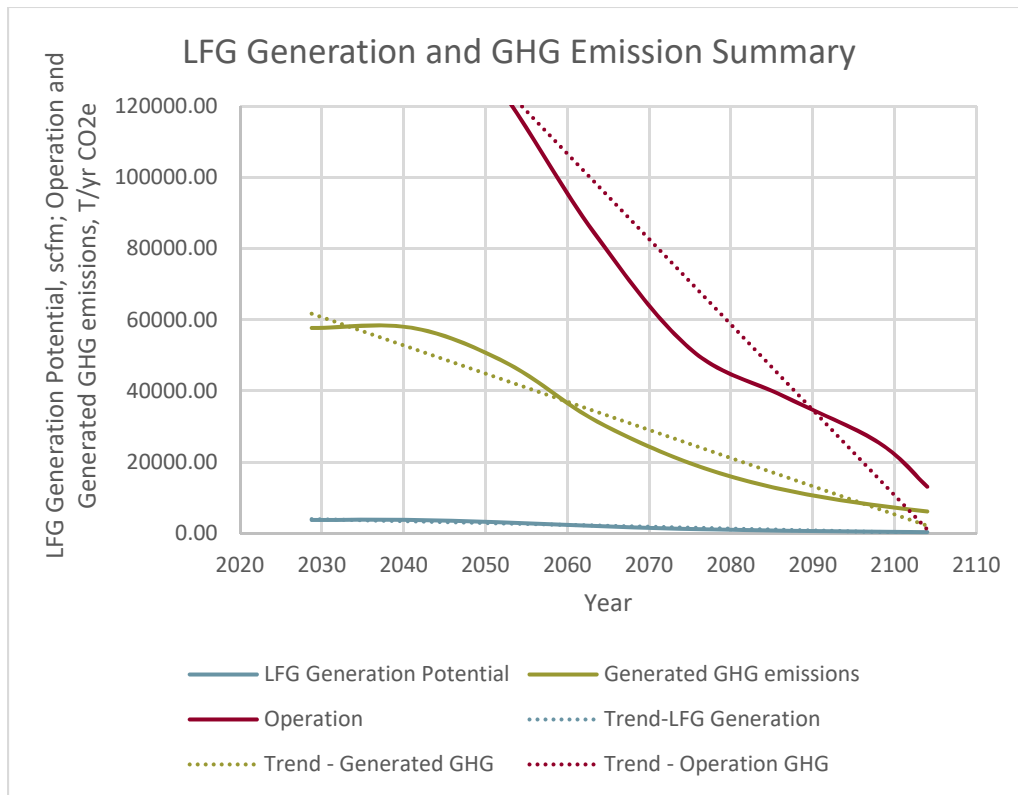
2.2 RESPONSE TO COMMENT 3

This section addresses the MPCA's request for details on GHG emissions after closure. Specifically, they inquired when the RNG plant is estimated to shutdown and how this affects the GHG emissions after shutdown.

Maximum generation of GHG emissions occur as shown in the calculations when the RNG Plant and open flare operate at capacity, which occurs when the peak amount of LFG is generated. The peak LFG generation occurs in 2023 as shown in the landfill gas generation emission (LandGEM) model. GHG emissions from landfill generation which during operation of the RNG Plant and open flare are fugitive and decline as generation of LFG declines.

Pine Bend RNG, LLC (PBR) estimates the RNG plant will shutdown when the landfill generates approximately 1600 scfm or less of LFG. To operate the equipment efficiently between peak operation and shutdown of the RNG Plant, the operation capacity of the RNG Plant as well as the open flare will decline until 2069 when the LFG generation is approximately 1600 scfm. After 2069, the open flare will be the only device combusting LFG. PBL estimates the open flare will be able to combust LFG and emit GHG until the calendar year of 2104 when the LandGEM curve estimates a flow of approximately 400 scfm. If PBL meets the requirements of control removal noted in the regulations in 2104, GHG will be emitted through fugitive emissions after 2104. Figure 2-1 demonstrates the decline of landfill gas flow and GHG emissions over time.

FIGURE 2-1 LFG GENERATION AND GHG EMISSION SUMMARY





Appendix A

GHG Emission Summary

GHG EMISSIONS SUMMARY

GHG Emissions Before Construction

Source Descriptions	Emission Sub-Type	Existing CO2e Emissions (Mton/yr)	Calculation Methods
Flare	Combustion	110,860.76	Emission factors and info from 40 CFR 98 Subpart C
RNG Plant	Combustion	56,315.95	Emission factors and info from 40 CFR 98 Subpart C
Fugitive LFG	Fugitive	7,853.08	Emission factors and info from 40 CFR 98 Subpart C
Waste Disposal Operations	Combustion Mobile Sources	6,075,453.06	Emission factors and info from 40 CFR 98 Subpart C
Insignificant Operations	Combustion Mobile Sources	177.35	Emission factors and info from 40 CFR 98 Subpart C
Indirect Operations	Electrical Usage	69.12	Emission factors and info from 40 CFR 98 Subpart C
Total		6,250,729.31	

Notes:

- Existing greenhouse gas footprint of the Pine Bend Landfill include emissions from a flare, fugitive landfill gas, waste disposal operations, insignificant sources, and offsite electricity. Please note the GHG emissions from the RNG Plant are emissions from combustion of waste gas and natural gas through the thermal oxidizer.
- Waste disposal operations include emissions from mobile sources (waste disposal trucks, landfill compactor, D8 Bulldozer, and 32 waste disposal trucks) and tippers. Emissions from off-site waste management is included in waste disposal operations.
- Insignificant sources include light plants, power washer, air compressors, snow blower, weed eaters, heaters, forklift, and HVAC.
- Emissions calculated based upon information from Pine Bend Landfill. Emission factors from 40 CFR 98 Subpart C of the Mandatory Greenhouse Gas Reporting Rule. **See calculations in Appendix B for further details.**

Emissions from Construction

Source Descriptions	Emission Sub-Type	Project-Related CO2e Emissions (Mton/yr)	Calculation Methods
Construction	Combustion Mobile Sources	4,756.80	Emission factors and info from 40 CFR 98 Subpart C

Notes

- See emission calculations for emission sources characterized for construction.
- Daily operations for the landfill are not included as part of the construction. These do not change.
- Emissions from the installation of the two culverts are included in the calculations.
- Emission factors used were found in 40 CFR 98 Subpart C of Mandatory Greenhouse Gas Reporting Rule. **See calculations in Appendix B for further details.**

Emissions from Operations After Construction (Calendar Years 2024 to 2048)

Source Descriptions	Emission Sub-Type	Facility CO2e Emissions after Project (Mton/yr)	Calculation Methods
Flare	Combustion	110,860.76	Emission factors and info from 40 CFR 98 Subpart C
RNG Plant	Combustion	56,315.95	Emission factors and info from 40 CFR 98 Subpart C
Fugitive Landfill Gas	Fugitive	7,853.08	Emission factors and info from 40 CFR 98 Subpart C
Waste Disposal Operations	Combustion Mobile Sources	6,075,453.06	Emission factors and info from 40 CFR 98 Subpart C
Insignificant Operations	Combustion Mobile Sources	177.35	Emission factors and info from 40 CFR 98 Subpart C
Indirect Operations	Electrical Usage	69.12	USEPA's Emission Factor's Hub
Total		6,250,729.31	

Lifetime Emissions, 24 years of operation of the expansion 150,017,503.54

Notes:

1) Facility operations after project include operating the flare at reduced capacity and majority of the landfill gas sent to a renewable natural gas (RNG) plant. The RNG plant will emit GHG emissions through the thermal oxidizer from treatment of waste and off-gases from the operation of the plant as well from the combustion of the natural gas that is used to fuel the thermal oxidizer. Landfill gas not used in the RNG plant or combusted by the flare is fugitively emitted. Conservatively, biogenic CO₂ is included in the calculations, since those emissions are part of the natural carbon cycle and not regulated under the Clean Air Act.

2) Future emissions associated with waste disposal operations and insignificant source are assumed to be the same as the emissions from operations before expansion. It is assumed that these emissions do not change from the existing since the purpose of the expansion is to extend the life of the landfill not to accommodate increased waste intake.

3) Emissions from electrical usage is assumed to be same as the emissions from prior to construction. **See calculations in Appendix B for further details.**

Emission Change In Operation After Expansion		
Emissions After Construction	6,250,729.31	MT/yr
Emissions before Construction	6,250,729.31	MT/yr
Emission Change After Construction	0.00	MT/yr

One Time Additional GHG Emissions from Construction		
Construction of Expansion	4,756.80	MT/yr



Appendix B

GHG Emission Calculations

Landfill Gas Control and Fugitive GHG Emissions

EMISSIONS DURING PERIOD OF OPERATION OF THE RNG PLANT (2023 to 2024)

Operations Before Expansion

Maximum Potential Emissions Before Expansion

Pine Bend Landfill has equipment that has the capacity of managing up to 7200 standard cubic feet per minute (scfm). 3200 standard cubic feet per minute (scfm) of collected LFG is sent to the RNG Plant and the remaining 4,000 scfm is sent to the open flare. Emission sources during this operation include the non-enclosed flare (open flare) and the thermal oxidizer. The open flare only burns landfill gas. No period in 8760 hours of operation that off-spec gas will be generated and sent to the enclosed flare. 160 scfm of natural gas fuels the thermal oxidizer in the RNG plant. PTE for these devices are calculated at max capacity. Actual flows combusted in these devices are less.

Fugitive emissions are assumed to be 15% of the maximum landfill gas generated. Maximum landfill gas generated is based upon LandGEM estimate of 3799 scfm. The assumed 85% collection efficiency reflects the approved efficiency of the amendment for RNG Plant.

GHG Emissions from LFG Sources

Biogenic GHG											
Source Description	LFG Compounds			Methane Heating Value	LFG Heating Value	LFG flow	Heat Input	CO2 Emission Factor	Emissions		
	CH4	CO2							CO2	CO2e	
	%	%	pmv in inlet LFG	BTU/ft³	BTU/ft³	scfm	MMBTU/hr	kg/MMBTU	T/yr	T/yr	
Flare (combustion)	50%	49.8%	498,352	1013	506.5	4000	121.56	52.07	61,131	61,131	
Flare (Pass-through)	50%	49.8%	498,352	1013	506.5	4000	121.56	-	60,757	60,757	
LFG Fugitive	50%	49.8%	498,352	1013	506.5	569.91	121.56	-	8,656	8,656	
Anthropogenic GHG											
Source Description	Global Warming Potential			Methane Heating	LFG Heating	LFG flow	Heat Input	Emission Factor		Emissions	
	CH4	N2O						CH4	N2O	CH4	N2O
	BTU/ft³	BTU/ft³	scfm	MMBTU/hr	kg/MMBTU	kg/MMBTU	T/yr	T/yr			
Flare	25	298		1013	506.5	4000	121.56	0.003	0.001	93.92	220.4
LFG Fugitive	25	-		1013	506.5	569.91	121.56	-	-	-	-
Total Anthropogenic GHG										314	
Total GHG from LFG Sources, MT/yr										130,858	

Notes:

- 1) Methane, CH4 Concentration - Assumed
- 2) Carbon Dioxide, CO2, concentration derived from the sum of the LFG compounds and methane concentration.
- 3) Estimated LFG generation is 4,000 scfm of LFG. Assumed collection efficiency is 85%. Therefore, fugitive LFG is 15% of LFG generated.
- 4) Emission factors for CO2 (combustion), CH4, and N2O are from Tables A-1, C-1, and C-2 of 40 CFR 98 respectively
- 3) CO2 (combustion), CH4, and N2O emissions calculated by: Heat Input, MMBTU/hr * Emission factor, kg/MMBTU*2.205 lb/kg*(8760/2000)
- 4) CO2 (pass through and fugitive) and CH4 (fugitive) emissions calculated by: ((Flow, scfm * MW, lb/lb mole*ppmv *0.000001 ppm/ppmv*60 min*1 atm)/(0.7302 atm ft³/lb/mol R*519.68 R))*(8760/2000)
- 5) Anthropogenic CH4 and N2O emissions are multiplied by the respective global warming potential factors to obtain CO2e

Landfill Gas Control and Fugitive GHG Emissions

EMISSIONS DURING PERIOD OF OPERATION OF THE RNG PLANT (2024 to 2048)

Operations After Expansion

Maximum Potential Emissions After Expansion

Pine Bend Landfill has equipment that has the capacity of managing up to 7200 standard cubic feet per minute (scfm). 3200 standard cubic feet per minute (scfm) of collected LFG is sent to the RNG Plant and the remaining 4,000 scfm is sent to the open flare. Emission sources during this operation include the non-enclosed flare (open flare) and the thermal oxidizer. The open flare only burns landfill gas. No period in 8760 hours of operation that off-spec gas will be generated and sent to the enclosed flare. 160 scfm of natural gas fuels the thermal oxidizer in the RNG plant. PTE for these devices are calculated at max capacity. Actual flows combusted in these devices are less.

Fugitive emissions are assumed to be 15% of the maximum landfill gas generated. Maximum landfill gas generated is based upon LandGEM estimate of 3799 scfm. The assumed 85% collection efficiency reflects the approved efficiency of the amendment for RNG Plant.

GHG Emissions from LFG Gas

Biogenic GHG										
Source Description	LFG Compounds			Methane Heating	LFG Heating	LFG flow	Heat Input	CO2 Emission Factor	Emissions	
	CH4	CO2							CO2	CO2e
	%	%	pmv in inlet LFG	BTU/ft³	BTU/ft³	scfm	MMBTU/hr	kg/MMBTU	T/yr	T/yr
Flare (combustion)	50%	49.8%	498,352	1013	506.5	4000	121.56	52.07	61,131	61,131
Flare (Pass-through)	50%	49.8%	498,352	1013	506.5	4000	121.56	-	60,757	60,757
LFG Fugitive	50%	49.8%	498,352	1013	506.5	569.91	121.56	-	8,656	8,656
Anthropogenic GHG										
Source Description	Global Warming Potential		Methane Heating	LFG Heating	LFG flow	Heat Input	Emission Factor		Emissions	
	CH4	N2O					CH4	N2O	CH4	N2O
				BTU/ft³	BTU/ft³	scfm	MMBTU/hr	kg/MMBTU	kg/MMBTU	T/yr
Flare	25	298	1013	506.5	4000	121.56	3.20E-03	6.30E-04	93.92	220.4
LFG Fugitive	25	-	1013	506.5	569.91	121.56	-	-	-	-
Total Anthropogenic GHG										314
Total GHG from LFG Sources, MT/yr										130,858

Notes:

- 1) Methane, CH4 Concentration - Assumed
- 2) Carbon Dioxide, CO2, concentration derived from the sum of the LFG compounds and methane concentration. Concentrations of LFG compounds taken from AP-42 Chapter 2.42, tables 2.4.1 and 2.4.2.
- 3) Estimated LFG generation is 4,000 scfm of LFG. Assumed collection efficiency is 85%. Therefore, fugitive LFG is 15% of LFG generated.
- 4) Emission factors for CO2 (combustion), CH4, and N2O are from Tables A-1, C-1, and C-2 of 40 CFR 98 respectively
- 3) CO2 (combustion), CH4, and N2O emissions calculated by: Heat Input, MMBTU/hr * Emission factor, kg/MMBTU*2.205 lb/kg*(8760/2000)
- 4) CO2 (pass through and fugitive) and CH4 (fugitive) emissions calculated by: ((Flow, scfm * MW, lb/lb mole*ppmv *0.000001 ppm/ppmv*60 min*1 atm)/(0.7302 atm ft³/lb/mol R*519.68 R))*(8760/2000)
- 5) Anthropogenic CH4 and N2O emissions are multiplied by the respective global warming potential factors to obtain CO2e

GHG Emissions from Waste Gas										
Biogenic GHG										
Source Description	LFG Compounds			Methane Heating Value	WG Heating Value	flow	Heat Input	CO2 Emission Factor	Emissions	
	CH4	CO2							CO2	CO2e
	%	%	pmv in inlet LFG	BTU/ft ³	BTU/ft ³	scfm	MMBTU/hr	kg/MMBTU	T/yr	T/yr
Thermal Oxidizer (combustion)	5%	78.5%	-	1012	54.04	2235	7.2	52.07	3,644	3,644
Thermal (Pass-through)	5%	78.5%	785,000	1012	54.04	2235	7.2	-	53,441	53,441
Anthropogenic GHG										
Source Description	Global Warming Potential		Methane Heating	LFG Heating	LFG flow	Heat Input	Emission Factor		Emissions	
	CH4	N2O					CH4	N2O	CH4	N2O
				BTU/ft ³	BTU/ft ³	scfm	MMBTU/hr	kg/MMBTU	kg/MMBTU	T/yr
Thermal Oxidizer (combustion)	25	298	1012	54.04	2235	7.2	3.20E-03	6.30E-04	5.60	13.13984
Total GHG from Waste Gas, MT/yr										57,104
Notes:										
1) Methane and Carbon Dioxide concentrations provided by manufacturer of thermal oxidizer.										
2) Waste gas assumed have be equivalent to a biogas therefore emission factors for CO2, CH4, and N2O taken from Table C-1 and Table C-2 of 40 CFR 98										
3) CO2 (combustion), CH4, and N2O emissions calculated by: Heat Input, MMBTU/hr * Emission factor, kg/MMBTU*2.205 lb/kg*(8760/2000)										
4) CO2 (pass through and fugitive) and CH4 (fugitive) emissions calculated by: ((Flow, scfm * MW, lb/lb mole*ppmv *0.000001 ppm/ppmv*60 min*1 atm)/((0.7302 atm ft ³ /lb/mol R*519.68 R))*(8760/2000)										

OTHER GHG EMISSION SOURCES

General Information

Global Warming Potential

CH4 25

N2O 298

DAILY OPERATION EQUIPMENT

Source Description	Fuel Type	Gallons	MMBTU/ Gal	MMBTU	Emission Factors, kg/MMBTU			Emissions, MT/yr				Short Ton/yr
					CO2	CH4	N2O	CO2	CH4	N2O	CO2e	CO2e
Waste Disposal Operations, Assumed to operate 260 days a year 10 hours per day or 2600 hours a year												
(2) Tippers, 164 hp	Diesel	21,782	0.138	3005.93	73.96	0.003	0.0006	222.32	0.0090	0.0018	223.08	245.90
(2) Landfill Compactor, 562 hp	Diesel	149,287	0.138	20601.61	73.96	0.003	0.0006	1,523.69	0.0618	0.0124	1528.92	1685.35
Trucks, 300 hp	Diesel	6.54E+08	0.138	9.02E+07	73.96	0.003	0.0006	6.67E+06	270.6367	54.1273	6.69E+06	7.38E+06
335hp D8 Dozer	Diesel	22,247	0.138	3070.08	73.96	0.003	0.0006	227.06	0.0092	0.0018	227.84	251.15
Insignificant Operations, Assumed to operate 130 days a year 8 hours per day or 1040 hours a year												
(3) Light Plants, 41.9 hp	Diesel	2,226	0.138	307.19	73.96	0.003	0.0006	22.72	0.0009	0.0002	22.80	25.13
Power Washer, 12 hp	Diesel	638	0.138	87.98	73.96	0.003	0.0006	6.51	0.0003	0.0001	6.53	7.20
Caterpillar Air Compressor, 59.9 hp	Diesel	3,182	0.138	439.16	73.96	0.003	0.0006	32.48	0.0013	0.0003	32.59	35.93
John Deer Compressor, 80 hp	Diesel	4,250	0.138	586.52	73.96	0.003	0.0006	43.38	0.0018	0.0004	43.53	47.98
Snow Blower, 5 hp	Gasoline	266	0.125	33.20	70.22	0.003	0.0006	2.33	0.0001	0.0000	2.34	2.58
(2) weed eaters, 0.5 hp	Gasoline	27	0.125	3.32	70.22	0.003	0.0006	0.23	0.0000	0.0000	0.23	0.26
Heaters, 783,333 btu/hr	Natural Gas	7,406	0.11	814.67	66.88	0.001	0.0001	54.48	0.0008	0.0001	54.53	60.11

Source Description	Fuel Type	Gallons	MMBTU/ Gal	MMBTU	Emission Factors, kg/MMBTU			Emissions, MT/yr				Short Ton/yr
					CO2	CH4	N2O	CO2	CH4	N2O	CO2e	CO2e
Forklift, 101,777.37 btu/hr	Propane	1,163	0.091	105.85	62.87	0.003	0.0006	6.65	0.0003	0.0001	6.68	7.37
HVAC, 400,000 btu/hr	Propane	4,571	0.091	416.00	62.87	0.003	0.0006	26.15	0.0012	0.0002	26.26	28.95

Notes:

- 1) Emission factors for CO2, CH4, and N2O are from Tables C-1 and C-2 of 40 CFR 98 Subpart C of the Mandatory Greenhouse Gas Reporting Rule.
- 2) To convert hp to gal/yr, the maximum total fuel usage per hour was used based on AP-42 Emission factors from Table 3.3-1 of 7,000 btu/hp-hour; btu/lb of fuel of 19,300 btu; and a density of 7.1 lbs per gallon.
- 3) Gallons for units operating on propane or natural gas are based upon the annual BTU capacity and high heat value for Natural Gas or Propane from Table C-1 of 40 CFR 98.
- 4) Number of waste trucks to be assumed an approximate annual rate of 590,100 tons of waste was hauled in. Assuming each waste disposal truck had a 40 cy capacity and the waste had a 1600 lb/cy density; 18750 trucks hauled in waste.

Project GHG Emissions (Construction Equipment)

Source Description	Fuel Type	Gallons	MMBTU/ Gal	MMBTU	Emission Factors, kg/MMBTU			Emissions, MT/yr				Short Ton/yr
					CO2	CH4	N2O	CO2	CH4	N2O	CO2e	CO2e
Construction Operations, Assumed to operate 130 days of the year, 10 hours per day.												
(2) 225hp Dozer	Diesel	29,884	0.138	4123.99	73.96	0.003	0.0006	305.01	0.0124	0.0025	306.06	337.37
180hp backhoe	Diesel	11,954	0.138	1649.59	73.96	0.003	0.0006	122.00	0.0049	0.0010	122.42	134.95
Excavator 512hp	Diesel	34,001	0.138	4692.18	73.96	0.003	0.0006	347.03	0.0141	0.0028	348.22	383.85
249hp Sheepsfoot Comp	Diesel	16,536	0.138	2281.94	73.96	0.003	0.0006	168.77	0.0068	0.0014	169.35	186.68
Scraper 570 hp	Diesel	37,853	0.138	5223.72	73.96	0.003	0.0006	386.35	0.0157	0.0031	387.67	427.33
Vibratory smooth compactor roller, 169hp	Diesel	11,223	0.138	1548.79	73.96	0.003	0.0006	114.55	0.0046	0.0009	114.94	126.70
Grader, 196 hp	Diesel	13,016	0.138	1796.23	73.96	0.003	0.0006	132.85	0.0054	0.0011	133.30	146.94
Articulated Dump Truck, 342 hp	Diesel	45,424	0.138	6268.46	73.96	0.003	0.0006	463.62	0.0188	0.0038	465.21	512.80
Dump Truck, 300 hp	Diesel	79,691	0.138	10997.30	73.96	0.003	0.0006	813.36	0.0330	0.0066	816.15	899.65

Project GHG Emissions (Construction Equipment)-Continued

Source Description	Fuel Type	Gallons	MMBTU/ Gal	MMBTU	Emission Factors, kg/MMBTU			Emissions, MT/yr				Short Ton/yr
					CO2	CH4	N2O	CO2	CH4	N2O	CO2e	CO2e
passenger truck, 348 hp	Diesel	184,882	0.138	25513.74	73.96	0.003	0.0006	1,887.00	0.0765	0.0153	1893.47	2087.19

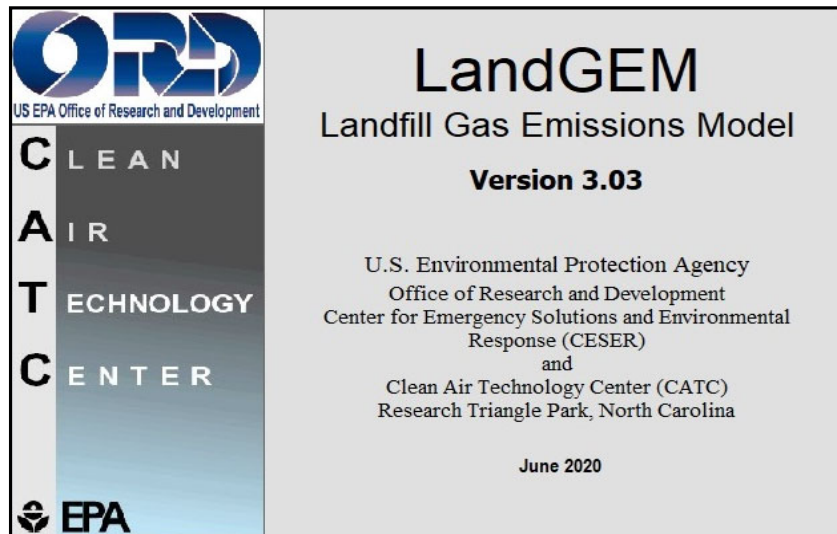
Notes:

- 1) Emission factors for CO2, CH4, and N2O are from Tables C-1 and C-2 of 40 CFR 98 Subpart C of the Mandatory Greenhouse Gas Reporting Rule.
- 2) To convert hp to gal/yr, the maximum total fuel usage per hour was used based on AP-42 Emission factors from Table 3.3-1 of 7,000 btu/hp-hour; btu/lb of fuel of 19,300 btu; and a density of 7.1 lbs per gallon.
- 3) Gallons for units operating on propane or natural gas are based upon the annual BTU capacity and high heat value for Natural Gas or Propane from Table C-1of 40 CFR 98.
- 4) Assumed the construction will occur 130 days of the year, 10 hours per day.
- 5) Capacity of equipment (Horsepower) assumed from specifications from various manufacturers

GHG Emissions Electrical Usage

Source	Electricity Used				Emissions, short tons/yr				Emissions, MT/y
	MWH	CO2, lb/MWH	CH4, lb/MWH	N2O, lb/MWH	CO2	CH4	N2O	CO2e	CO2e
Electrical Usage	137.72	1,098	0.119	0.02	151271.6	16.39	2.34	76.19	69.12

- 1) Megawats per hour (MWH) provided by Pine Bend Landfill.
- 2) Emission factors used were from the USEPA's Emission Factor's Hub for Greenhouse Gas Inventories



Summary Report

Landfill Name or Identifier: Pine Bend Landfill Phases 1 through 7

Date: Tuesday, July 18, 2023

Description/Comments:

About LandGEM:

First-Order Decomposition Rate Equation:

$$Q_{CH_4} = \sum_{i=1}^n \sum_{j=0.1}^1 k L_o \left(\frac{M_i}{10} \right) e^{-k t_{ij}}$$

Where,

Q_{CH_4} = annual methane generation in the year of the calculation ($m^3/year$)

i = 1-year time increment

n = (year of the calculation) - (initial year of waste acceptance)

j = 0.1-year time increment

k = methane generation rate ($year^{-1}$)

L_o = potential methane generation capacity (m^3/Mg)

M_i = mass of waste accepted in the i^{th} year (Mg)

t_{ij} = age of the j^{th} section of waste mass M_i accepted in the i^{th} year ($decimal\ years$, e.g., 3.2 years)

LandGEM is based on a first-order decomposition rate equation for quantifying emissions from the decomposition of landfilled waste in municipal solid waste (MSW) landfills. The software provides a relatively simple approach to estimating landfill gas emissions. Model defaults are based on empirical data from U.S. landfills. Field test data can also be used in place of model defaults when available. Further guidance on EPA test methods, Clean Air Act (CAA) regulations, and other guidance regarding landfill gas emissions and control technology requirements can be found at <http://www.epa.gov/ttnatw01/landfill/landflpg.html>.

LandGEM is considered a screening tool — the better the input data, the better the estimates. Often, there are limitations with the available data regarding waste quantity and composition, variation in design and operating practices over time, and changes occurring over time that impact the emissions potential. Changes to landfill operation, such as operating under wet conditions through leachate recirculation or other liquid additions, will result in generating more gas at a faster rate. Defaults for estimating emissions for this type of operation are being developed to include in LandGEM along with defaults for conventional landfills (no leachate or liquid additions) for developing emission inventories and determining CAA applicability. Refer to the Web site identified above for future updates.

Input Review

LANDFILL CHARACTERISTICS

Landfill Open Year	1971	
Landfill Closure Year (with 80-year limit)	2048	
Actual Closure Year (without limit)	2048	
Have Model Calculate Closure Year?	No	
Waste Design Capacity	20,590,386	<i>short tons</i>

MODEL PARAMETERS

Methane Generation Rate, k	0.040	<i>year⁻¹</i>
Potential Methane Generation Capacity, L ₀	100	<i>m³/Mg</i>
NMOC Concentration	595	<i>ppmv as hexane</i>
Methane Content	50	<i>% by volume</i>

GASES / POLLUTANTS SELECTED

Gas / Pollutant #1:	Total landfill gas
Gas / Pollutant #2:	Methane
Gas / Pollutant #3:	Carbon dioxide
Gas / Pollutant #4:	NMOC

WASTE ACCEPTANCE RATES

Year	Waste Accepted		Waste-In-Place	
	(Mg/year)	(short tons/year)	(Mg)	(short tons)
1971	155,700	171,270	0	0
1972	155,700	171,270	155,700	171,270
1973	199,500	219,450	311,400	342,540
1974	319,400	351,340	510,900	561,990
1975	368,700	405,570	830,300	913,330
1976	99,000	108,900	1,199,000	1,318,900
1977	95,000	104,500	1,298,000	1,427,800
1978	439,000	482,900	1,393,000	1,532,300
1979	485,000	533,500	1,832,000	2,015,200
1980	533,000	586,300	2,317,000	2,548,700
1981	448,000	492,800	2,850,000	3,135,000
1982	424,000	466,400	3,298,000	3,627,800
1983	437,636	481,400	3,722,000	4,094,200
1984	504,000	554,400	4,159,636	4,575,600
1985	542,000	596,200	4,663,636	5,130,000
1986	651,000	716,100	5,205,636	5,726,200
1987	813,000	894,300	5,856,636	6,442,300
1988	669,000	735,900	6,669,636	7,336,600
1989	711,000	782,100	7,338,636	8,072,500
1990	392,000	431,200	8,049,636	8,854,600
1991	287,000	315,700	8,441,636	9,285,800
1992	161,000	177,100	8,728,636	9,601,500
1993	165,000	181,500	8,889,636	9,778,600
1994	183,000	201,300	9,054,636	9,960,100
1995	158,000	173,800	9,237,636	10,161,400
1996	195,000	214,500	9,395,636	10,335,200
1997	228,000	250,800	9,590,636	10,549,700
1998	261,000	287,100	9,818,636	10,800,500
1999	210,000	231,000	10,079,636	11,087,600
2000	260,000	286,000	10,289,636	11,318,600
2001	394,765	434,242	10,549,636	11,604,600
2002	450,732	495,805	10,944,402	12,038,842
2003	266,538	293,192	11,395,134	12,534,647
2004	202,649	222,914	11,661,672	12,827,839
2005	215,246	236,771	11,864,321	13,050,753
2006	235,871	259,458	12,079,567	13,287,524
2007	278,536	306,390	12,315,438	13,546,982
2008	195,999	215,599	12,593,975	13,853,372
2009	224,094	246,503	12,789,974	14,068,971
2010	294,491	323,940	13,014,067	14,315,474

WASTE ACCEPTANCE RATES (Continued)

Year	Waste Accepted		Waste-In-Place	
	(Mg/year)	(short tons/year)	(Mg)	(short tons)
2011	391,753	430,928	13,308,558	14,639,414
2012	293,218	322,540	13,700,311	15,070,342
2013	323,246	355,571	13,993,529	15,392,882
2014	427,671	470,438	14,316,775	15,748,453
2015	257,976	283,774	14,744,446	16,218,891
2016	267,395	294,134	15,002,423	16,502,665
2017	282,965	311,262	15,269,817	16,796,799
2018	281,856	310,042	15,552,783	17,108,061
2019	324,855	357,340	15,834,639	17,418,103
2020	335,994	369,593	16,159,494	17,775,443
2021	448,215	493,036	16,495,487	18,145,036
2022	365,376	401,914	16,943,702	18,638,072
2023	281,818	310,000	17,309,078	19,039,986
2024	281,818	310,000	17,590,896	19,349,986
2025	281,818	310,000	17,872,715	19,659,986
2026	281,818	310,000	18,154,533	19,969,986
2027	281,818	310,000	18,436,351	20,279,986
2028	281,818	310,000	18,718,169	20,589,986
2029	281,818	310,000	18,999,987	20,899,986
2030	281,818	310,000	19,281,805	21,209,986
2031	281,818	310,000	19,563,624	21,519,986
2032	281,818	310,000	19,845,442	21,829,986
2033	281,818	310,000	20,127,260	22,139,986
2034	281,818	310,000	20,409,078	22,449,986
2035	281,818	310,000	20,690,896	22,759,986
2036	281,818	310,000	20,972,715	23,069,986
2037	281,818	310,000	21,254,533	23,379,986
2038	281,818	310,000	21,536,351	23,689,986
2039	281,818	310,000	21,818,169	23,999,986
2040	281,818	310,000	22,099,987	24,309,986
2041	281,818	310,000	22,381,805	24,619,986
2042	281,818	310,000	22,663,624	24,929,986
2043	281,818	310,000	22,945,442	25,239,986
2044	281,818	310,000	23,227,260	25,549,986
2045	281,818	310,000	23,509,078	25,859,986
2046	281,818	310,000	23,790,896	26,169,986
2047	281,818	310,000	24,072,715	26,479,986
2048	63,636	70,000	24,354,533	26,789,986
2049	0	0	24,418,169	26,859,986
2050	0	0	24,418,169	26,859,986

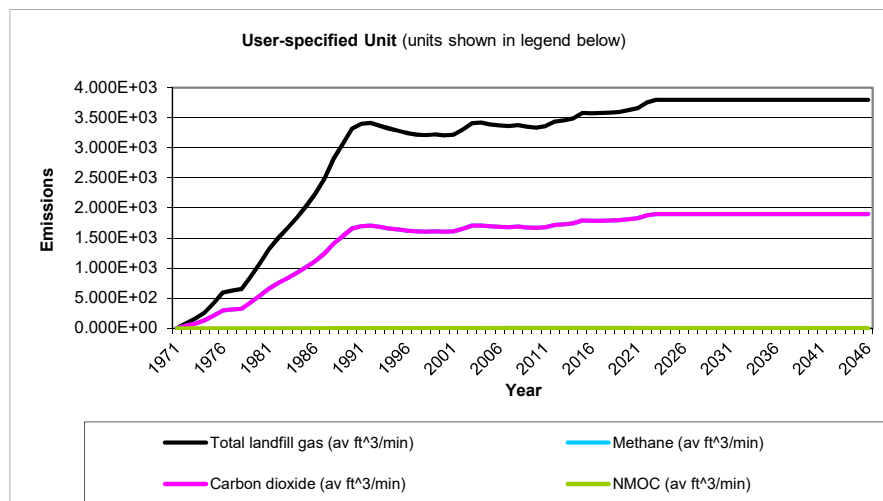
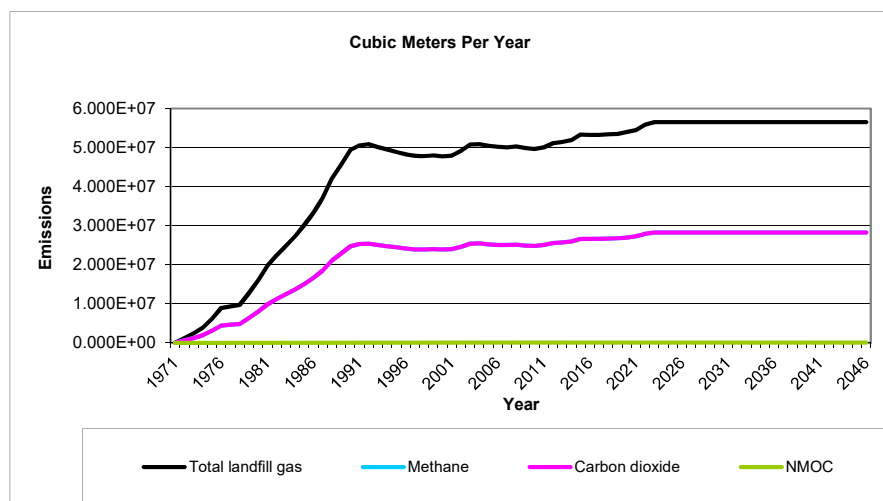
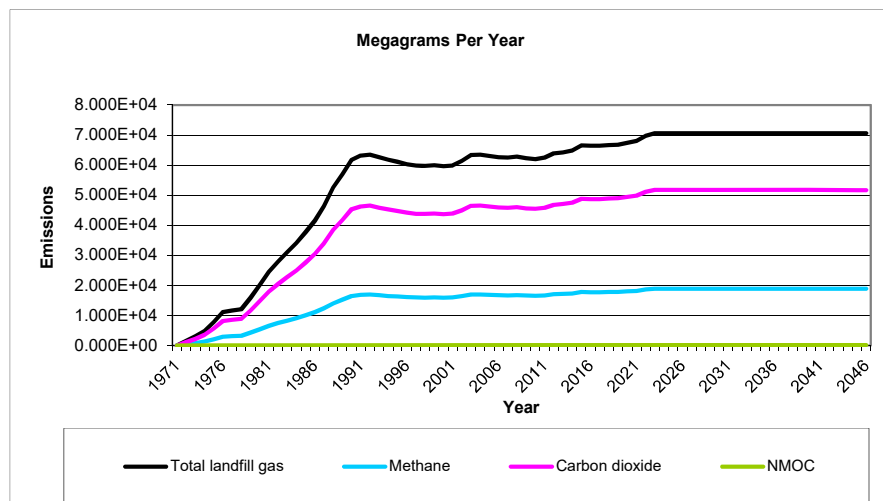
Pollutant Parameters

Gas / Pollutant Default Parameters:				User-specified Pollutant Parameters:	
	Compound	Concentration (ppmv)	Molecular Weight	Concentration (ppmv)	Molecular Weight
Gases	Total landfill gas		0.00		
	Methane		16.04		
	Carbon dioxide		44.01		
	NMOC	4,000	86.18		
Pollutants	1,1,1-Trichloroethane (methyl chloroform) - HAP	0.48	133.41		
	1,1,1,2,2-Tetrachloroethane - HAP/VOC	1.1	167.85		
	1,1-Dichloroethane (ethylidene dichloride) - HAP/VOC	2.4	98.97		
	1,1-Dichloroethene (vinylidene chloride) - HAP/VOC	0.20	96.94		
	1,2-Dichloroethane (ethylene dichloride) - HAP/VOC	0.41	98.96		
	1,2-Dichloropropane (propylene dichloride) - HAP/VOC	0.18	112.99		
	2-Propanol (isopropyl alcohol) - VOC	50	60.11		
	Acetone	7.0	58.08		
	Acrylonitrile - HAP/VOC	6.3	53.06		
	Benzene - No or Unknown Co-disposal - HAP/VOC	1.9	78.11		
	Benzene - Co-disposal - HAP/VOC	11	78.11		
	Bromodichloromethane - VOC	3.1	163.83		
	Butane - VOC	5.0	58.12		
	Carbon disulfide - HAP/VOC	0.58	76.13		
	Carbon monoxide	140	28.01		
	Carbon tetrachloride - HAP/VOC	4.0E-03	153.84		
	Carbonyl sulfide - HAP/VOC	0.49	60.07		
	Chlorobenzene - HAP/VOC	0.25	112.56		
	Chlorodifluoromethane	1.3	86.47		
	Chloroethane (ethyl chloride) - HAP/VOC	1.3	64.52		
	Chloroform - HAP/VOC	0.03	119.39		
	Chloromethane - VOC	1.2	50.49		
	Dichlorobenzene - (HAP for para isomer/VOC)	0.21	147		
	Dichlorodifluoromethane	16	120.91		
	Dichlorofluoromethane - VOC	2.6	102.92		
	Dichloromethane (methylene chloride) - HAP	14	84.94		
	Dimethyl sulfide (methyl sulfide) - VOC	7.8	62.13		
	Ethane	890	30.07		
	Ethanol - VOC	27	46.08		

Pollutant Parameters (Continued)

Gas / Pollutant Default Parameters:				User-specified Pollutant Parameters:	
	Compound	Concentration (ppmv)	Molecular Weight	Concentration (ppmv)	Molecular Weight
Pollutants	Ethyl mercaptan (ethanethiol) - VOC	2.3	62.13		
	Ethylbenzene - HAP/VOC	4.6	106.16		
	Ethylene dibromide - HAP/VOC	1.0E-03	187.88		
	Fluorotrichloromethane - VOC	0.76	137.38		
	Hexane - HAP/VOC	6.6	86.18		
	Hydrogen sulfide	36	34.08		
	Mercury (total) - HAP	2.9E-04	200.61		
	Methyl ethyl ketone - HAP/VOC	7.1	72.11		
	Methyl isobutyl ketone - HAP/VOC	1.9	100.16		
	Methyl mercaptan - VOC	2.5	48.11		
	Pentane - VOC	3.3	72.15		
	Perchloroethylene (tetrachloroethylene) - HAP	3.7	165.83		
	Propane - VOC	11	44.09		
	t-1,2-Dichloroethene - VOC	2.8	96.94		
	Toluene - No or Unknown Co-disposal - HAP/VOC	39	92.13		
	Toluene - Co-disposal - HAP/VOC	170	92.13		
	Trichloroethylene (trichloroethene) - HAP/VOC	2.8	131.40		
	Vinyl chloride - HAP/VOC	7.3	62.50		
	Xylenes - HAP/VOC	12	106.16		

Graphs



Results

Year	Total landfill gas			Methane		
	(Mg/year)	(m ³ /year)	(av ft ³ /min)	(Mg/year)	(m ³ /year)	(av ft ³ /min)
1971	0	0	0	0	0	0
1972	1.528E+03	1.223E+06	8.220E+01	4.081E+02	6.117E+05	4.110E+01
1973	2.996E+03	2.399E+06	1.612E+02	8.002E+02	1.199E+06	8.059E+01
1974	4.836E+03	3.873E+06	2.602E+02	1.292E+03	1.936E+06	1.301E+02
1975	7.781E+03	6.230E+06	4.186E+02	2.078E+03	3.115E+06	2.093E+02
1976	1.109E+04	8.883E+06	5.969E+02	2.963E+03	4.442E+06	2.984E+02
1977	1.163E+04	9.313E+06	6.257E+02	3.107E+03	4.656E+06	3.129E+02
1978	1.211E+04	9.694E+06	6.514E+02	3.234E+03	4.847E+06	3.257E+02
1979	1.594E+04	1.276E+07	8.576E+02	4.258E+03	6.382E+06	4.288E+02
1980	2.007E+04	1.607E+07	1.080E+03	5.362E+03	8.037E+06	5.400E+02
1981	2.452E+04	1.963E+07	1.319E+03	6.549E+03	9.816E+06	6.595E+02
1982	2.795E+04	2.238E+07	1.504E+03	7.466E+03	1.119E+07	7.519E+02
1983	3.102E+04	2.484E+07	1.669E+03	8.285E+03	1.242E+07	8.344E+02
1984	3.410E+04	2.730E+07	1.834E+03	9.107E+03	1.365E+07	9.172E+02
1985	3.770E+04	3.019E+07	2.029E+03	1.007E+04	1.510E+07	1.014E+03
1986	4.154E+04	3.327E+07	2.235E+03	1.110E+04	1.663E+07	1.118E+03
1987	4.630E+04	3.708E+07	2.491E+03	1.237E+04	1.854E+07	1.246E+03
1988	5.247E+04	4.201E+07	2.823E+03	1.401E+04	2.101E+07	1.411E+03
1989	5.697E+04	4.562E+07	3.065E+03	1.522E+04	2.281E+07	1.533E+03
1990	6.172E+04	4.942E+07	3.321E+03	1.649E+04	2.471E+07	1.660E+03
1991	6.314E+04	5.056E+07	3.397E+03	1.687E+04	2.528E+07	1.699E+03
1992	6.348E+04	5.083E+07	3.416E+03	1.696E+04	2.542E+07	1.708E+03
1993	6.257E+04	5.011E+07	3.367E+03	1.671E+04	2.505E+07	1.683E+03
1994	6.174E+04	4.944E+07	3.322E+03	1.649E+04	2.472E+07	1.661E+03
1995	6.112E+04	4.894E+07	3.288E+03	1.632E+04	2.447E+07	1.644E+03
1996	6.027E+04	4.826E+07	3.243E+03	1.610E+04	2.413E+07	1.621E+03
1997	5.982E+04	4.790E+07	3.218E+03	1.598E+04	2.395E+07	1.609E+03
1998	5.971E+04	4.781E+07	3.213E+03	1.595E+04	2.391E+07	1.606E+03
1999	5.993E+04	4.799E+07	3.224E+03	1.601E+04	2.400E+07	1.612E+03
2000	5.964E+04	4.776E+07	3.209E+03	1.593E+04	2.388E+07	1.604E+03
2001	5.985E+04	4.793E+07	3.220E+03	1.599E+04	2.396E+07	1.610E+03
2002	6.138E+04	4.915E+07	3.302E+03	1.640E+04	2.458E+07	1.651E+03
2003	6.340E+04	5.077E+07	3.411E+03	1.693E+04	2.538E+07	1.705E+03
2004	6.353E+04	5.087E+07	3.418E+03	1.697E+04	2.543E+07	1.709E+03
2005	6.303E+04	5.047E+07	3.391E+03	1.683E+04	2.523E+07	1.695E+03
2006	6.267E+04	5.018E+07	3.372E+03	1.674E+04	2.509E+07	1.686E+03
2007	6.252E+04	5.007E+07	3.364E+03	1.670E+04	2.503E+07	1.682E+03
2008	6.281E+04	5.029E+07	3.379E+03	1.678E+04	2.515E+07	1.690E+03
2009	6.227E+04	4.986E+07	3.350E+03	1.663E+04	2.493E+07	1.675E+03
2010	6.202E+04	4.967E+07	3.337E+03	1.657E+04	2.483E+07	1.669E+03
2011	6.248E+04	5.003E+07	3.362E+03	1.669E+04	2.502E+07	1.681E+03
2012	6.388E+04	5.115E+07	3.437E+03	1.706E+04	2.557E+07	1.718E+03
2013	6.425E+04	5.145E+07	3.457E+03	1.716E+04	2.572E+07	1.728E+03
2014	6.490E+04	5.197E+07	3.492E+03	1.734E+04	2.598E+07	1.746E+03
2015	6.655E+04	5.329E+07	3.581E+03	1.778E+04	2.665E+07	1.790E+03
2016	6.648E+04	5.323E+07	3.577E+03	1.776E+04	2.662E+07	1.788E+03
2017	6.649E+04	5.324E+07	3.577E+03	1.776E+04	2.662E+07	1.789E+03
2018	6.666E+04	5.338E+07	3.587E+03	1.781E+04	2.669E+07	1.793E+03
2019	6.681E+04	5.350E+07	3.595E+03	1.785E+04	2.675E+07	1.797E+03
2020	6.738E+04	5.396E+07	3.625E+03	1.800E+04	2.698E+07	1.813E+03

Results (Continued)

Year	Total landfill gas			Methane		
	(Mg/year)	(m ³ /year)	(av ft ³ /min)	(Mg/year)	(m ³ /year)	(av ft ³ /min)
2021	6.804E+04	5.448E+07	3.661E+03	1.817E+04	2.724E+07	1.830E+03
2022	6.977E+04	5.587E+07	3.754E+03	1.864E+04	2.793E+07	1.877E+03
2023	7.062E+04	5.655E+07	3.799E+03	1.886E+04	2.827E+07	1.900E+03
2024	7.061E+04	5.654E+07	3.799E+03	1.886E+04	2.827E+07	1.900E+03
2025	7.061E+04	5.654E+07	3.799E+03	1.886E+04	2.827E+07	1.900E+03
2026	7.061E+04	5.654E+07	3.799E+03	1.886E+04	2.827E+07	1.899E+03
2027	7.060E+04	5.654E+07	3.799E+03	1.886E+04	2.827E+07	1.899E+03
2028	7.060E+04	5.653E+07	3.799E+03	1.886E+04	2.827E+07	1.899E+03
2029	7.060E+04	5.653E+07	3.798E+03	1.886E+04	2.827E+07	1.899E+03
2030	7.060E+04	5.653E+07	3.798E+03	1.886E+04	2.826E+07	1.899E+03
2031	7.059E+04	5.653E+07	3.798E+03	1.886E+04	2.826E+07	1.899E+03
2032	7.059E+04	5.653E+07	3.798E+03	1.886E+04	2.826E+07	1.899E+03
2033	7.059E+04	5.652E+07	3.798E+03	1.885E+04	2.826E+07	1.899E+03
2034	7.059E+04	5.652E+07	3.798E+03	1.885E+04	2.826E+07	1.899E+03
2035	7.058E+04	5.652E+07	3.798E+03	1.885E+04	2.826E+07	1.899E+03
2036	7.058E+04	5.652E+07	3.797E+03	1.885E+04	2.826E+07	1.899E+03
2037	7.058E+04	5.652E+07	3.797E+03	1.885E+04	2.826E+07	1.899E+03
2038	7.058E+04	5.652E+07	3.797E+03	1.885E+04	2.826E+07	1.899E+03
2039	7.058E+04	5.651E+07	3.797E+03	1.885E+04	2.826E+07	1.899E+03
2040	7.057E+04	5.651E+07	3.797E+03	1.885E+04	2.826E+07	1.899E+03
2041	7.057E+04	5.651E+07	3.797E+03	1.885E+04	2.826E+07	1.898E+03
2042	7.057E+04	5.651E+07	3.797E+03	1.885E+04	2.825E+07	1.898E+03
2043	7.057E+04	5.651E+07	3.797E+03	1.885E+04	2.825E+07	1.898E+03
2044	7.057E+04	5.651E+07	3.797E+03	1.885E+04	2.825E+07	1.898E+03
2045	7.057E+04	5.651E+07	3.797E+03	1.885E+04	2.825E+07	1.898E+03
2046	7.056E+04	5.650E+07	3.797E+03	1.885E+04	2.825E+07	1.898E+03
2047	7.056E+04	5.650E+07	3.796E+03	1.885E+04	2.825E+07	1.898E+03
2048	7.056E+04	5.650E+07	3.796E+03	1.885E+04	2.825E+07	1.898E+03
2049	6.842E+04	5.479E+07	3.681E+03	1.828E+04	2.739E+07	1.841E+03
2050	6.574E+04	5.264E+07	3.537E+03	1.756E+04	2.632E+07	1.768E+03
2051	6.316E+04	5.057E+07	3.398E+03	1.687E+04	2.529E+07	1.699E+03
2052	6.068E+04	4.859E+07	3.265E+03	1.621E+04	2.430E+07	1.632E+03
2053	5.830E+04	4.669E+07	3.137E+03	1.557E+04	2.334E+07	1.568E+03
2054	5.602E+04	4.486E+07	3.014E+03	1.496E+04	2.243E+07	1.507E+03
2055	5.382E+04	4.310E+07	2.896E+03	1.438E+04	2.155E+07	1.448E+03
2056	5.171E+04	4.141E+07	2.782E+03	1.381E+04	2.070E+07	1.391E+03
2057	4.968E+04	3.978E+07	2.673E+03	1.327E+04	1.989E+07	1.337E+03
2058	4.773E+04	3.822E+07	2.568E+03	1.275E+04	1.911E+07	1.284E+03
2059	4.586E+04	3.672E+07	2.468E+03	1.225E+04	1.836E+07	1.234E+03
2060	4.406E+04	3.528E+07	2.371E+03	1.177E+04	1.764E+07	1.185E+03
2061	4.234E+04	3.390E+07	2.278E+03	1.131E+04	1.695E+07	1.139E+03
2062	4.068E+04	3.257E+07	2.189E+03	1.087E+04	1.629E+07	1.094E+03
2063	3.908E+04	3.129E+07	2.103E+03	1.044E+04	1.565E+07	1.051E+03
2064	3.755E+04	3.007E+07	2.020E+03	1.003E+04	1.503E+07	1.010E+03
2065	3.608E+04	2.889E+07	1.941E+03	9.637E+03	1.444E+07	9.705E+02
2066	3.466E+04	2.776E+07	1.865E+03	9.259E+03	1.388E+07	9.325E+02
2067	3.330E+04	2.667E+07	1.792E+03	8.896E+03	1.333E+07	8.959E+02
2068	3.200E+04	2.562E+07	1.722E+03	8.547E+03	1.281E+07	8.608E+02
2069	3.074E+04	2.462E+07	1.654E+03	8.212E+03	1.231E+07	8.270E+02
2070	2.954E+04	2.365E+07	1.589E+03	7.890E+03	1.183E+07	7.946E+02
2071	2.838E+04	2.272E+07	1.527E+03	7.580E+03	1.136E+07	7.634E+02

Results (Continued)

Year	Total landfill gas			Methane		
	(Mg/year)	(m ³ /year)	(av ft ³ /min)	(Mg/year)	(m ³ /year)	(av ft ³ /min)
2072	2.727E+04	2.183E+07	1.467E+03	7.283E+03	1.092E+07	7.335E+02
2073	2.620E+04	2.098E+07	1.409E+03	6.998E+03	1.049E+07	7.047E+02
2074	2.517E+04	2.016E+07	1.354E+03	6.723E+03	1.008E+07	6.771E+02
2075	2.418E+04	1.936E+07	1.301E+03	6.460E+03	9.682E+06	6.506E+02
2076	2.323E+04	1.861E+07	1.250E+03	6.206E+03	9.303E+06	6.250E+02
2077	2.232E+04	1.788E+07	1.201E+03	5.963E+03	8.938E+06	6.005E+02
2078	2.145E+04	1.717E+07	1.154E+03	5.729E+03	8.587E+06	5.770E+02
2079	2.061E+04	1.650E+07	1.109E+03	5.504E+03	8.251E+06	5.544E+02
2080	1.980E+04	1.585E+07	1.065E+03	5.289E+03	7.927E+06	5.326E+02
2081	1.902E+04	1.523E+07	1.023E+03	5.081E+03	7.616E+06	5.117E+02
2082	1.828E+04	1.464E+07	9.834E+02	4.882E+03	7.318E+06	4.917E+02
2083	1.756E+04	1.406E+07	9.448E+02	4.691E+03	7.031E+06	4.724E+02
2084	1.687E+04	1.351E+07	9.078E+02	4.507E+03	6.755E+06	4.539E+02
2085	1.621E+04	1.298E+07	8.722E+02	4.330E+03	6.490E+06	4.361E+02
2086	1.557E+04	1.247E+07	8.380E+02	4.160E+03	6.236E+06	4.190E+02
2087	1.496E+04	1.198E+07	8.051E+02	3.997E+03	5.991E+06	4.026E+02
2088	1.438E+04	1.151E+07	7.735E+02	3.840E+03	5.756E+06	3.868E+02
2089	1.381E+04	1.106E+07	7.432E+02	3.690E+03	5.531E+06	3.716E+02
2090	1.327E+04	1.063E+07	7.141E+02	3.545E+03	5.314E+06	3.570E+02
2091	1.275E+04	1.021E+07	6.861E+02	3.406E+03	5.105E+06	3.430E+02
2092	1.225E+04	9.811E+06	6.592E+02	3.273E+03	4.905E+06	3.296E+02
2093	1.177E+04	9.426E+06	6.333E+02	3.144E+03	4.713E+06	3.167E+02
2094	1.131E+04	9.056E+06	6.085E+02	3.021E+03	4.528E+06	3.042E+02
2095	1.087E+04	8.701E+06	5.846E+02	2.902E+03	4.351E+06	2.923E+02
2096	1.044E+04	8.360E+06	5.617E+02	2.789E+03	4.180E+06	2.809E+02
2097	1.003E+04	8.032E+06	5.397E+02	2.679E+03	4.016E+06	2.698E+02
2098	9.637E+03	7.717E+06	5.185E+02	2.574E+03	3.859E+06	2.593E+02
2099	9.260E+03	7.415E+06	4.982E+02	2.473E+03	3.707E+06	2.491E+02
2100	8.896E+03	7.124E+06	4.787E+02	2.376E+03	3.562E+06	2.393E+02
2101	8.548E+03	6.845E+06	4.599E+02	2.283E+03	3.422E+06	2.299E+02
2102	8.212E+03	6.576E+06	4.419E+02	2.194E+03	3.288E+06	2.209E+02
2103	7.890E+03	6.318E+06	4.245E+02	2.108E+03	3.159E+06	2.123E+02
2104	7.581E+03	6.071E+06	4.079E+02	2.025E+03	3.035E+06	2.039E+02
2105	7.284E+03	5.833E+06	3.919E+02	1.946E+03	2.916E+06	1.959E+02
2106	6.998E+03	5.604E+06	3.765E+02	1.869E+03	2.802E+06	1.883E+02
2107	6.724E+03	5.384E+06	3.618E+02	1.796E+03	2.692E+06	1.809E+02
2108	6.460E+03	5.173E+06	3.476E+02	1.726E+03	2.587E+06	1.738E+02
2109	6.207E+03	4.970E+06	3.339E+02	1.658E+03	2.485E+06	1.670E+02
2110	5.963E+03	4.775E+06	3.209E+02	1.593E+03	2.388E+06	1.604E+02
2111	5.730E+03	4.588E+06	3.083E+02	1.530E+03	2.294E+06	1.541E+02

Results (Continued)

Year	Carbon dioxide			NMOC		
	(Mg/year)	(m ³ /year)	(av ft ³ /min)	(Mg/year)	(m ³ /year)	(av ft ³ /min)
1971	0	0	0	0	0	0
1972	1.120E+03	6.117E+05	4.110E+01	2.609E+00	7.280E+02	4.891E-02
1973	2.196E+03	1.199E+06	8.059E+01	5.116E+00	1.427E+03	9.591E-02
1974	3.544E+03	1.936E+06	1.301E+02	8.259E+00	2.304E+03	1.548E-01
1975	5.702E+03	3.115E+06	2.093E+02	1.329E+01	3.707E+03	2.491E-01
1976	8.130E+03	4.442E+06	2.984E+02	1.895E+01	5.286E+03	3.551E-01
1977	8.524E+03	4.656E+06	3.129E+02	1.986E+01	5.541E+03	3.723E-01
1978	8.873E+03	4.847E+06	3.257E+02	2.068E+01	5.768E+03	3.876E-01
1979	1.168E+04	6.382E+06	4.288E+02	2.722E+01	7.594E+03	5.103E-01
1980	1.471E+04	8.037E+06	5.400E+02	3.428E+01	9.564E+03	6.426E-01
1981	1.797E+04	9.816E+06	6.595E+02	4.187E+01	1.168E+04	7.849E-01
1982	2.049E+04	1.119E+07	7.519E+02	4.774E+01	1.332E+04	8.948E-01
1983	2.273E+04	1.242E+07	8.344E+02	5.297E+01	1.478E+04	9.929E-01
1984	2.499E+04	1.365E+07	9.172E+02	5.823E+01	1.624E+04	1.091E+00
1985	2.763E+04	1.510E+07	1.014E+03	6.439E+01	1.796E+04	1.207E+00
1986	3.045E+04	1.663E+07	1.118E+03	7.095E+01	1.979E+04	1.330E+00
1987	3.394E+04	1.854E+07	1.246E+03	7.908E+01	2.206E+04	1.482E+00
1988	3.845E+04	2.101E+07	1.411E+03	8.960E+01	2.500E+04	1.680E+00
1989	4.176E+04	2.281E+07	1.533E+03	9.730E+01	2.714E+04	1.824E+00
1990	4.523E+04	2.471E+07	1.660E+03	1.054E+02	2.940E+04	1.976E+00
1991	4.628E+04	2.528E+07	1.699E+03	1.078E+02	3.008E+04	2.021E+00
1992	4.653E+04	2.542E+07	1.708E+03	1.084E+02	3.025E+04	2.032E+00
1993	4.586E+04	2.505E+07	1.683E+03	1.069E+02	2.981E+04	2.003E+00
1994	4.525E+04	2.472E+07	1.661E+03	1.054E+02	2.942E+04	1.976E+00
1995	4.479E+04	2.447E+07	1.644E+03	1.044E+02	2.912E+04	1.956E+00
1996	4.417E+04	2.413E+07	1.621E+03	1.029E+02	2.872E+04	1.929E+00
1997	4.384E+04	2.395E+07	1.609E+03	1.022E+02	2.850E+04	1.915E+00
1998	4.376E+04	2.391E+07	1.606E+03	1.020E+02	2.845E+04	1.912E+00
1999	4.392E+04	2.400E+07	1.612E+03	1.024E+02	2.855E+04	1.919E+00
2000	4.371E+04	2.388E+07	1.604E+03	1.019E+02	2.842E+04	1.909E+00
2001	4.387E+04	2.396E+07	1.610E+03	1.022E+02	2.852E+04	1.916E+00
2002	4.499E+04	2.458E+07	1.651E+03	1.048E+02	2.925E+04	1.965E+00
2003	4.646E+04	2.538E+07	1.705E+03	1.083E+02	3.021E+04	2.030E+00
2004	4.656E+04	2.543E+07	1.709E+03	1.085E+02	3.027E+04	2.034E+00
2005	4.619E+04	2.523E+07	1.695E+03	1.076E+02	3.003E+04	2.018E+00
2006	4.593E+04	2.509E+07	1.686E+03	1.070E+02	2.986E+04	2.006E+00
2007	4.582E+04	2.503E+07	1.682E+03	1.068E+02	2.979E+04	2.002E+00
2008	4.603E+04	2.515E+07	1.690E+03	1.073E+02	2.992E+04	2.011E+00
2009	4.563E+04	2.493E+07	1.675E+03	1.063E+02	2.967E+04	1.993E+00
2010	4.546E+04	2.483E+07	1.669E+03	1.059E+02	2.955E+04	1.986E+00
2011	4.579E+04	2.502E+07	1.681E+03	1.067E+02	2.977E+04	2.000E+00
2012	4.681E+04	2.557E+07	1.718E+03	1.091E+02	3.043E+04	2.045E+00
2013	4.709E+04	2.572E+07	1.728E+03	1.097E+02	3.061E+04	2.057E+00
2014	4.757E+04	2.598E+07	1.746E+03	1.108E+02	3.092E+04	2.078E+00
2015	4.878E+04	2.665E+07	1.790E+03	1.137E+02	3.171E+04	2.131E+00
2016	4.872E+04	2.662E+07	1.788E+03	1.135E+02	3.167E+04	2.128E+00
2017	4.873E+04	2.662E+07	1.789E+03	1.136E+02	3.168E+04	2.129E+00
2018	4.886E+04	2.669E+07	1.793E+03	1.138E+02	3.176E+04	2.134E+00
2019	4.897E+04	2.675E+07	1.797E+03	1.141E+02	3.183E+04	2.139E+00
2020	4.938E+04	2.698E+07	1.813E+03	1.151E+02	3.210E+04	2.157E+00

Results (Continued)

Year	Carbon dioxide			NMOC		
	(Mg/year)	(m ³ /year)	(av ft ³ /min)	(Mg/year)	(m ³ /year)	(av ft ³ /min)
2021	4.986E+04	2.724E+07	1.830E+03	1.162E+02	3.242E+04	2.178E+00
2022	5.113E+04	2.793E+07	1.877E+03	1.192E+02	3.324E+04	2.233E+00
2023	5.175E+04	2.827E+07	1.900E+03	1.206E+02	3.365E+04	2.261E+00
2024	5.175E+04	2.827E+07	1.900E+03	1.206E+02	3.364E+04	2.261E+00
2025	5.175E+04	2.827E+07	1.900E+03	1.206E+02	3.364E+04	2.260E+00
2026	5.175E+04	2.827E+07	1.899E+03	1.206E+02	3.364E+04	2.260E+00
2027	5.175E+04	2.827E+07	1.899E+03	1.206E+02	3.364E+04	2.260E+00
2028	5.174E+04	2.827E+07	1.899E+03	1.206E+02	3.364E+04	2.260E+00
2029	5.174E+04	2.827E+07	1.899E+03	1.206E+02	3.364E+04	2.260E+00
2030	5.174E+04	2.826E+07	1.899E+03	1.206E+02	3.364E+04	2.260E+00
2031	5.174E+04	2.826E+07	1.899E+03	1.206E+02	3.363E+04	2.260E+00
2032	5.174E+04	2.826E+07	1.899E+03	1.206E+02	3.363E+04	2.260E+00
2033	5.173E+04	2.826E+07	1.899E+03	1.206E+02	3.363E+04	2.260E+00
2034	5.173E+04	2.826E+07	1.899E+03	1.205E+02	3.363E+04	2.260E+00
2035	5.173E+04	2.826E+07	1.899E+03	1.205E+02	3.363E+04	2.260E+00
2036	5.173E+04	2.826E+07	1.899E+03	1.205E+02	3.363E+04	2.259E+00
2037	5.173E+04	2.826E+07	1.899E+03	1.205E+02	3.363E+04	2.259E+00
2038	5.173E+04	2.826E+07	1.899E+03	1.205E+02	3.363E+04	2.259E+00
2039	5.172E+04	2.826E+07	1.899E+03	1.205E+02	3.363E+04	2.259E+00
2040	5.172E+04	2.826E+07	1.899E+03	1.205E+02	3.362E+04	2.259E+00
2041	5.172E+04	2.826E+07	1.898E+03	1.205E+02	3.362E+04	2.259E+00
2042	5.172E+04	2.825E+07	1.898E+03	1.205E+02	3.362E+04	2.259E+00
2043	5.172E+04	2.825E+07	1.898E+03	1.205E+02	3.362E+04	2.259E+00
2044	5.172E+04	2.825E+07	1.898E+03	1.205E+02	3.362E+04	2.259E+00
2045	5.172E+04	2.825E+07	1.898E+03	1.205E+02	3.362E+04	2.259E+00
2046	5.172E+04	2.825E+07	1.898E+03	1.205E+02	3.362E+04	2.259E+00
2047	5.171E+04	2.825E+07	1.898E+03	1.205E+02	3.362E+04	2.259E+00
2048	5.171E+04	2.825E+07	1.898E+03	1.205E+02	3.362E+04	2.259E+00
2049	5.014E+04	2.739E+07	1.841E+03	1.168E+02	3.260E+04	2.190E+00
2050	4.818E+04	2.632E+07	1.768E+03	1.123E+02	3.132E+04	2.104E+00
2051	4.629E+04	2.529E+07	1.699E+03	1.079E+02	3.009E+04	2.022E+00
2052	4.447E+04	2.430E+07	1.632E+03	1.036E+02	2.891E+04	1.943E+00
2053	4.273E+04	2.334E+07	1.568E+03	9.957E+01	2.778E+04	1.866E+00
2054	4.105E+04	2.243E+07	1.507E+03	9.567E+01	2.669E+04	1.793E+00
2055	3.944E+04	2.155E+07	1.448E+03	9.192E+01	2.564E+04	1.723E+00
2056	3.790E+04	2.070E+07	1.391E+03	8.831E+01	2.464E+04	1.655E+00
2057	3.641E+04	1.989E+07	1.337E+03	8.485E+01	2.367E+04	1.590E+00
2058	3.498E+04	1.911E+07	1.284E+03	8.152E+01	2.274E+04	1.528E+00
2059	3.361E+04	1.836E+07	1.234E+03	7.833E+01	2.185E+04	1.468E+00
2060	3.229E+04	1.764E+07	1.185E+03	7.525E+01	2.099E+04	1.411E+00
2061	3.103E+04	1.695E+07	1.139E+03	7.230E+01	2.017E+04	1.355E+00
2062	2.981E+04	1.629E+07	1.094E+03	6.947E+01	1.938E+04	1.302E+00
2063	2.864E+04	1.565E+07	1.051E+03	6.674E+01	1.862E+04	1.251E+00
2064	2.752E+04	1.503E+07	1.010E+03	6.413E+01	1.789E+04	1.202E+00
2065	2.644E+04	1.444E+07	9.705E+02	6.161E+01	1.719E+04	1.155E+00
2066	2.540E+04	1.388E+07	9.325E+02	5.920E+01	1.651E+04	1.110E+00
2067	2.441E+04	1.333E+07	8.959E+02	5.688E+01	1.587E+04	1.066E+00
2068	2.345E+04	1.281E+07	8.608E+02	5.465E+01	1.525E+04	1.024E+00
2069	2.253E+04	1.231E+07	8.270E+02	5.250E+01	1.465E+04	9.842E-01
2070	2.165E+04	1.183E+07	7.946E+02	5.044E+01	1.407E+04	9.456E-01
2071	2.080E+04	1.136E+07	7.634E+02	4.847E+01	1.352E+04	9.085E-01

General information

Public comment period begins: October 31, 2023

Public comment period ends: December 15, 2023

The Minnesota Pollution Control Agency (MPCA) Commissioner has made a preliminary determination to reissue this permit.

Name and address of Permittee:

Pine Bend Landfill Inc; Republic
Services Inc
2495 117th St E
Inver Grove Heights, MN 55077-5919

4325 66th St E
Inver Grove Heights, MN 55076-4233

Facility name and location:

Pine Bend Energy LLC
2495 117th St E
Inver Grove Heights, MN 55077-5919
Dakota County

MPCA contact person:

Air Permit
Joy Wiecks
Industrial Division
Minnesota Pollution Control Agency
525 Lake Ave S., Suite 400
Duluth, MN 55802
Phone: 218-302-6672
Email: joy.wiecks@state.mn.us

File manager phone: 651-757-2728 or
844-828-0942

A draft permit and supporting documentation are available for review on the MPCA Public Notices webpage at <https://www.pca.state.mn.us/get-engaged/public-comments>. Additional materials relating to the issuance of this permit are available for inspection by appointment at any MPCA office (<https://www.pca.state.mn.us/about-mpca/contact-us>) between the hours of 8:00 a.m. and 4:30 p.m., Monday through Friday. The MPCA will mail or email a copy of the draft permit upon request. Comments, petitions, and other requests must be received at the MPCA in writing on or before the public comment period end date and U.S. Mail comments must be received by 4:30 p.m.

Description of Pine Bend RNG, LLC

BFI Waste Systems of North America, LLC owns and operates the Pine Bend landfill, a mixed solid waste landfill in the City of Inver Grove Heights in Dakota County, Minnesota. Pine Bend RNG, LLC operates a renewable natural gas (RNG) facility that recovers landfill gas and converts it to pipeline quality natural gas equivalent. Air emissions from the RNG facility are controlled by an open flare and a thermal oxidizer. BFI Waste Systems North America, LLC proposes to develop and permit an 85-foot vertical expansion at the landfill that has the potential to increase air emissions at the facility. The MPCA is co-noticing an Environmental Assessment Worksheet and a draft air emissions Part 70 permit.

The draft Part 70 operating permit encompasses the entire facility and incorporates three minor amendments – one for the vertical expansion at the landfill, one for the installation of the RNG facility and one for approval to operate a diesel-fired tipper on the working face of the landfill. The draft permit also includes testing and monitoring requirements for proper operation of the thermal oxidizer and open flare.

A summary of the Potential to Emit (PTE) in tons per year is as follows:

Pollutant	PM	PM ₁₀	PM _{2.5}	SO ₂	NO _x	VOCs	CO	CO ₂ e	Single HAP*	All HAPs
Total Facility PTE Emissions	97.0	32.0	13.5	90.6	40.8	10.52	163.2	250,790	3.55	8.95

PM = Particulate Matter

PM_{2.5} = PM, 2.5 microns and smaller

NO_x = Nitrogen Oxides

CO = Carbon Monoxide

HAP = Hazardous Air Pollutant

PM₁₀ = PM, 10 microns and smaller

SO₂ = Sulfur Dioxide

VOCs = Volatile Organic Compounds

CO₂e = Carbon Dioxide Equivalents as defined in Minn. R. 7007.0100

* Single HAP = Metallic HAPs

The preliminary determination to reissue this Air permit is tentative.

Description of EAW Action

The MPCA is concurrently releasing its environmental assessment worksheet (EAW) for the proposed vertical expansion of the Pine Bend Landfill in Dakota County. BFI Waste Systems of North America, LLC. Is proposing to develop and permit a vertical expansion of their mixed municipal solid waste landfill, increasing the capacity by approximately 8.185 million cubic yards and increasing the height of the landfill by 85 feet.

Procedure for public participation

As stated in Minn. R. chs. 7000 and 7001, there are three formal procedures for public participation in the MPCA's consideration of this matter. Interested persons may:

- 1) Submit written comments on the draft permit.
- 2) Petition the MPCA to hold a public informational meeting. As described below, this meeting will be held on August 14, 2023.
- 3) Petition the MPCA to hold a contested case hearing.

Submitting written comments

Comments may be submitted:

- 1) Online at <https://mpca.commentinput.com/comment/search>; or
- 2) By U.S. postal mail to the following address:
Minnesota Pollution Control Agency
c/o Joy Wiecks
525 Lake Ave S., Suite 400
Duluth, MN 55802

Submitted comments or petitions must state:

- 1) Your interest in the permit application or the draft permit.
- 2) The action you wish the MPCA to take, including specific references to the section of the draft permit you believe should be changed.
- 3) The reasons supporting your position, stated with sufficient specificity as to allow the MPCA to investigate the merits of the position.

Public informational meeting

The Minnesota Pollution Control Agency (MPCA) will host a public informational meeting for an EAW and draft Part 70 air permit reissuance to BFI Waste Systems of North America, LLC. on Thursday, November 30, 2023. The meeting will run from 5:30 p.m. to 7:00 p.m. The MPCA is posting notice of this public meeting pursuant to Minn. R. 7001.1020. The meeting will be held at Woodcrest Church at 525 Cliff Road, Eagan, MN. The meeting will start at 5:30 p.m. with a 30 minute open house to allow review of visual aids and printed materials. At 6:00 p.m., there will be a short presentation by MPCA about the EAW and draft air permit followed by a question and answer session. Information about the meeting will also be posted on MPCA's website at [Public Notices | Minnesota Pollution Control Agency \(state.mn.us\)](https://www.mn.gov/public-notices).

Contested Case Hearing

A contested case hearing is a formal proceeding before an administrative law judge empowered to advise the MPCA regarding issues of fact. As described in Minn. R. 7000.1800, persons who submit petitions for a contested case hearing must also state the issues they propose to address in a contested case hearing, the specific relief requested or resolution of the matter, and the reasons (which may be in the form of proposed findings) supporting an MPCA decision to hold a contested case hearing. Failure to comply with these rules exactly may result in a denial of the request. To the extent known, the petitioner may also submit a list of prospective witnesses to be called at a hearing, a proposed list of publications, references, or studies to be introduced at a hearing and the approximate time required for the petitioner to present the matter at a hearing. The decision whether to hold a contested case hearing will be made under Minn. R. 7000.1900.

Concurrent Environmental Assessment Worksheet Public Notice

In conjunction with the air permit public notice, an environmental assessment worksheet (EAW) has been prepared for this project. The EAW is undergoing a separate, but concurrent public review. An electronic version of the EAW is available on the MPCA Environmental Review webpage at <http://www.pca.state.mn.us/oxpg691>. If you would like a copy of the EAW or have any questions on the EAW, contact:
Megen Kabele

Resource Management and Assistance Division
Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, MN 55155
Phone: 651-757-2044
Email: megen.kabele@state.mn.us

October 31, 2023

Ms. Genevieve Damico, Chief
Air Permit Section (AR-18J)
U.S. Environmental Protection Agency
77 West Jackson Boulevard
Chicago, IL 60604

RE: Proposal to Issue Permit No. 03700138-101, to Pine Bend Energy LLC for Their Facility Located at 2495 117th Street E, Inver Grove Heights, Dakota County, Minnesota

Dear Genevieve Damico:

Air Emissions Permit No. 03700138-101, is being placed on public notice. A copy of the public notice, permit, and technical support document can be found on the Minnesota Pollution Control Agency (MPCA) website at <https://mpca.commentinput.com/comment/search>. The draft permit is being placed on a 45-day public notice.

The permit action is for reissuance of the Part 70 operating permit; therefore, the permit has been placed on public notice.

PBL is a single stationary source composed of a municipal solid waste (MSW) landfill and a renewable natural gas (RNG) plant. The landfill gas (LFG) generated through waste decomposition in the MSW landfill is routed to the RNG Plant that converts the LFG to pipeline quality natural gas equivalent. The RNG plant processes include compression, filtration, water removal (through a chiller), combustion and removal of non-methane gas. A thermal oxidizer combusts waste gas generated by the conversion of LFG to RNG. LFG not converted to RNG as well as RNG not meeting pipeline quality of natural gas (otherwise known as off-spec gas) is combusted in the open flare.

This facility previously burned LFG on-site to generate electricity. This equipment has been removed and replaced by the RNG plant as a minor amendment. In total, three minor amendments and one administrative amendment are being rolled into the Part 70 permit reissuance. One minor amendment was for installation of a diesel fired tipper on the working face of the landfill to assist in unloading waste that arrives in large semi-trucks. The second minor amendment allowed installation of the RNG treatment system, along with a thermal oxidizer and open flare. The third minor amendment increased the landfill's capacity. These amendments allowed minor increases of combustion products and landfill gas emissions. The administrative amendment requested that the facility's name be changed from Pine Bend Energy, LLC to Pine Bend RNG, LLC. As stated above, two turbines and two duct burners that were previously used to generate electricity have been removed, along with two enclosed flares.

The permit is assigned to Joy Wiecks, of our staff. The proposed permit will be provided to the U.S. Environmental Protection Agency (EPA) for review following the 45-day public review period.

Ms. Genevieve Damico

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October 31, 2023

Please feel free to contact me at 651-757-2514, or Joy Wiecks, at 218-302-6672 if you have any questions or comments.

Sincerely,

A handwritten signature in black ink that reads "Jared LaFave". The script is cursive and fluid.

This document has been electronically signed.

Jared LaFave, P.E.

Supervisor, Air Quality Permits Unit 4

Air Quality Permits Section

Industrial Division

JL/JW:lao

cc: Aaron Janusz, Pine Bend Landfill Inc
Dan Dietrich, MPCA
Joy Wiecks, MPCA

Draft
Air Individual Permit
Part 70 Reissuance
03700138-101

Permittee: Pine Bend RNG LLC
Co-permittee name: Pine Bend RNG, LLC
Facility name: Pine Bend Landfill
2345 117th Street E
Inver Grove Heights, MN 55077-5917
Dakota County

Expiration date: [five years from issuance]

* All Title I Conditions do not expire

Part 70 Reissuance: [Action Issue Date]

Permit characteristics: Federal; Part 70

The emission units, control equipment and emission stacks at the stationary source authorized in this permit reissuance are as described in the submittals listed in the Permit Applications Table.

This permit reissuance supersedes Air Emission Permit No. 03700138- 004 and authorizes the Permittee to operate the stationary source at the address listed above unless otherwise noted in the permit. The Permittee must comply with all the conditions of the permit. Any changes or modifications to the stationary source must be performed in compliance with Minn. R. 7007.1150 to 7007.1500. Terms used in the permit are as defined in the state air pollution control rules unless the term is explicitly defined in the permit.

Unless otherwise indicated, all the Minnesota rules cited as the origin of the permit terms are incorporated into the SIP under 40 CFR § 52.1220 and as such are enforceable by U.S. Environmental Protection Agency (EPA) Administrator or citizens under the Clean Air Act.

Signature: ()

This document has been electronically signed.

for Steven S. Pak, P.E., Manager
Air Quality Permits Section
Industrial Division

for the Minnesota Pollution Control Agency

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Permit issued: [month day, year]
Permit expires: [month day, year]

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1. Permit applications table

Title description	Application receipt date	Action number
Minor Amendment	11/03/2009	03700138-101
Minor Amendment	05/25/2021	
Part 70 Reissuance	09/01/2009	
Minor Amendment	12/18/2020	
Administrative Amendment	12/15/2020	

2. Where to send submittals

Send submittals that are required to be submitted to the EPA regional office to:

Chief Air Enforcement
Air and Radiation Branch
EPA Region V
77 West Jackson Boulevard
Chicago, Illinois 60604

Each submittal must be postmarked or received by the date specified in the applicable Table. Those submittals required by Minn. R. 7007.0100 to 7007.1850 must be certified by a responsible official, defined in Minn. R. 7007.0100, subp. 21. Other submittals shall be certified as appropriate if certification is required by an applicable rule or permit condition.

Send submittals that are required by the Acid Rain Program to:

U.S. Environmental Protection Agency
Clean Air Markets Division
1200 Pennsylvania Avenue NW (6204M)
Washington, D.C. 20460

Send any application for a permit or permit amendment to:

Fiscal Services – 6th Floor
Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, Minnesota 55155-4194

Also, where required by an applicable rule or permit condition, send to the Permit Document Coordinator notices of:

- a. Accumulated insignificant activities
- b. Installation of control equipment
- c. Replacement of an emissions unit, and
- d. Changes that contravene a permit term

Unless another person is identified in the applicable Table, send all other submittals to:

AQ Compliance Tracking Coordinator
Industrial Division
Minnesota Pollution Control Agency
520 Lafayette Road North
St. Paul, Minnesota 55155-4194

Or

Email a signed and scanned PDF copy to:
submitstacktest.pca@state.mn.us
(for submittals related to stack testing)
AQRoutineReport.PCA@state.mn.us
(for other compliance submittals)
(See complete email instructions in “Routine Air Report Instructions Letter” at
<https://www.pca.state.mn.us/sites/default/files/aq-f6-15.pdf>)

3. Facility description

The Pine Bend Landfill (PBL) is located at 2495 117th Street E, Inver Grove Heights, Dakota County, Minnesota.

PBL is single stationary source composed of a municipal solid waste (MSW) landfill and a renewable natural gas (RNG) plant. The MSW landfill is owned and operated by BFI Waste Systems of North America, LLC. The RNG Plant is owned and operated by Pine Bend RNG, LLC (PBR). The landfill gas (LFG) generated through waste decomposition in the MSW landfill is routed to the RNG Plant that converts the LFG to pipeline quality natural gas equivalent. The RNG plant processes include compression, filtration, water removal (through a chiller), combustion and removal of non-methane gas. A thermal oxidizer combusts waste gas generated by the conversion of LFG to RNG. LFG not converted to RNG as well as RNG not meeting pipeline quality of natural gas (otherwise known as off-spec gas) is combusted in the open flare.

This Facility previously burned LFG on-site to generate electricity. This equipment has been removed and replaced by the RNG plant as a minor amendment. In total, three minor amendments and one administrative amendment are being rolled into the Part 70 permit reissuance. One minor amendment was for installation of a diesel fired tipper on the working face of the landfill to assist in unloading waste that arrives in large semi-trucks. The second minor amendment allowed installation of the RNG treatment system, along with a thermal oxidizer and open flare. The third minor amendment increased the landfill's capacity. These amendments allowed minor increases of combustion products and landfill gas emissions. The administrative amendment requested that the facility's name be changed from Pine Bend Energy, LLC to Pine Bend RNG, LLC. As stated above, two turbines and two duct burners that were previously used to generate electricity have been removed, along with two enclosed flares.

This permit does not cover emissions related to the end use of the natural gas that is produced.

4. Summary of subject items

SI ID: Description	Relationship type	Related SI ID: Description
TFAC 1: Pine Bend RNG LLC		
COMG 7: Landfill and Treatment Systems	has members	EQUI 29, EQUI 31, FUGI 2, TREA 6
EQUI 17: LFG flow and pilot flame recorder	receives from	EQUI 22: LFG flow meter
EQUI 17: LFG flow and pilot flame recorder	receives from	EQUI 23: Pilot flame continuous measurement
EQUI 18: Off spec gas flow recorder	receives from	EQUI 24: Off spec gas flow meter
EQUI 19: Waste gas flow and combustion temp recorder	receives from	EQUI 25: Waste gas flow meter
EQUI 19: Waste gas flow and combustion temp recorder	receives from	EQUI 26: Combustion temp sensor
EQUI 20: LFG and combustion temp recorder		
EQUI 21: Natural gas flow recorder	receives from	EQUI 28: Natural gas flow meter
EQUI 22: LFG flow meter		
EQUI 23: Pilot flame continuous measurement		
EQUI 24: Off spec gas flow meter		
EQUI 25: Waste gas flow meter		
EQUI 26: Combustion temp sensor		
EQUI 27: LFG flow meter		
EQUI 28: Natural gas flow meter		
EQUI 29: Industrial/Demolition Landfill	is controlled by	TREA 6: Open Flare
EQUI 31: Renewable Natural Gas Plant	is controlled by	TREA 6: Open Flare
EQUI 31: Renewable Natural Gas Plant	is controlled by	TREA 7: Low-BTU Gas Flare

SI ID: Description	Relationship type	Related SI ID: Description
FUGI 2: Fugitive Emissions from Landfill		
FUGI 3: Fugitive PM from paved roads	is controlled by	TREA 2: Dust Suppression by Water Spray
FUGI 4: Fugitive PM from unpaved roads	is controlled by	TREA 3: Dust Suppression by Water Spray
STRU 1: Main Building		
STRU 2: Gas Compressor Building		
STRU 3: Office Building		
STRU 4:		
STRU 12: Stack/Vent		
STRU 13: Stack/Vent		
TREA 2: Dust Suppression by Water Spray		
TREA 3: Dust Suppression by Water Spray		
TREA 6: Open Flare	sends to	EQUI 17: LFG flow and pilot flame recorder
TREA 6: Open Flare	sends to	EQUI 18: Off spec gas flow recorder
TREA 6: Open Flare	sends to	EQUI 20: LFG and combustion temp recorder
TREA 6: Open Flare	is monitored by	EQUI 22: LFG flow meter
TREA 6: Open Flare	is monitored by	EQUI 23: Pilot flame continuous measurement
TREA 6: Open Flare	is monitored by	EQUI 24: Off spec gas flow meter
TREA 6: Open Flare	is monitored by	EQUI 26: Combustion temp sensor
TREA 6: Open Flare	sends to	STRU 13: Stack/Vent
TREA 7: Low-BTU Gas Flare	sends to	EQUI 19: Waste gas flow and

Permit Issued: [month day, year]
Permit Expires: [month day, year]

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SI ID: Description	Relationship type	Related SI ID: Description
		combustion temp recorder
TREA 7: Low-BTU Gas Flare	sends to	EQUI 21: Natural gas flow recorder
TREA 7: Low-BTU Gas Flare	is monitored by	EQUI 24: Off spec gas flow meter
TREA 7: Low-BTU Gas	is monitored	EQUI 26:

SI ID: Description	Relationship type	Related SI ID: Description
Flare	by	Combustion temp sensor
TREA 7: Low-BTU Gas Flare	is monitored by	EQUI 28: Natural gas flow meter
TREA 7: Low-BTU Gas Flare	sends to	STRU 12: Stack/Vent

5. Limits and other requirements

Requirement number	Requirement and citation
TFAC 1	Pine Bend RNG LLC
5.1.1	Permit Appendices: This permit contains appendices as listed in the permit Table of Contents. The Permittee shall comply with all requirements contained in Appendices A. Insignificant activities and general applicable requirements, B. 40 CFR Part 60, Subpart XXX - Standards of Performance for Municipal Solid Waste Landfills That Commenced Construction, Reconstruction, or Modification After July 17, 2014, C. 40 CFR Part 60, Subpart A - General Provisions, D. 40 CFR Part 63, Subpart AAAAA - National Emissions Standards for Hazardous Air Pollutants: Municipal Solid Waste Landfills, E 40 CFR Part 63, Subpart A - General Provisions. [Minn. R. 7007.0800, subp. 2(A) & (B)]
5.1.2	The Permittee must comply with Minn. Stat. 116.385. The Permittee may not use trichloroethylene at its permitted facility including in any manufacturing, processing, or cleaning processes, except as described in Minn. Stat. 116.385, subd. 2(b) and 4. This is a state-only requirement and is not enforceable by the U.S. Environmental Protection Agency (EPA) Administrator and citizens under the Clean Air Act. [Minn. R. 7007.0100, subp. 7(X), Minn. Stat. 116.385]
5.1.3	PERMIT SHIELD: Subject to the limitations in Minn. R. 7007.1800, compliance with the conditions of this permit shall be deemed compliance with the specific provision of the applicable requirement identified in the permit as the basis of each condition. Subject to the limitations of Minn. R. 7007.1800 and 7017.0100, subp. 2, notwithstanding the conditions of this permit specifying compliance practices for applicable requirements, any person (including the Permittee) may also use other credible evidence to establish compliance or noncompliance with applicable requirements. This permit shall not alter or affect the liability of the Permittee for any violation of applicable requirements prior to or at the time of permit issuance. [Minn. R. 7007.1800(A)(2)]
5.1.4	The Permittee shall comply with National Primary and Secondary Ambient Air Quality Standards, 40 CFR pt. 50, and the Minnesota Ambient Air Quality Standards, Minn. R. 7009.0010 to 7009.0090. Compliance shall be demonstrated upon written request by the MPCA. [Minn. R. 7007.0800, subp. 2(A) & (B), Minn. R. 7009.0020-7009.0090, Minn. Stat. 116.07, subd. 4a(a)]
5.1.5	Circumvention: Do not install or use a device or means that conceals or dilutes emissions, which would otherwise violate a federal or state air pollution control rule, without reducing the total amount of pollutant emitted. [Minn. R. 7011.0020]
5.1.6	The Permittee must at all times properly operate and maintain the facilities and systems of treatment and control and the appurtenances related to them that are installed or used by the Permittee to achieve compliance with the conditions of the permit. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance procedures. [Minn. R. 7007.0800, subp. 16(J)]
5.1.7	Operation and Maintenance Plan: Retain at the stationary source an operation and maintenance plan for all air pollution control equipment. At a minimum, the O & M plan shall identify all air pollution control equipment and control practices and shall include a preventative maintenance program for the equipment and practices, a description of (the minimum but not necessarily the only) corrective actions to be taken to restore the equipment and practices to proper operation to meet applicable permit conditions, a description of the employee training program for proper operation and maintenance of the control equipment and practices, and the records kept to demonstrate plan implementation. [Minn. R. 7007.0800, subp. 14, Minn. R. 7007.0800, subp. 16(J)]
5.1.8	Operation Changes: In any shutdown, breakdown, or deviation the Permittee must immediately or as soon as possible considering plant and personnel safety take all practical steps to modify operations to reduce the emission of any regulated air pollutant. No emissions units that have an unreasonable

Requirement number	Requirement and citation
	shutdown or breakdown frequency of process or control equipment are permitted to operate. [Minn. R. 7019.1000, subp. 4]
5.1.9	Fugitive Emissions: Do not cause or permit the handling, use, transporting, or storage of any material in a manner which may allow avoidable amounts of particulate matter to become airborne. Comply with all other requirements listed in Minn. R. 7011.0150. [Minn. R. 7011.0150]
5.1.10	Noise: The Permittee shall comply with the noise standards set forth in Minn. R. 7030.0010 to 7030.0080 at all times during the operation of any emission units. This is a state only requirement and is not enforceable by the EPA Administrator or citizens under the Clean Air Act. [Minn. R. 7030.0010-7030.0080]
5.1.11	Inspections: The Permittee shall comply with the inspection procedures and requirements as found in Minn. R. 7007.0800, subp. 9(A). [Minn. R. 7007.0800, subp. 9(A)]
5.1.12	The Permittee shall comply with the General Conditions listed in Minn. R. 7007.0800, subp. 16. [Minn. R. 7007.0800, subp. 16]
5.1.13	Performance Testing: Conduct all performance tests in accordance with Minn. R. ch. 7017 unless otherwise noted in this permit. [Minn. R. ch. 7017]
5.1.14	Performance Test Notifications and Submittals: Performance Test Notification and Plan: due 30 days before each Performance Test Performance Test Pre-test Meeting: due seven days before each Performance Test Performance Test Report: due 45 days after each Performance Test The Notification, Test Plan, and Test Report must be submitted in a format specified by the commissioner. [Minn. R. 7017.2017, Minn. R. 7017.2030, subps. 1-4, Minn. R. 7017.2035, subps. 1-2]
5.1.15	Limits set as a result of a performance test (conducted before or after permit issuance) apply until superseded as stated in the MPCA's Notice of Compliance letter granting preliminary approval. Preliminary approval is based on formal review of a subsequent performance test on the same unit as specified by Minn. R. 7017.2025, subp. 3. The limit is final upon issuance of a permit amendment incorporating the change. [Minn. R. 7017.2025, subp. 3]
5.1.16	Monitoring Equipment Calibration - The Permittee shall either: 1. Calibrate or replace required monitoring equipment every 12 months; or 2. Calibrate at the frequency stated in the manufacturer's specifications. For each monitor, the Permittee shall maintain a record of all calibrations, including the date conducted, and any corrective action that resulted. The Permittee shall include the calibration frequencies, procedures, and manufacturer's specifications (if applicable) in the Operations and Maintenance Plan. Any requirements applying to continuous emission monitors are listed separately in this permit. [Minn. R. 7007.0800, subp. 4(D)]
5.1.17	Operation of Monitoring Equipment: Unless noted elsewhere in this permit, monitoring a process or control equipment connected to that process is not necessary during periods when the process is shutdown, or during checks of the monitoring systems, such as calibration checks and zero and span adjustments. If monitoring records are required, they should reflect any such periods of process shutdown or checks of the monitoring system. [Minn. R. 7007.0800, subp. 4(D)]
5.1.18	Recordkeeping: Retain all records at the stationary source, unless otherwise specified within this permit, for five (5) years from the date of monitoring, sample, measurement, or report. Records which must be retained at this location include all calibration and maintenance records, all original recordings for continuous monitoring instrumentation, and copies of all reports required by the permit. Records must conform to the requirements listed in Minn. R. 7007.0800, subp. 5(A). [Minn. R. 7007.0800, subp. 5(C)]

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5.1.19	Recordkeeping: Maintain records describing any insignificant modifications (as required by Minn. R. 7007.1250, subp. 3) or changes contravening permit terms (as required by Minn. R. 7007.1350, subp. 2), including records of the emissions resulting from those changes. [Minn. R. 7007.0800, subp. 5(B)]
5.1.20	If the Permittee determines that no permit amendment or notification is required prior to making a change, the Permittee must retain records of all calculations required under Minn. R. 7007.1200. For expiring permits, these records shall be kept for a period of five years from the date the change was made or until permit reissuance, whichever is longer. The records shall be kept at the stationary source for the current calendar year of operation and may be kept at the stationary source or office of the stationary source for all other years. The records may be maintained in either electronic or paper format. [Minn. R. 7007.1200, subp. 4]
5.1.21	Shutdown Notifications: Notify the commissioner at least 24 hours in advance of a planned shutdown of any control equipment or process equipment if the shutdown would cause any increase in the emissions of any regulated air pollutant. If the Permittee does not have advance knowledge of the shutdown, the Permittee must notify the commissioner as soon as possible after the shutdown. However, notification is not required in the circumstances outlined in items A, B, and C of Minn. R. 7019.1000, subp. 3. At the time of notification, the owner or operator must inform the commissioner of the cause of the shutdown and the estimated duration. The owner or operator must notify the commissioner when the shutdown is over. [Minn. R. 7019.1000, subp. 3]
5.1.22	Breakdown Notifications: Notify the commissioner within 24 hours of a breakdown of more than one hour of any control equipment or process equipment if the breakdown causes any increase in the emissions of any regulated air pollutant. The 24-hour time period starts when the breakdown was discovered or reasonably should have been discovered by the owner or operator. However, notification is not required in the circumstances outlined in items A, B, and C of Minn. R. 7019.1000, subp. 2. At the time of notification or as soon as possible thereafter, the Permittee must inform the commissioner of the cause of the breakdown and the estimated duration. The Permittee must notify the commissioner when the breakdown is over. [Minn. R. 7019.1000, subp. 2]
5.1.23	Notification of Deviations Endangering Human Health or the Environment: Immediately after discovery of the deviation or immediately after when the deviation reasonably should have been discovered, notify the commissioner either orally or by e-mail, or telephone the state duty officer at 800-422-0798 or 651-649-5451, of any deviation from permit conditions that could endanger human health or the environment. [Minn. R. 7019.1000, subp. 1]
5.1.24	Notification of Deviations Endangering Human Health or the Environment Report: Within two working days of discovery, notify the commissioner in writing of any deviation from permit conditions that could endanger human health or the environment. Include the following information in this written description: 1. the cause of the deviation; 2. the exact dates of the period of the deviation, if the deviation has been corrected; 3. whether or not the deviation has been corrected; 4. the anticipated time by which the deviation is expected to be corrected, if not yet corrected; and 5. steps taken or planned to reduce, eliminate, and prevent reoccurrence of the deviation. [Minn. R. 7019.1000, subp. 1]
5.1.25	Application for Permit Amendment: If a permit amendment is needed, submit an application in accordance with the requirements of Minn. R. 7007.1150 through Minn. R. 7007.1500. Submittal dates vary, depending on the type of amendment needed. Upon adoption of a new or amended federal applicable requirement, and if there are three or more

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	years remaining in the permit term, the Permittee shall file an application for an amendment within nine months of promulgation of the applicable requirement, pursuant to Minn. R. 7007.0400, subp. 3. [Minn. R. 7007.0400, subp. 3, Minn. R. 7007.1150 - 7007.1500]
5.1.26	Extension Requests: The Permittee may apply for an Administrative Amendment to extend a deadline in a permit by no more than 120 days, provided the proposed deadline extension meets the requirements of Minn. R. 7007.1400, subp. 1(H). Performance testing deadlines from the General Provisions of 40 CFR pt. 60 and pt. 63 are examples of deadlines for which the MPCA does not have authority to grant extensions and therefore do not meet the requirements of Minn. R. 7007.1400, subp. 1(H). [Minn. R. 7007.1400, subp. 1(H)]
5.1.27	Within 15 days of a request from the Commissioner, the Permittee must provide a complete summary of all performance tests required at the facility including the subject item, pollutant, most recent test date (if applicable), and the date of the next test in an approved format. [Minn. R. 7007.0800, subp. 16(L)]
5.1.28	Emission Inventory Report: due on or before April 1 of each calendar year following permit issuance. Submit in a format specified by the Commissioner. [Minn. R. 7019.3000-7019.3100]
5.1.29	Emission Fees: due 30 days after receipt of an MPCA bill. [Minn. R. 7002.0005-7002.0085]
5.1.30	The Permittee shall not have engines that meet subparagraph (1)(iii) under the definition of Nonroad Engine at 40 CFR Section 1068.30 in one location within the stationary source for more than 12 consecutive months. A location is any single site at a building, structure, facility, or installation. Any engine, or engines, that replaces an engine at a location and that is intended to perform the same or similar function as the engine it replaced will be included in calculating the consecutive time period. [40 CFR 1068.30]
5.1.31	For a nonroad engine that is excluded from any requirements of 40 CFR Part 1068 because it is a stationary engine, the Permittee may not move it or install it in any mobile equipment, except as allowed by the provisions of 40 CFR Part 1068. The Permittee may not circumvent or attempt to circumvent the residence-time requirements of subparagraph (2)(iii) of the Nonroad Engine definition at 40 CFR Section 1068.30. [40 CFR 1068.101(b)(3)]
5.1.32	The Permittee shall conduct an inventory of all engines on-site that meet subparagraph (1)(iii) under the definition of Nonroad Engine at 40 CFR Section 1068.30, once each calendar quarter; inventories shall not take place in consecutive months. This applies to nonroad engines that are owned by the Permittee, or rented and operated by the Permittee, or brought onsite and operated by a vendor or contractor. The inventory shall include the following: 1) Date that the nonroad engine is inventoried. 2) Identification number. 3) Function of the nonroad engine (e.g. compressor, welder). 4) Location of the engine within the stationary source. 5) Statement that the nonroad engine has not been located in a single location for 12 consecutive months, and movement between locations has not been for purposes of circumvention of residence time requirements of subparagraph (2)(iii) under the definition of Nonroad Engine at 40 CFR Section 1068.30. [40 CFR 1068.30(nonrd engn)(1)(iii), Minn. R. 7007.0800, subps. 4-5]
5.1.33	A nonroad engine ceases to be a nonroad engine and becomes a new stationary engine if: 1. At any time, it meets the criteria specified in subparagraph (2)(iii) under the definition of Nonroad Engine in 40 CFR Section 1068.30. For example, a portable generator engine ceases to be a nonroad engine if it is used or will be used in a single specific location for 12 months or longer. If the Administrator or the Permitting authority determines that an engine will be or has been used in a single specific location for 12 months or longer, it ceased to be a nonroad engine when it was placed in that location.

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	OR 2. It is otherwise regulated by a federal New Source Performance Standard promulgated under section 111 of the Clean Air Act (42 U.S.C. 7411). [40 CFR 1068.31(e)]
COMG 7	Landfill and Treatment Systems
5.2.1	The Permittee must comply with all applicable requirements of 40 CFR pt. 60, subp. XXX as follows: 40 CFR 60.760(a); 40 CFR 60.761; 40 CFR 60.762(b)(1),(b)(2)(ii),(b)(2)(iii)(A),(C), (b)(2)(iv)-(v); 40 CFR 60.764(a)(1-5),(b)-(e); 40 CFR 60.767(a)(1),(3),(b)(3),(c)-(f),(i); 40 CFR 60.768(a),(b)(1),(b)(4)-(5),(c)(5),(d)(2),(e)(6),(f)-(j); and 40 CFR 60.769(a),(b), and (c)(1). A copy of 40 CFR pt. 60, subp. XXX is included in Appendix B. If the standard changes or upon adoption of a new or amended federal applicable requirement, and if there are more than 3 years remaining in the permit term, the Permittee shall file an application for an amendment within nine months of promulgation of the applicable requirement, pursuant to Minn. R. 7007.0400, subp. 3. [40 CFR pt. 60, subp. XXX, Minn. R. 7007.0400, subp. 3, Minn. R. 7011.3515]
5.2.2	The Permittee must comply with all applicable requirements of 40 CFR pt. 60, subp. A as follows: 40 CFR 60.1(a)-(c); 40 CFR 60.2; 40 CFR 60.3; 40 CFR 60.4; 40 CFR 60.5(a),(b); 40 CFR 60.6(a)-(c); 40 CFR 60.7(a)(1)-(4); 40 CFR 60.7(b); 40 CFR 60.7(f)-(h); 40 CFR 60.8(a); 40 CFR 60.8(c)-(h); 40 CFR 60.9; 40 CFR 60.11(a); 40 CFR 60.11(d); 40 CFR 60.11(g); 40 CFR 60.12; 40 CFR 60.13(a)-(b); 40 CFR 60.13(b); 40 CFR 60.13(e)(1); 40 CFR 60.13(f); 40 CFR 60.13(h)(2)-(3); 40 CFR 60.14(a); 40 CFR 60.14(b); 40 CFR 60.17; 40 CFR 60.18(a)-(b) 40 CFR 60.18(c)(1)-(3),(6); 40 CFR 60.18(d)-(f); 40 CFR 60.19(a)-(d); 40 CFR 60.19(f)(1)-(4);

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	A copy of 40 CFR pt. 60, subp. A is included in Appendix C. If the standard changes or upon adoption of a new or amended federal applicable requirement, and if there are more than 3 years remaining in the permit term, the Permittee shall file an application for an amendment within nine months of promulgation of the applicable requirement, pursuant to Minn. R. 7007.0400, subp. 3. [40 CFR pt. 60, subp. A, Minn. R. 7007.0400, subp. 3, Minn. R. 7007.1150-7007.1500, Minn. R. 7011.0050, Minn. R. 7017.1010 & 7017.2025, Minn. R. 7019.0100]
5.2.3	The Permittee must comply with all applicable requirements of 40 CFR pt. 63, subp. AAAA, as follows: 40 CFR 63.1930(b); 40 CFR 63.1935(a)(3); 40 CFR 63.1940(a),(c); 40 CFR 63.1945(b); 40 CFR 63.1950; 40 CFR 63.1955(a),(c); 40 CFR 63.1957; 40 CFR 63.1958; 40 CFR 63.1959(a); 40 CFR 63.1959(b)(1); 40 CFR 63.1959(b)(2)(i),(ii); 40 CFR 63.1959(b)(2)(iii)(A),(C); 40 CFR 63.1959(c)-(f); 40 CFR 63.1960; 40 CFR 63.1961(a),(c)-(h); 40 CFR 63.1962; 40 CFR 63.1964; 40 CFR 63.1965; 40 CFR 63.1975; 40 CFR 63.1981; 40 CFR 63.1982; 40 CFR 63.1983(a),(b)(1),(3)-(5),(c)(2)-(8),(d)-(h); 40 CFR 63.1985; 40 CFR 63.1990; and 40 CFR pt. 63, subp. AAAA, Table 1, Applicability of NESHAP General Provisions, as specified elsewhere in this permit. A copy of 40 CFR pt. 63, subp. AAAA is included in Appendix D. If the standard changes or upon adoption of a new or amended federal applicable requirement, and if there are more than 3 years remaining in the permit term, the Permittee shall file an application for an amendment within nine months of promulgation of the applicable requirement, pursuant to Minn. R. 7007.0400, subp. 3. [40 CFR pt. 63, subp. AAAA, Minn. R. 7007.0400, subp. 3, Minn. R. 7011.7390]
5.2.4	The Permittee must comply with all applicable requirements of 40 CFR pt. 63, subp. A as follows: 40 CFR 63.1(a); 40 CFR 63.1(b)(1); 40 CFR 63.1(c)(1)-(2); 40 CFR 63.1(e); 40 CFR 63.2; 40 CFR 63.3; 40 CFR 63.4(a)-(c); 40 CFR 63.5(b)(3);

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	40 CFR 63.6(a)(1); 40 CFR 63.6(c)(1)-(2); 40 CFR 63.6(e)(1); 40 CFR 63.6(f); 40 CFR 63.6(g); 40 CFR 63.7(a)-(b); 40 CFR 63.7(c)(1); 40 CFR 63.7(c)(2)(i),(ii),(iii)(A)-(C),(iv)-(v); 40 CFR 63.7(c)(3); 40 CFR 63.7(d); 40 CFR 63.7(e)(2)-(3); 40 CFR 63.7(g); 40 CFR 63.8(a); 40 CFR 63.8(c)(2)-(3); 40 CFR 63.8(c)(4)(i); 40 CFR 63.8(c)(5)-(6); 40 CFR 63.8(c)(7)(ii); 40 CFR 63.8(c)(8); 40 CFR 63.8(g)(1),(3-5); 40 CFR 63.9(a)(1),(3),(4)(ii); 40 CFR 63.9(b)(1)(i),(iii); 40 CFR 63.9(b)(2); 40 CFR 63.9(e); 40 CFR 63.9(h)(1),(3),(6); 40 CFR 63.9(i)(1); 40 CFR 63.9(k); 40 CFR 63.10(a)(1),(3),(4)(ii); 40 CFR 63.10(a)(5); 40 CFR 63.10(b)(1); 40 CFR 63.10(b)(2)(iii),(vi)-(xi),(xiv); 40 CFR 63.10(d)(1); 40 CFR 63.10(d)(2); 40 CFR 63.11(a)(1)-(2); 40 CFR 63.11(b)(1)-(6); 40 CFR 63.12(a)(1)-(2); 40 CFR 63.13; 40 CFR 63.14; and 40 CFR 63.15(a)-(b) . A copy of 40 CFR pt. 63, subp. A is included in Appendix E. If the standard changes or upon adoption of a new or amended federal applicable requirement, and if there are more than three years remaining in the permit term, the Permittee shall file an application for an amendment within nine months of promulgation of the applicable requirement, pursuant to Minn. R. 7007.0400, subp. 3. [40 CFR pt. 63, subp. A, Minn. R. 7007.0400, subp. 3, Minn. R. 7007.1150-7007.1500, Minn. R. 7011.0050, subp. 1(B), Minn. R. 7017.1010 & 7017.2025, Minn. R. 7019.0100]
5.2.5	The Permittee shall operate the collection system with negative pressure at each wellhead except under the following conditions: (1) A fire or increased well temperature. The Permittee must record instances when positive pressure occurs in efforts to avoid a fire. These records must be submitted with the annual reports as provided 40 CFR 63.1981(h); (2) Use of a geomembrane or synthetic cover. The Permittee must develop acceptable pressure limits

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	in the design plan; (3) A decommissioned well. A well may experience a static positive pressure after shut down to accommodate for declining flows. All design changes must be approved by the Administrator as specified in 40 CFR 63.1981(d)(2). [40 CFR 60.762(b)(2)(iv), 40 CFR 63.1958(b), Minn. R. 7011.3515, Minn. R. 7011.7390]
5.2.6	The Permittee shall operate each interior wellhead in the collection system with a landfill gas Temperature <= 62.8 degrees Celsius (145 degrees Fahrenheit). The Permittee may establish a higher operating temperature value at a particular well. A higher operating value demonstration must be submitted to the Administrator for approval and must include supporting data demonstrating that the elevated parameter neither causes fires nor significantly inhibits anaerobic decomposition by killing methanogens. The demonstration must satisfy both criteria in order to be approved (i.e., neither causing fires nor killing methanogens is acceptable). [40 CFR 60.762(b)(2)(iv), 40 CFR 63.1958(c), Minn. R. 7011.3515, Minn. R. 7011.7390]
FUGI 3	Fugitive PM from paved roads
5.3.1	The Permittee shall minimize or eliminate fugitive emissions from all paved surfaces. The Permittee shall use water to control fugitive particulate emissions, except as provided below. If fugitive emissions are observed, the Permittee shall record: 1) The date that fugitive dust was observed; 2) What corrective actions were taken, when the corrective actions were taken, and whether the corrective actions eliminated the fugitive dust; 3) If dust control measures were not taken because of a rainfall event or because an area is snow or ice-covered, documentation of the event or condition along with the source of measurement for rainfall (e.g. on-site rain gauge); 4) If dust control measures were not taken because of weather conditions, documentation of the date and the weather conditions (e.g. documentation that the temperature indicated freezing conditions). The Permittee is not required to use water to control fugitive particulate emissions under any of the following circumstances: 1) If there was a 0.10 inch rainfall during the previous 24 hours, or 2) If the areas to be controlled are covered with snow or ice, or 3) During freezing conditions. [Minn. R. 7007.0800, subps. 2(A) and 5(A), Minn. R. 7011.0150]
FUGI 4	Fugitive PM from unpaved roads
5.4.1	The Permittee must visually inspect all unpaved surfaces for fugitive emissions on each day of operation. If visible emissions are observed, the Permittee shall take appropriate corrective action. Corrective actions include, but are not limited to, watering or use of chemical stabilizers during adversely dry conditions. The facility shall maintain records of daily watering reports and fugitive emissions exception reports. [Minn. R. 7007.0800, subp. 2(A), Minn. R. 7011.0150]
TREA 6	Open Flare
5.5.1	The Permittee shall operate and maintain control equipment such that it achieves a control efficiency for Methane Gas >= 98 percent control efficiency. [Minn. R. 7007.0800, subp. 2(A) & (B)]
5.5.2	The Permittee shall operate and maintain control equipment such that it achieves a control efficiency for Nonmethane organic compounds (NMOC) >= 98 percent control efficiency. [Minn. R. 7007.0800, subp. 2(A) & (B)]
5.5.3	The Permittee shall operate and maintain control equipment such that it achieves a control efficiency for HAPs - Volatile >= 98 percent control efficiency. [Minn. R. 7007.0800, subp. 2(A) & (B)]
5.5.4	The Permittee must operate and maintain control equipment such that it achieves a control efficiency for Volatile Organic Compounds >= 98 percent control efficiency. [Minn. R. 7007.0800, subp. 2(A)]
5.5.5	Visible Emissions: TREA 6 shall be designed for and operated with no visible emissions, except for

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	periods not to exceed a total of 5 minutes during any 2 consecutive hours. [40 CFR 60.18(c)(1), 40 CFR 60.762(b)(2)(iii)(A), 40 CFR 63.11(b)(4), 40 CFR 63.1959(b)(2)(iii)(A), Minn. R. 7011.0050, Minn. R. 7011.3515, Minn. R. 7011.7390]
5.5.6	Fuel type: landfill gas and off-spec gas only. [Minn. R. 7007.0800, subp. 2(A) & (B)]
5.5.7	The Permittee shall vent landfill gas from either/both EQUI 29 and EQUI 31 to TREA 6, and operate and maintain TREA 6 at all times that any landfill gas is vented to TREA 6. The Permittee shall vent off-spec gas from EQUI 31 to TREA 6, and operate and maintain TREA 6 at all times that any off-spec gas is vented to TREA 6. The Permittee shall document periods of non-operation of the control equipment TREA 6. [Minn. R. 7007.0800, subp. 2(A)]
5.5.8	If the Permittee replaces TREA 6, the replacement control must meet or exceed the control efficiency requirements of TREA 6 as well as comply with all other requirements of TREA 6. Prior to making such a change, the Permittee shall apply for and obtain the appropriate permit amendment, as applicable. If no amendment is needed for the replacement, the Permittee shall submit an electronic notice to the Agency using Form CR-05. The notice must be received by the Agency seven working days prior to the commencement/start of replacement. [Minn. R. 7007.0800, subp. 2(A)]
5.5.9	The flare must be operated with a flare flame or pilot flame (or an electronically controlled automatic igniter system) present at all times. [Minn. R. 7007.0800, subp. 14]
5.5.10	The Permittee must operate and maintain the flare in accordance with the Operations and Maintenance (O & M) Plan. The Permittee must keep copies of the O & M Plan available onsite for use by staff and MPCA staff. [Minn. R. 7007.0800, subp. 14]
5.5.11	Daily Monitoring: The Permittee must physically verify the operation of the device used to monitor for flame presence at least once each operating day to verify that it is working and recording properly. The Permittee must maintain a written record of the daily verifications. [Minn. R. 7007.0800, subps. 4-5]
5.5.12	Recordkeeping: The Permittee must record the date, times and duration of all periods during which: 1. the flare flame or all the pilot flames are absent; 3. whether or not emissions were being vented to the flare during periods of flame absence; and 4. whether or not emissions were being vented to the flare during periods of visible emissions. If periods of flame absence or visible emissions are recorded when emissions are being vented to the flare, the emissions during that time must be considered uncontrolled until flame presence and/or no visible emission conditions are restored. The period of time for which there is no flame or there are visible emissions are considered deviations as defined by Minn. R. 7007.0100, subp. 8a and must be reported. [Minn. R. 7007.0800, subps. 4-5]
5.5.13	Recordkeeping of Flame Presence: The Permittee must maintain records of flame presence and other supporting information. The Permittee must maintain written records of the monitoring. [Minn. R. 7007.0800, subp. 5]
5.5.14	The Permittee must install, maintain, and operate a heat sensing device, such as an ultraviolet beam sensor or thermocouple, at the pilot light or the flame itself that continuously indicates and records the presence of a flame. [Minn. R. 7007.0800, subps. 4-5]
5.5.15	The Permittee must calibrate or replace the thermocouple or other equivalent monitoring device at least once every 12 months, or calibrate at the frequency stated in the manufacturer's specifications, and must maintain a written record of the calibration and any action resulting from the calibration. [Minn. R. 7007.0800, subp. 14, Minn. R. 7007.0800, subps. 4-5]
5.5.16	Annual Inspection: At least once per calendar year, the Permittee must conduct an inspection of the operating systems of the control device. The Permittee must keep a record of the inspection and any action resulting from the inspection. [Minn. R. 7007.0800, subp. 14, Minn. R. 7007.0800, subps. 4-5]

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5.5.17	Corrective Actions: If any of the flare components are found during the inspections to need repair, or the presence of flame is not detected, the Permittee must take corrective action as soon as possible. Corrective actions include, but are not limited to, those outlined in the O & M Plan for the Flare. The Permittee must keep a record of the type and date of any corrective action taken. [Minn. R. 7007.0800, subp. 14, Minn. R. 7007.0800, subp. 2(A), Minn. R. 7007.0800, subp. 5]
TREA 7	Low-BTU Gas Flare
5.6.1	The Permittee shall operate and maintain control equipment such that it achieves a control efficiency for Methane Gas $\geq$ 98 percent control efficiency. [Minn. R. 7007.0800, subp. 2(A) & (B)]
5.6.2	The Permittee shall operate and maintain control equipment such that it achieves a control efficiency for Nonmethane organic compounds (NMOC) $\geq$ 98 percent control efficiency. [Minn. R. 7007.0800, subp. 2(A) & (B)]
5.6.3	The Permittee shall operate and maintain control equipment such that it achieves a control efficiency for HAPs - Volatile $\geq$ 98 percent control efficiency. [Minn. R. 7007.0800, subp. 2(A) & (B)]
5.6.4	The Permittee must operate and maintain control equipment such that it achieves a control efficiency for Volatile Organic Compounds $\geq$ 98 percent control efficiency. [Minn. R. 7007.0800, subp. 2(A)]
5.6.5	The Permittee shall vent waste gas from EQUI 31 to TREA 7 whenever EQUI 31 operates, and operate and maintain TREA 7 at all times that any waste gas is vented to TREA 7. The Permittee shall document periods of non-operation of the control equipment TREA 7 whenever EQUI 31 is operating. [Minn. R. 7007.0800, subp. 2(A)]
5.6.6	If the Permittee replaces TREA 7, the replacement control must meet or exceed the control efficiency requirements of TREA 7 as well as comply with all other requirements of TREA 7. Prior to making such a change, the Permittee shall apply for and obtain the appropriate permit amendment, as applicable. If no amendment is needed for the replacement, the Permittee shall submit an electronic notice to the Agency using Form CR-05. The notice must be received by the Agency seven working days prior to the commencement/start of replacement. [Minn. R. 7007.0800, subp. 2(A)]
5.6.7	The Permittee shall operate and maintain the thermal oxidizer in accordance with the Operation and Maintenance (O & M) Plan. The Permittee shall keep copies of the O & M Plan available onsite for use by staff and MPCA staff. [Minn. R. 7007.0800, subp. 14]
5.6.8	Temperature Monitoring: The Permittee shall maintain and operate a thermocouple monitoring device that continuously indicates and records the combustion chamber temperature of the thermal oxidizer. The monitoring device shall have a margin of error less than the greater of $\pm$ 0.75 percent of the temperature being measured or $\pm$ 4.5 degrees Fahrenheit. The recording device shall also calculate the three-hour rolling average combustion chamber temperature. Recorded values outside the range specified in this permit are considered Deviations as defined by Minn. R. 7007.0100, subp. 8a. [Minn. R. 7007.0800, subps. 4-5]
5.6.9	Daily Monitoring: The Permittee shall physically verify the operation of the temperature recording device at least once each operating day to verify that it is working and recording properly. The Permittee shall maintain a written record of the daily verifications. [Minn. R. 7007.0800, subps. 4-5]
5.6.10	Monitoring Equipment: The Permittee shall install and maintain thermocouples to conduct temperature monitoring required by this permit. The monitoring equipment must be installed, in use, and properly maintained whenever operation of the monitored control equipment is required. [Minn. R. 7007.0800, subps. 4-5]
5.6.11	The Permittee shall maintain a continuous hard copy readout or computer disk file of the temperature readings and calculated three hour rolling average temperatures for the combustion chamber. [Minn. R. 7007.0800, subps. 4-5]
5.6.12	Annual Calibration: The Permittee shall calibrate the temperature monitor at least once every 12 months or at the frequency state in the manufacturer's specifications, and shall maintain a written

Requirement number	Requirement and citation
	record of the calibration and any action resulting from the calibration. [Minn. R. 7007.0800, subp. 14, Minn. R. 7007.0800, subp. 4, Minn. R. 7007.0800, subp. 5]
5.6.13	Quarterly Inspections: At least once per calendar quarter, the Permittee shall inspect the control equipment internal and external system components, including but not limited to the refractory, heat exchanger, and electrical systems. The Permittee shall maintain a written record of the inspection and any corrective actions taken resulting from the inspection. [Minn. R. 7007.0800, subp. 14, Minn. R. 7007.0800, subp. 4, Minn. R. 7007.0800, subp. 5]
5.6.14	Annual Inspection: At least once per calendar year, the Permittee shall conduct an internal inspection of the control device that includes all operating systems of the control device. The Permittee shall maintain a written record of the inspection and any action resulting from the inspection. [Minn. R. 7007.0800, subp. 14, Minn. R. 7007.0800, subp. 4, Minn. R. 7007.0800, subp. 5]
5.6.15	For periods when the thermal oxidizer is operated above the minimum combustion chamber temperature, the Permittee shall use either one of the following when completing calculations as required elsewhere in this permit: a. The control efficiency limit specified in this permit for this equipment (98%); or b. The control efficiency determined during the most recent MPCA approved performance test. If the tested efficiency is less than the efficiency limit in this permit, the Permittee must use the tested value in all calculations until the efficiency is demonstrated to be above the permit limit through a new test. [Minn. R. 7007.0800, subps. 4-5]
5.6.16	Corrective Actions: If the temperature is below the minimum specified by this permit or if the thermal oxidizer or any of its components are found during the inspections to need repair, the Permittee shall take corrective action as soon as possible. Corrective actions shall return the temperature to at least the permitted minimum and/or include completion of necessary repairs identified during the inspection, as applicable. Corrective actions include, but are not limited to, those outlined in the O & M Plan for the thermal oxidizer. The Permittee shall keep a record of the type and date of any corrective action taken. [Minn. R. 7007.0800, subp. 14, Minn. R. 7007.0800, subp. 2(A), Minn. R. 7007.0800, subp. 5]
5.6.17	Temperature ≥ 1556.6 degrees Fahrenheit 3-hour rolling average, at the combustion chamber outlet, unless a new limit is required to be set pursuant to Minn. R. 7017.2025, subp. 3. If a new minimum is required to be set it will be based on the values recorded during the most recent MPCA-approved performance test where compliance was demonstrated. The new limit shall be implemented upon receipt of the Notice of Compliance letter granting preliminary approval. The limit is final upon issuance of a permit amendment incorporating the change. If the 3-hour rolling average temperature is below the minimum temperature limit, the VOC emitted during that time shall be considered uncontrolled until the average temperature is above the minimum temperature limit. This shall be reported as a deviation. [Minn. R. 7007.0800, subp. 2(A)]

6. Submittal/action requirements

This section lists most of the submittals required by this permit. Please note that some submittal requirements may appear in the Limits and Other Requirements section, or, if applicable, within a Compliance Schedule section.

Requirement number	Requirement and citation
TFAC 1	Pine Bend RNG LLC
6.1.1	The Permittee must submit a semiannual deviations report : Due semiannually, by the 30th of January and July. The first semiannual report submitted by the Permittee must cover the calendar half-year in which the permit is issued. The first report of each calendar year covers January 1 - June 30. The second report of each calendar year covers July 1 - December 31. Submit this on form DRF-2

Requirement number	Requirement and citation
	(Deviation Reporting Form). If no deviations have occurred, submit the signed report certifying that there were no deviations. [Minn. R. 7007.0800, subp. 6(B)(2)]
6.1.2	The Permittee must submit a compliance certification : Due annually, by the 31st of January (for the previous calendar year). Submit this on form CR-04 (Annual Compliance Certification Report). This report covers all deviations experienced during the calendar year. If no deviations have occurred, submit the signed report certifying that there were no deviations. [Minn. R. 7007.0800, subp. 6(D)]
6.1.3	The Permittee shall submit an application for permit reissuance : Due 180 calendar days before Permit Expiration Date. [Minn. R. 7007.0400, subp. 2]
COMG 7	Landfill and Treatment Systems
6.2.1	The Permittee must submit an initial design capacity report: Due 90 days after construction commenced that includes the information specified in 40 CFR Section 60.767(a)(2)(i) and (ii). [40 CFR 60.767(a), 40 CFR 63.1981, Minn. R. 7011.3515, Minn. R. 7011.7390]
6.2.2	The Permittee must submit a collection and control system design plan: Due within 1 year of the first NMOC emission rate report in which the NMOC emission rate equals or exceeds 34 megagrams per year. The collection and control system design plan must be prepared and approved by a professional engineer and must meet the requirements of 40 CFR Section 60.767(c)(1) through (7). [40 CFR 60.767(c), 40 CFR 63.1981, Minn. R. 7011.3515, Minn. R. 7011.7390]
6.2.3	The Permittee that has already been required to submit a collection and control system design plan under 40 CFR Section 60.767(c) or 40 CFR Section 63.1981(d) must submit a revised design plan following 40 CFR Section 60.767(d)(1) and (2). [40 CFR 60.767(d), 40 CFR 63.1981(e), Minn. R. 7011.3515, Minn. R. 7011.7390]
6.2.4	The permittee must submit a closure report: Due within 30 days of waste acceptance cessation. [40 CFR 60.767(e), 40 CFR 63.1981(f), Minn. R. 7011.3515, Minn. R. 7011.7390]
6.2.5	The Permittee must submit an equipment removal report: Due 30 days prior to removal or cessation of operation of the control equipment that includes the information specified in 40 CFR Section 60.767(f)(1). [40 CFR 60.767(f), 40 CFR 63.1981(g), Minn. R. 7011.3515, Minn. R. 7011.7390]
6.2.6	The Permittee must submit a semi-annual report: Due 30 days after the end of each calendar half-year that includes the information specified in 40 CFR Section 63.1981(h)(1) through (8). [40 CFR 60.767(g), 40 CFR 63.1981(h), Minn. R. 7011.3515, Minn. R. 7011.7390]
6.2.7	The Permittee must submit information regarding corrective actions according to 40 CFR 63.1960(j)(1) and (2). (1) For corrective action that is required according to 40 CFR 63.1960(a)(3) or (4) and is not completed within 60 days after the initial exceedance, the Permittee must submit a notification as soon as practicable but no later than 75 days after the first measurement of positive pressure or temperature exceedance. (2) For corrective action that is required according to 40 CFR 63.1960(a)(3) or (4) and is expected to take longer than 120 days after the initial exceedance to complete, the Permittee must submit the root cause analysis, corrective action analysis, and corresponding implementation timeline as soon as practicable but no later than 75 days after the first measurement of positive pressure or temperature monitoring value of 62.8 degrees Celsius (145 degrees Fahrenheit) or above unless a higher operating temperature value has been approved by the Administrator for the well. The Administrator must approve the plan for corrective action and the corresponding timeline. [40 CFR 60.762(b)(2)(iv), 40 CFR 60.767(j), 40 CFR 63.1981(h), Minn. R. 7011.3515, Minn. R. 7011.7390]
6.2.8	24-hour high temperature report. Where the Permittee seeks to demonstrate compliance with the operational standard for temperature in 40 CFR 63.1958(c)(1) and a landfill gas temperature measured at either the wellhead or at any point in the well is greater than or equal to 76.7 degrees Celsius (170 degrees Fahrenheit) and the carbon monoxide concentration measured is greater than or equal to 1,000 ppmv, then the Permittee must report the date, time, well identifier, temperature and

Requirement number	Requirement and citation
	carbon monoxide reading via email within 24 hours of the measurement unless a higher operating temperature value has been approved per 40 CFR 63.1958(c). [40 CFR 60.767(m), 40 CFR 63.1981(k), Minn. R. 7011.3515, Minn. R. 7011.7390]
6.2.9	The Permittee shall start up a collection and control system that captures the gas generated within the landfill as required by 40 CFR 60.762(b)(2)(ii)(C) and (b)(2)(iii) within 30 months after the first annual report submitted in which the NMOC emission rate equals or exceeds 34 megagrams per year. [40 CFR 60.762(b)(2)(ii), 40 CFR 63.1959(a)(2)(ii)(A), Minn. R. 7011.3515, Minn. R. 7011.7390]
6.2.10	Revised design plan. The Permittee must submit a revised design plan for approval as follows: (1) At least 90 days before expanding operations to an area not covered by the previously approved design plan. (2) Prior to installing or expanding the gas collection system in a way that is not consistent with the design plan that was submitted to the Administrator according to 40 CFR 60.767(c). [40 CFR 60.767(d), 40 CFR 63.1981, 40 CFR 63.1981(e), Minn. R. 7011.3515, Minn. R. 7011.7390]
TREA 6	Open Flare
6.3.1	Initial performance test. The Permittee shall conduct a performance test within 180 days of initial startup of TREA 6 to ensure that the flare is operated in accordance with the parameters established in 40 CFR 63.11(b). The net heating value of the combusted landfill gas as determined in 40 CFR 63.11(b)(6)(ii) is calculated from the concentration of methane in the landfill gas as measured by EPA Method 3C of appendix A to 40 CFR Part 60. A minimum of three 30-minute EPA Method 3C samples are determined. The measurement of other organic components, hydrogen, and carbon monoxide is not applicable. EPA Method 3C may be used to determine the landfill gas molecular weight for calculating the flare gas exit velocity under 40 CFR 63.11(b)(7) of subpart A. [40 CFR 63.1959(b)(2)(iii)(A), 40 CFR 63.1959(e), 40 CFR 63.7(a)(2), Minn. R. 7011.7390]
6.3.2	Initial performance test report. The Permittee shall submit performance test results according to the procedures of 40 CFR 60.767(i)(1) within 60 days after completion of the performance test. The report shall include any associated fuel analyses, according to 40 CFR 60.764(b), along with the following information required by 40 CFR 60.767(h)(1)-(6). [40 CFR 60.764(e)(1), 40 CFR 60.767(h), 40 CFR 63.1981, 40 CFR 63.1981(i), Minn. R. 7011.3515, Minn. R. 7011.7390]

7. Appendices

Appendix A. Insignificant activities and general applicable requirements

The table below lists the insignificant activities that are currently at the Facility and their associated general applicable requirements.

Minn. R.	Rule description of the activity	General applicable requirement
Minn. R. 7007.1300, subp. 3(A)	Fuel Use: space heaters fueled by kerosene, natural gas, or propane, less than 420,000 Btu/hr	PM ≤ 0.6 or 0.4 lb/MMBtu, depending on year constructed Opacity ≤ 20% with exceptions (Minn. R. 7011.0515)
Minn. R. 7007.1300, subp. 3(B)(2)	Indirect heating equipment with a heat input capacity less than 420,000 Btu/hour, etc.	PM ≤ 0.6 or 0.4, depending on year constructed Opacity ≤ 20% with exceptions (Minn. R. 7011.0515)
Minn. R. 7007.1300, subp. 3(E)	Brazing, soldering, torch-cutting, or welding equipment	PM, variable depending on airflow Opacity ≤ 20% (Minn. R. 7011.0715)

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Minn. R. 7007.1300, subp. 3(F)	Individual units with potential emissions less than 2000 lb/year of certain pollutants	PM <= 0.6 or 0.4, depending on year constructed Opacity <= 20% with exceptions (Minn. R. 7011.0515)
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Appendix B. 40 CFR Part 60, Subpart XXX—Standards of Performance for Municipal Solid Waste Landfills That Commenced Construction, Reconstruction, or Modification After July 17, 2014

§ 60.760 Applicability, designation of affected source, and delegation of authority.

(a) The provisions of this subpart apply to each municipal solid waste landfill that commenced construction, reconstruction, or modification after July 17, 2014. Physical or operational changes made to an MSW landfill solely to comply with subparts Cc, Cf, or WWW of this part are not considered construction, reconstruction, or modification for the purposes of this section.

(b) The following authorities are retained by the Administrator and are not transferred to the state: § 60.764(a)(5).

(c) Activities required by or conducted pursuant to a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Resource Conservation and Recovery Act (RCRA), or state remedial action are not considered construction, reconstruction, or modification for purposes of this subpart.

§ 60.761 Definitions.

As used in this subpart, all terms not defined herein have the meaning given them in the Act or in subpart A of this part.

Active collection system means a gas collection system that uses gas mover equipment.

Active landfill means a landfill in which solid waste is being placed or a landfill that is planned to accept waste in the future.

Closed area means a separately lined area of an MSW landfill in which solid waste is no longer being placed. If additional solid waste is placed in that area of the landfill, that landfill area is no longer closed. The area must be separately lined to ensure that the landfill gas does not migrate between open and closed areas.

Closed landfill means a landfill in which solid waste is no longer being placed, and in which no additional solid wastes will be placed without first filing a notification of modification as prescribed under § 60.7(a)(4). Once a notification of modification has been filed, and additional solid waste is placed in the landfill, the landfill is no longer closed.

Closure means that point in time when a landfill becomes a closed landfill.

Commercial solid waste means all types of solid waste generated by stores, offices, restaurants, warehouses, and other nonmanufacturing activities, excluding residential and industrial wastes.

Controlled landfill means any landfill at which collection and control systems are required under this subpart as a result of the nonmethane organic compounds emission rate. The landfill is considered controlled at the time a collection and control system design plan is submitted in compliance with either § 60.762(b)(2)(i), 40 CFR part 60, subpart WWW, or a Federal plan or EPA approved and effective state plan or tribal plan that implements either 40 CFR part 60, subparts Cc or Cf, whichever regulation first required submission of a collection and control system design plan for the landfill.

Corrective action analysis means a description of all reasonable interim and long-term measures, if any, that are available, and an explanation of why the selected corrective action(s) is/are the best alternative(s),

including, but not limited to, considerations of cost effectiveness, technical feasibility, safety, and secondary impacts.

Design capacity means the maximum amount of solid waste a landfill can accept, as indicated in terms of volume or mass in the most recent permit issued by the state, local, or tribal agency responsible for regulating the landfill, plus any in-place waste not accounted for in the most recent permit. If the owner or operator chooses to convert the design capacity from volume to mass or from mass to volume to demonstrate its design capacity is less than 2.5 million megagrams or 2.5 million cubic meters, the calculation must include a site-specific density, which must be recalculated annually.

Disposal facility means all contiguous land and structures, other appurtenances, and improvements on the land used for the disposal of solid waste.

Emission rate cutoff means the threshold annual emission rate to which a landfill compares its estimated emission rate to determine if control under the regulation is required.

Enclosed combustor means an enclosed firebox which maintains a relatively constant limited peak temperature generally using a limited supply of combustion air. An enclosed flare is considered an enclosed combustor.

Flare means an open combustor without enclosure or shroud.

Gas mover equipment means the equipment (*i.e.*, fan, blower, compressor) used to transport landfill gas through the header system.

Gust means the highest instantaneous wind speed that occurs over a 3-second running average.

Household waste means any solid waste (including garbage, trash, and sanitary waste in septic tanks) derived from households (including, but not limited to, single and multiple residences, hotels and motels, bunkhouses, ranger stations, crew quarters, campgrounds, picnic grounds, and day-use recreation areas). Household waste does not include fully segregated yard waste. Segregated yard waste means vegetative matter resulting exclusively from the cutting of grass, the pruning and/or removal of bushes, shrubs, and trees, the weeding of gardens, and other landscaping maintenance activities. Household waste does not include construction, renovation, or demolition wastes, even if originating from a household.

Industrial solid waste means solid waste generated by manufacturing or industrial processes that is not a hazardous waste regulated under Subtitle C of the Resource Conservation and Recovery Act, parts 264 and 265 of this chapter. Such waste may include, but is not limited to, waste resulting from the following manufacturing processes: Electric power generation; fertilizer/agricultural chemicals; food and related products/by-products; inorganic chemicals; iron and steel manufacturing; leather and leather products; nonferrous metals manufacturing/foundries; organic chemicals; plastics and resins manufacturing; pulp and paper industry; rubber and miscellaneous plastic products; stone, glass, clay, and concrete products; textile manufacturing; transportation equipment; and water treatment. This term does not include mining waste or oil and gas waste.

Interior well means any well or similar collection component located inside the perimeter of the landfill waste. A perimeter well located outside the landfilled waste is not an interior well.

Landfill means an area of land or an excavation in which wastes are placed for permanent disposal, and that is not a land application unit, surface impoundment, injection well, or waste pile as those terms are defined under § 257.2 of this title.

Lateral expansion means a horizontal expansion of the waste boundaries of an existing MSW landfill. A lateral expansion is not a modification unless it results in an increase in the design capacity of the landfill.

Leachate recirculation means the practice of taking the leachate collected from the landfill and reapplying it to the landfill by any of one of a variety of methods, including pre-wetting of the waste, direct discharge into the working face, spraying, infiltration ponds, vertical injection wells, horizontal gravity distribution systems, and pressure distribution systems.

Modification means an increase in the permitted volume design capacity of the landfill by either lateral or vertical expansion based on its permitted design capacity as of July 17, 2014. Modification does not occur until the owner or operator commences construction on the lateral or vertical expansion.

Municipal solid waste landfill or *MSW landfill* means an entire disposal facility in a contiguous geographical space where household waste is placed in or on land. An MSW landfill may also receive other types of RCRA Subtitle D wastes (§ 257.2 of this title) such as commercial solid waste, nonhazardous sludge, conditionally exempt small quantity generator waste, and industrial solid waste. Portions of an MSW landfill may be separated by access roads. An MSW landfill may be publicly or privately owned. An MSW landfill may be a new MSW landfill, an existing MSW landfill, or a lateral expansion.

Municipal solid waste landfill emissions or *MSW landfill emissions* means gas generated by the decomposition of organic waste deposited in an MSW landfill or derived from the evolution of organic compounds in the waste.

NMOC means nonmethane organic compounds, as measured according to the provisions of § 60.764.

Nondegradable waste means any waste that does not decompose through chemical breakdown or microbiological activity. Examples are, but are not limited to, concrete, municipal waste combustor ash, and metals.

Passive collection system means a gas collection system that solely uses positive pressure within the landfill to move the gas rather than using gas mover equipment.

Root cause analysis means an assessment conducted through a process of investigation to determine the primary cause, and any other contributing causes, of positive pressure at a wellhead.

Segregated yard waste means vegetative matter resulting exclusively from the cutting of grass, the pruning and/or removal of bushes, shrubs, and trees, the weeding of gardens, and other landscaping maintenance activities.

Sludge means the term sludge as defined in 40 CFR 258.2.

Solid waste means the term solid waste as defined in 40 CFR 258.2.

Sufficient density means any number, spacing, and combination of collection system components, including vertical wells, horizontal collectors, and surface collectors, necessary to maintain emission and migration control as determined by measures of performance set forth in this part.

Sufficient extraction rate means a rate sufficient to maintain a negative pressure at all wellheads in the collection system without causing air infiltration, including any wellheads connected to the system as a result of expansion or excess surface emissions, for the life of the blower.

Treated landfill gas means landfill gas processed in a treatment system as defined in this subpart.

Treatment system means a system that filters, de-waters, and compresses landfill gas for sale or beneficial use.

Untreated landfill gas means any landfill gas that is not treated landfill gas.

§ 60.762 Standards for air emissions from municipal solid waste landfills.

(a) Each owner or operator of an MSW landfill having a design capacity less than 2.5 million megagrams by mass or 2.5 million cubic meters by volume must submit an initial design capacity report to the Administrator as provided in § 60.767(a). The landfill may calculate design capacity in either megagrams or cubic meters for comparison with the exemption values. Any density conversions must be documented and submitted with the report. Submittal of the initial design capacity report fulfills the requirements of this subpart except as provided for in paragraphs (a)(1) and (2) of this section.

(1) The owner or operator must submit to the Administrator an amended design capacity report, as provided for in § 60.767(a)(3).

(2) When an increase in the maximum design capacity of a landfill exempted from the provisions of §§ 60.762(b) through 60.769 on the basis of the design capacity exemption in paragraph (a) of this section results in a revised maximum design capacity equal to or greater than 2.5 million megagrams and 2.5 million cubic meters, the owner or operator must comply with the provisions of paragraph (b) of this section.

(b) Each owner or operator of an MSW landfill having a design capacity equal to or greater than 2.5 million megagrams and 2.5 million cubic meters, must either comply with paragraph (b)(2) of this section or calculate an NMOC emission rate for the landfill using the procedures specified in § 60.764. The NMOC emission rate must be recalculated annually, except as provided in § 60.767(b)(1)(ii). The owner or operator of an MSW landfill subject to this subpart with a design capacity greater than or equal to 2.5 million megagrams and 2.5 million cubic meters is subject to part 70 or 71 permitting requirements.

(1) If the calculated NMOC emission rate is less than 34 megagrams per year, the owner or operator must:

(i) Submit an annual NMOC emission rate emission report to the Administrator, except as provided for in § 60.767(b)(1)(ii); and

(ii) Recalculate the NMOC emission rate annually using the procedures specified in § 60.764(a)(1) until such time as the calculated NMOC emission rate is equal to or greater than 34 megagrams per year, or the landfill is closed.

(A) If the calculated NMOC emission rate, upon initial calculation or annual recalculation required in paragraph (b) of this section, is equal to or greater than 34 megagrams per year, the owner or operator must either: Comply with paragraph (b)(2) of this section; calculate NMOC emissions using the next higher tier in § 60.764; or conduct a surface emission monitoring demonstration using the procedures specified in § 60.764(a)(6).

(B) If the landfill is permanently closed, a closure report must be submitted to the Administrator as provided for in § 60.767(e).

(2) If the calculated NMOC emission rate is equal to or greater than 34 megagrams per year using Tier 1, 2, or 3 procedures, the owner or operator must either:

(i) *Calculated NMOC Emission Rate.* Submit an initial or revised collection and control system design plan prepared by a professional engineer to the Administrator as specified in § 60.767(c) or (d); calculate NMOC emissions using the next higher tier in § 60.764; or conduct a surface emission monitoring demonstration using the procedures specified in § 60.764(a)(6). The collection and control system must meet the requirements in paragraphs (b)(2)(ii) and (iii) of this section.

(ii) *Collection system.* Install and start up a collection and control system that captures the gas generated within the landfill as required by paragraphs (b)(2)(ii)(C) or (D) and (b)(2)(iii) of this section within 30 months after:

(A) The first annual report submitted under this subpart or part 62 of this subchapter in which the NMOC emission rate equals or exceeds 34 megagrams per year, unless Tier 2 or Tier 3 sampling demonstrates that the NMOC emission rate is less than 34 megagrams per year, as specified in § 60.767(c)(4); or

(B) The most recent NMOC emission rate report in which the NMOC emission rate equals or exceeds 34 megagrams per year based on Tier 2, if the Tier 4 surface emissions monitoring shows a surface methane emission concentration of 500 parts per million methane or greater as specified in § 60.767(c)(4)(iii).

(C) An active collection system must:

(1) Be designed to handle the maximum expected gas flow rate from the entire area of the landfill that warrants control over the intended use period of the gas control system equipment;

(2) Collect gas from each area, cell, or group of cells in the landfill in which the initial solid waste has been placed for a period of 5 years or more if active; or 2 years or more if closed or at final grade.

(3) Collect gas at a sufficient extraction rate;

(4) Be designed to minimize off-site migration of subsurface gas.

(D) A passive collection system must:

(1) Comply with the provisions specified in paragraphs (b)(2)(ii)(C)(1), (2), and (3) of this section.

(2) Be installed with liners on the bottom and all sides in all areas in which gas is to be collected. The liners must be installed as required under 40 CFR 258.40.

(iii) *Control system.* Route all the collected gas to a control system that complies with the requirements in either paragraph (b)(2)(iii)(A), (B), or (C) of this section.

(A) A non-enclosed flare designed and operated in accordance with the parameters established in § 60.18 except as noted in § 60.764(e); or

(B) A control system designed and operated to reduce NMOC by 98 weight-percent, or, when an enclosed combustion device is used for control, to either reduce NMOC by 98 weight percent or reduce the outlet NMOC concentration to less than 20 parts per million by volume, dry basis as hexane at 3 percent oxygen. The reduction efficiency or parts per million by volume must be established by an initial performance test to be completed no later than 180 days after the initial startup of the approved control system using the test methods specified in § 60.764(d). The performance test is not required for boilers and process heaters with design heat input capacities equal to or greater than 44 megawatts that burn landfill gas for compliance with this subpart.

(1) If a boiler or process heater is used as the control device, the landfill gas stream must be introduced into the flame zone.

(2) The control device must be operated within the parameter ranges established during the initial or most recent performance test. The operating parameters to be monitored are specified in § 60.766;

(C) Route the collected gas to a treatment system that processes the collected gas for subsequent sale or beneficial use such as fuel for combustion, production of vehicle fuel, production of high-Btu gas for pipeline injection, or use as a raw material in a chemical manufacturing process. Venting of treated landfill gas to the ambient air is not allowed. If the treated landfill gas cannot be routed for subsequent sale or beneficial use, then the treated landfill gas must be controlled according to either paragraph (b)(2)(iii)(A) or (B) of this section.

(D) All emissions from any atmospheric vent from the gas treatment system are subject to the requirements of paragraph (b)(2)(iii)(A) or (B) of this section. For purposes of this subpart, atmospheric vents located on the condensate storage tank are not part of the treatment system and are exempt from the requirements of paragraph (b)(2)(iii)(A) or (B) of this section.

(iv) *Operation.* Operate the collection and control device installed to comply with this subpart in accordance with the provisions of §§ 60.763, 60.765, and 60.766; or the provisions of §§ 63.1958, 63.1960, and 63.1961 of this chapter. Once the owner or operator begins to comply with the provisions of §§ 63.1958, 63.1960, and 63.1961 of this chapter, the owner or operator must continue to operate the collection and control device according to those provisions and cannot return to the provisions of §§ 60.763, 60.765, and 60.766.

(v) *Removal criteria.* The collection and control system may be capped, removed, or decommissioned if the following criteria are met:

(A) The landfill is a closed landfill (as defined in § 60.761). A closure report must be submitted to the Administrator as provided in § 60.767(e).

(B) The collection and control system has been in operation a minimum of 15 years or the landfill owner or operator demonstrates that the GCCS will be unable to operate for 15 years due to declining gas flow.

(C) Following the procedures specified in § 60.764(b), the calculated NMOC emission rate at the landfill is less than 34 megagrams per year on three successive test dates. The test dates must be no less than 90 days apart, and no more than 180 days apart.

(c) For purposes of obtaining an operating permit under title V of the Clean Air Act, the owner or operator of an MSW landfill subject to this subpart with a design capacity less than 2.5 million megagrams or 2.5 million cubic meters is not subject to the requirement to obtain an operating permit for the landfill under part 70 or 71 of this chapter, unless the landfill is otherwise subject to either part 70 or 71. For purposes of submitting a timely application for an operating permit under part 70 or 71, the owner or operator of an MSW landfill subject to this subpart with a design capacity greater than or equal to 2.5 million megagrams and 2.5 million cubic meters, and not otherwise subject to either part 70 or 71, becomes subject to the requirements of § 70.5(a)(1)(i) or § 71.5(a)(1)(i) of this chapter, regardless of when the design capacity report is actually submitted, no later than:

(1) November 28, 2016 for MSW landfills that commenced construction, modification, or reconstruction after July 17, 2014 but before August 29, 2016;

(2) Ninety days after the date of commenced construction, modification, or reconstruction for MSW landfills that commence construction, modification, or reconstruction after August 29, 2016.

(d) When an MSW landfill subject to this subpart is closed as defined in this subpart, the owner or operator is no longer subject to the requirement to maintain an operating permit under part 70 or 71 of this chapter for the landfill if the landfill is not otherwise subject to the requirements of either part 70 or 71 and if either of the following conditions are met:

(1) The landfill was never subject to the requirement for a control system under paragraph (b)(2) of this section; or

(2) The owner or operator meets the conditions for control system removal specified in paragraph (b)(2)(v) of this section.

§ 60.763 Operational standards for collection and control systems.

Each owner or operator of an MSW landfill with a gas collection and control system used to comply with the provisions of § 60.762(b)(2) must:

(a) Operate the collection system such that gas is collected from each area, cell, or group of cells in the MSW landfill in which solid waste has been in place for:

(1) 5 years or more if active; or

(2) 2 years or more if closed or at final grade;

(b) Operate the collection system with negative pressure at each wellhead except under the following conditions:

(1) A fire or increased well temperature. The owner or operator must record instances when positive pressure occurs in efforts to avoid a fire. These records must be submitted with the annual reports as provided in § 60.767(g)(1);

(2) Use of a geomembrane or synthetic cover. The owner or operator must develop acceptable pressure limits in the design plan;

(3) A decommissioned well. A well may experience a static positive pressure after shut down to accommodate for declining flows. All design changes must be approved by the Administrator as specified in § 60.767(c);

(c) Operate each interior wellhead in the collection system with a landfill gas temperature less than 55 degrees Celsius (131 degrees Fahrenheit). The owner or operator may establish a higher operating temperature value at a particular well. A higher operating value demonstration must be submitted to the Administrator for approval and must include supporting data demonstrating that the elevated parameter neither causes fires nor significantly inhibits anaerobic decomposition by killing methanogens. The demonstration must satisfy both criteria in order to be approved (*i.e.*, neither causing fires nor killing methanogens is acceptable).

(d) Operate the collection system so that the methane concentration is less than 500 parts per million above background at the surface of the landfill. To determine if this level is exceeded, the owner or operator must conduct surface testing using an organic vapor analyzer, flame ionization detector, or other portable monitor meeting the specifications provided in § 60.765(d). The owner or operator must conduct surface testing around the perimeter of the collection area and along a pattern that traverses the landfill at no more than 30-meter intervals and where visual observations indicate elevated concentrations of landfill gas, such as distressed vegetation and cracks or seeps in the cover and all cover penetrations. Thus, the owner or operator must monitor any openings that are within an area of the landfill where waste has been placed and a gas collection system is required. The owner or operator may establish an alternative traversing pattern that ensures equivalent coverage. A surface monitoring design plan must be developed that includes a topographical map with the monitoring route and the rationale for any site-specific deviations from the 30-meter intervals. Areas with steep slopes or other dangerous areas may be excluded from the surface testing.

(e) Operate the system such that all collected gases are vented to a control system designed and operated in compliance with § 60.762(b)(2)(iii). In the event the collection or control system is not operating, the gas mover system must be shut down and all valves in the collection and control system contributing to venting of the gas to the atmosphere must be closed within 1 hour of the collection or control system not operating; and

(f) Operate the control system at all times when the collected gas is routed to the system.

(g) If monitoring demonstrates that the operational requirements in paragraphs (b), (c), or (d) of this section are not met, corrective action must be taken as specified in § 60.765(a)(3) and (5) or (c). If corrective actions are taken as specified in § 60.765, the monitored exceedance is not a violation of the operational requirements in this section.

§ 60.764 Test methods and procedures.

(a) (1) *NMOC emission rate*. The landfill owner or operator must calculate the NMOC emission rate using either Equation 1 provided in paragraph (a)(1)(i) of this section or Equation 2 provided in paragraph (a)(1)(ii) of this section. Both Equation 1 and Equation 2 may be used if the actual year-to-year solid waste acceptance rate is known, as specified in paragraph (a)(1)(i) of this section, for part of the life of the landfill and the actual year-to-year solid waste acceptance rate is unknown, as specified in paragraph (a)(1)(ii) of this section, for part of the life of the landfill. The values to be used in both Equation 1 and Equation 2 are 0.05 per year for k , 170 cubic meters per megagram for L_o , and 4,000 parts per million by volume as hexane for the C_{NMOC} . For landfills located in geographical areas with a 30-year annual average precipitation of less than 25 inches, as measured at the nearest representative official meteorologic site, the k value to be used is 0.02 per year.

(i) (A) Equation 1 must be used if the actual year-to-year solid waste acceptance rate is known.

$$M_{NMOC} = \sum_{i=1}^n 2 k L_o M_i (e^{-kt_i}) (C_{NMOC}) (3.6 \times 10^{-9}) \quad (\text{Eq. 1})$$

Where:

M_{NMOC} = Total NMOC emission rate from the landfill, megagrams per year.

k = Methane generation rate constant, year⁻¹.

L_o = Methane generation potential, cubic meters per megagram solid waste.

M_i = Mass of solid waste in the i^{th} section, megagrams.

t_i = Age of the i^{th} section, years.

C_{NMOC} = Concentration of NMOC, parts per million by volume as hexane.

3.6×10^{-9} = Conversion factor.

(B) The mass of nondegradable solid waste may be subtracted from the total mass of solid waste in a particular section of the landfill when calculating the value for M_i if documentation of the nature and amount of such wastes is maintained.

(ii) (A) Equation 2 must be used if the actual year-to-year solid waste acceptance rate is unknown.

$$M_{NMOC} = 2 L_o R (e^{-kC} - e^{-kt}) C_{NMOC} (3.6 \times 10^{-9}) \quad (\text{Eq. 2})$$

Where:

M_{NMOC} = Mass emission rate of NMOC, megagrams per year.

L_o = Methane generation potential, cubic meters per megagram solid waste.

R = Average annual acceptance rate, megagrams per year.

k = Methane generation rate constant, year⁻¹.

t = Age of landfill, years.

C_{NMOC} = Concentration of NMOC, parts per million by volume as hexane.

c = Time since closure, years; for active landfill $c = 0$ and $e^{-kc} = 1$.

3.6×10^{-9} = Conversion factor.

(B) The mass of nondegradable solid waste may be subtracted from the total mass of solid waste in a particular section of the landfill when calculating the value of R , if documentation of the nature and amount of such wastes is maintained.

(2) *Tier 1.* The owner or operator must compare the calculated NMOC mass emission rate to the standard of 34 megagrams per year.

(i) If the NMOC emission rate calculated in paragraph (a)(1) of this section is less than 34 megagrams per year, then the landfill owner or operator must submit an NMOC emission rate report according to § 60.767(b), and must recalculate the NMOC mass emission rate annually as required under § 60.762(b).

(ii) If the calculated NMOC emission rate as calculated in paragraph (a)(1) of this section is equal to or greater than 34 megagrams per year, then the landfill owner must either:

(A) Submit a gas collection and control system design plan within 1 year as specified in § 60.767(c) and install and operate a gas collection and control system within 30 months according to § 60.762(b)(2)(ii) and (iii);

(B) Determine a site-specific NMOC concentration and recalculate the NMOC emission rate using the Tier 2 procedures provided in paragraph (a)(3) of this section; or

(C) Determine a site-specific methane generation rate constant and recalculate the NMOC emission rate using the Tier 3 procedures provided in paragraph (a)(4) of this section.

(3) *Tier 2.* The landfill owner or operator must determine the site-specific NMOC concentration using the following sampling procedure. The landfill owner or operator must install at least two sample probes per hectare, evenly distributed over the landfill surface that has retained waste for at least 2 years. If the landfill is larger than 25 hectares in area, only 50 samples are required. The probes should be evenly distributed across the sample area. The sample probes should be located to avoid known areas of nondegradable solid waste. The owner or operator must collect and analyze one sample of landfill gas from each probe to determine the NMOC concentration using Method 25 or 25C of appendix A of this part. Taking composite samples from different probes into a single cylinder is allowed; however, equal sample volumes must be taken from each probe. For each composite, the sampling rate, collection times, beginning and ending cylinder vacuums, or alternative volume measurements must be recorded to verify that composite volumes are equal. Composite sample volumes should not be less than one liter unless evidence can be provided to substantiate the accuracy of smaller volumes. Terminate compositing before the cylinder approaches ambient pressure where measurement accuracy diminishes. If more than the required number of samples are taken, all samples must be used in the analysis. The landfill owner or operator must divide the NMOC concentration from Method 25 or 25C of appendix A of this part by six to convert from $C_{\text{NMOC as carbon}}$ to $C_{\text{NMOC as hexane}}$. If the landfill has an active or passive gas removal system in place, Method 25 or 25C samples may be collected from these systems instead of surface probes provided the removal system can be shown to provide sampling as representative as the two sampling probe per hectare requirement. For active

collection systems, samples may be collected from the common header pipe. The sample location on the common header pipe must be before any gas moving, condensate removal, or treatment system equipment. For active collection systems, a minimum of three samples must be collected from the header pipe.

(i) Within 60 days after the date of completing each performance test (as defined in § 60.8), the owner or operator must submit the results according to § 60.767(i)(1).

(ii) The landfill owner or operator must recalculate the NMOC mass emission rate using Equation 1 or Equation 2 provided in paragraph (a)(1)(i) or (a)(1)(ii) of this section and using the average site-specific NMOC concentration from the collected samples instead of the default value provided in paragraph (a)(1) of this section.

(iii) If the resulting NMOC mass emission rate is less than 34 megagrams per year, then the owner or operator must submit a periodic estimate of NMOC emissions in an NMOC emission rate report according to § 60.767(b)(1), and must recalculate the NMOC mass emission rate annually as required under § 60.762(b). The site-specific NMOC concentration must be retested every 5 years using the methods specified in this section.

(iv) If the NMOC mass emission rate as calculated using the Tier 2 site-specific NMOC concentration is equal to or greater than 34 megagrams per year, the landfill owner or operator must either:

(A) Submit a gas collection and control system design plan within 1 year as specified in § 60.767(c) and install and operate a gas collection and control system within 30 months according to § 60.762(b)(2)(ii) and (iii);

(B) Determine a site-specific methane generation rate constant and recalculate the NMOC emission rate using the site-specific methane generation rate using the Tier 3 procedures specified in paragraph (a)(4) of this section; or

(C) Conduct a surface emission monitoring demonstration using the Tier 4 procedures specified in paragraph (a)(6) of this section.

(4) *Tier 3.* The site-specific methane generation rate constant must be determined using the procedures provided in Method 2E of appendix A of this part. The landfill owner or operator must estimate the NMOC mass emission rate using Equation 1 or Equation 2 in paragraph (a)(1)(i) or (ii) of this section and using a site-specific methane generation rate constant, and the site-specific NMOC concentration as determined in paragraph (a)(3) of this section instead of the default values provided in paragraph (a)(1) of this section. The landfill owner or operator must compare the resulting NMOC mass emission rate to the standard of 34 megagrams per year.

(i) If the NMOC mass emission rate as calculated using the Tier 2 site-specific NMOC concentration and Tier 3 site-specific methane generation rate is equal to or greater than 34 megagrams per year, the owner or operator must either:

(A) Submit a gas collection and control system design plan within 1 year as specified in § 60.767(c) and install and operate a gas collection and control system within 30 months according to § 60.762(b)(2)(ii) and (iii); or

(B) Conduct a surface emission monitoring demonstration using the Tier 4 procedures specified in paragraph (a)(6) of this section.

(ii) If the NMOC mass emission rate is less than 34 megagrams per year, then the owner or operator must recalculate the NMOC mass emission rate annually using Equation 1 or Equation 2 in paragraph (a)(1) of this section and using the site-specific Tier 2 NMOC concentration and Tier 3 methane generation rate constant and submit a periodic NMOC emission rate report as provided in § 60.767(b)(1). The calculation of the methane generation rate constant is performed only once, and the value obtained from this test must be used in all subsequent annual NMOC emission rate calculations.

(5) *Other methods.* The owner or operator may use other methods to determine the NMOC concentration or a site-specific methane generation rate constant as an alternative to the methods required in paragraphs (a)(3) and (4) of this section if the method has been approved by the Administrator.

(6) *Tier 4.* The landfill owner or operator must demonstrate that surface methane emissions are below 500 parts per million. Surface emission monitoring must be conducted on a quarterly basis using the following procedures. Tier 4 is allowed only if the landfill owner or operator can demonstrate that NMOC emissions are greater than or equal to 34 Mg/yr but less than 50 Mg/yr using Tier 1 or Tier 2. If both Tier 1 and Tier 2 indicate NMOC emissions are 50 Mg/yr or greater, then Tier 4 cannot be used. In addition, the landfill must meet the criteria in paragraph (a)(6)(viii) of this section.

(i) The owner or operator must measure surface concentrations of methane along the entire perimeter of the landfill and along a pattern that traverses the landfill at no more than 30-meter intervals using an organic vapor analyzer, flame ionization detector, or other portable monitor meeting the specifications provided in § 60.765(d).

(ii) The background concentration must be determined by moving the probe inlet upwind and downwind at least 30 meters from the waste mass boundary of the landfill.

(iii) Surface emission monitoring must be performed in accordance with section 8.3.1 of Method 21 of appendix A of this part, except that the probe inlet must be placed no more than 5 centimeters above the landfill surface; the constant measurement of distance above the surface should be based on a mechanical device such as with a wheel on a pole, except as described in paragraph (a)(6)(iii)(A) of this section.

(A) The owner or operator must use a wind barrier, similar to a funnel, when onsite average wind speed exceeds 4 miles per hour or 2 meters per second or gust exceeding 10 miles per hour. Average on-site wind speed must also be determined in an open area at 5-minute intervals using an on-site anemometer with a continuous recorder and data logger for the entire duration of the monitoring event. The wind barrier must surround the SEM monitor, and must be placed on the ground, to ensure wind turbulence is blocked. SEM cannot be conducted if average wind speed exceeds 25 miles per hour.

(B) Landfill surface areas where visual observations indicate elevated concentrations of landfill gas, such as distressed vegetation and cracks or seeps in the cover, and all cover penetrations must also be monitored using a device meeting the specifications provided in § 60.765(d).

(iv) Each owner or operator seeking to comply with the Tier 4 provisions in paragraph (a)(6) of this section must maintain records of surface emission monitoring as provided in § 60.768(g) and submit a Tier 4 surface emissions report as provided in § 60.767(c)(4)(iii).

(v) If there is any measured concentration of methane of 500 parts per million or greater from the surface of the landfill, the owner or operator must submit a gas collection and control system design plan within 1 year of the first measured concentration of methane of 500 parts per million or greater from the surface of the landfill according to § 60.767(c) and install and operate a gas collection and control system according to § 60.762(b)(2)(ii) and (iii) within 30 months of the most recent NMOC emission rate report in which the NMOC emission rate equals or exceeds 34 megagrams per year based on Tier 2.

(vi) If after four consecutive quarterly monitoring periods at a landfill, other than a closed landfill, there is no measured concentration of methane of 500 parts per million or greater from the surface of the landfill, the owner or operator must continue quarterly surface emission monitoring using the methods specified in this section.

(vii) If after four consecutive quarterly monitoring periods at a closed landfill there is no measured concentration of methane of 500 parts per million or greater from the surface of the landfill, the owner or operator must conduct annual surface emission monitoring using the methods specified in this section.

(viii) If a landfill has installed and operates a collection and control system that is not required by this subpart, then the collection and control system must meet the following criteria:

(A) The gas collection and control system must have operated for 6,570 out of 8,760 hours preceding the Tier 4 surface emissions monitoring demonstration.

(B) During the Tier 4 surface emissions monitoring demonstration, the gas collection and control system must operate as it normally would to collect and control as much landfill gas as possible.

(b) After the installation and startup of a collection and control system in compliance with this subpart, the owner or operator must calculate the NMOC emission rate for purposes of determining when the system can be capped, removed or decommissioned as provided in § 60.762(b)(2)(v), using Equation 3:

$$M_{\text{NMOC}} = 1.89 \times 10^{-3} Q_{\text{LFG}} C_{\text{NMOC}} \quad (\text{Eq. 3})$$

Where:

M_{NMOC} = Mass emission rate of NMOC, megagrams per year.

Q_{LFG} = Flow rate of landfill gas, cubic meters per minute.

C_{NMOC} = NMOC concentration, parts per million by volume as hexane.

(1) The flow rate of landfill gas, Q_{LFG} , must be determined by measuring the total landfill gas flow rate at the common header pipe that leads to the control system using a gas flow measuring device calibrated according to the provisions of section 10 of Method 2E of appendix A of this part.

(2) The average NMOC concentration, C_{NMOC} , must be determined by collecting and analyzing landfill gas sampled from the common header pipe before the gas moving or condensate removal equipment

using the procedures in Method 25 or Method 25C. The sample location on the common header pipe must be before any condensate removal or other gas refining units. The landfill owner or operator must divide the NMOC concentration from Method 25 or Method 25C of appendix A of this part by six to convert from C_{NMOC} as carbon to C_{NMOC} as hexane.

(3) The owner or operator may use another method to determine landfill gas flow rate and NMOC concentration if the method has been approved by the Administrator.

(i) Within 60 days after the date of completing each performance test (as defined in § 60.8), the owner or operator must submit the results of the performance test, including any associated fuel analyses, according to § 60.767(i)(1).

(ii) [Reserved]

(c) When calculating emissions for Prevention of Significant Deterioration purposes, the owner or operator of each MSW landfill subject to the provisions of this subpart must estimate the NMOC emission rate for comparison to the Prevention of Significant Deterioration major source and significance levels in §§ 51.166 or 52.21 of this chapter using Compilation of Air Pollutant Emission Factors, Volume I: Stationary Point and Area Sources (AP-42) or other approved measurement procedures.

(d) For the performance test required in § 60.762(b)(2)(iii)(B), Method 25 or 25C (Method 25C may be used at the inlet only) of appendix A of this part must be used to determine compliance with the 98 weight-percent efficiency or the 20 parts per million by volume outlet concentration level, unless another method to demonstrate compliance has been approved by the Administrator as provided by § 60.767(c)(2). Method 3, 3A, or 3C must be used to determine oxygen for correcting the NMOC concentration as hexane to 3 percent. In cases where the outlet concentration is less than 50 ppm NMOC as carbon (8 ppm NMOC as hexane), Method 25A should be used in place of Method 25. Method 18 may be used in conjunction with Method 25A on a limited basis (compound specific, *e.g.*, methane) or Method 3C may be used to determine methane. The methane as carbon should be subtracted from the Method 25A total hydrocarbon value as carbon to give NMOC concentration as carbon. The landowner or operator must divide the NMOC concentration as carbon by 6 to convert from the C_{NMOC} as carbon to C_{NMOC} as hexane. Equation 4 must be used to calculate efficiency:

$$\text{Control Efficiency} = (\text{NMOC}_{\text{in}} - \text{NMOC}_{\text{out}}) / (\text{NMOC}_{\text{in}}) \quad (\text{Eq. 4})$$

Where:

NMOC_{in} = Mass of NMOC entering control device.

NMOC_{out} = Mass of NMOC exiting control device.

(e) For the performance test required in § 60.762(b)(2)(iii)(A), the net heating value of the combusted landfill gas as determined in § 60.18(f)(3) is calculated from the concentration of methane in the landfill gas as measured by Method 3C. A minimum of three 30-minute Method 3C samples are determined. The measurement of other organic components, hydrogen, and carbon monoxide is not applicable. Method 3C may be used to determine the landfill gas molecular weight for calculating the flare gas exit velocity under § 60.18(f)(4).

(1) Within 60 days after the date of completing each performance test (as defined in § 60.8), the owner or operator must submit the results of the performance tests, including any associated fuel analyses, required by § 60.764(b) or (d) according to § 60.767(i)(1).

(2) [Reserved]

§ 60.765 Compliance provisions.

(a) Except as provided in § 60.767(c)(2), the specified methods in paragraphs (a)(1) through (6) of this section must be used to determine whether the gas collection system is in compliance with § 60.762(b)(2)(ii).

(1) For the purposes of calculating the maximum expected gas generation flow rate from the landfill to determine compliance with § 60.762(b)(2)(ii)(C)(1), either Equation 5 or Equation 6 must be used. The methane generation rate constant (k) and methane generation potential (L_o) kinetic factors should be those published in the most recent Compilation of Air Pollutant Emission Factors (AP-42) or other site specific values demonstrated to be appropriate and approved by the Administrator. If k has been determined as specified in § 60.764(a)(4), the value of k determined from the test must be used. A value of no more than 15 years must be used for the intended use period of the gas mover equipment. The active life of the landfill is the age of the landfill plus the estimated number of years until closure.

(i) For sites with unknown year-to-year solid waste acceptance rate:

$$Q_m = 2L_oR (e^{-kc} - e^{-kt}) \quad (\text{Eq. 5})$$

Where:

Q_m = Maximum expected gas generation flow rate, cubic meters per year.

L_o = Methane generation potential, cubic meters per megagram solid waste.

R = Average annual acceptance rate, megagrams per year.

k = Methane generation rate constant, year^{-1} .

t = Age of the landfill at equipment installation plus the time the owner or operator intends to use the gas mover equipment or active life of the landfill, whichever is less. If the equipment is installed after closure, t is the age of the landfill at installation, years.

c = Time since closure, years (for an active landfill $c = 0$ and $e^{-kc} = 1$).

(ii) For sites with known year-to-year solid waste acceptance rate:

$$Q_M = \sum_{i=1}^n 2kL_oM_i(e^{-kt_i}) \quad (\text{Eq. 6})$$

Where:

Q_M = Maximum expected gas generation flow rate, cubic meters per year.

k = Methane generation rate constant, year^{-1} .

L_o = Methane generation potential, cubic meters per megagram solid waste.

M_i = Mass of solid waste in the i^{th} section, megagrams.

t_i = Age of the i^{th} section, years.

(iii) If a collection and control system has been installed, actual flow data may be used to project the maximum expected gas generation flow rate instead of, or in conjunction with, Equation 5 or Equation 6 in paragraphs (a)(1)(i) and (ii) of this section. If the landfill is still accepting waste, the actual measured flow data will not equal the maximum expected gas generation rate, so calculations using Equation 5 or Equation 6 in paragraphs (a)(1)(i) or (ii) of this section or other methods must be used to predict the maximum expected gas generation rate over the intended period of use of the gas control system equipment.

(2) For the purposes of determining sufficient density of gas collectors for compliance with § 60.762(b)(2)(ii)(C)(2), the owner or operator must design a system of vertical wells, horizontal collectors, or other collection devices, satisfactory to the Administrator, capable of controlling and extracting gas from all portions of the landfill sufficient to meet all operational and performance standards.

(3) For the purpose of demonstrating whether the gas collection system flow rate is sufficient to determine compliance with § 60.762(b)(2)(ii)(C)(3), the owner or operator must measure gauge pressure in the gas collection header applied to each individual well, monthly. If a positive pressure exists, action must be initiated to correct the exceedance within 5 calendar days, except for the three conditions allowed under § 60.763(b). Any attempted corrective measure must not cause exceedances of other operational or performance standards.

(i) If negative pressure cannot be achieved without excess air infiltration within 15 calendar days of the first measurement of positive pressure, the owner or operator must conduct a root cause analysis and correct the exceedance as soon as practicable, but no later than 60 days after positive pressure was first measured. The owner or operator must keep records according to § 60.768(e)(3).

(ii) If corrective actions cannot be fully implemented within 60 days following the positive pressure measurement for which the root cause analysis was required, the owner or operator must also conduct a corrective action analysis and develop an implementation schedule to complete the corrective action(s) as soon as practicable, but no more than 120 days following the positive pressure measurement. The owner or operator must submit the items listed in § 60.767(g)(7) as part of the next annual report. The owner or operator must keep records according to § 60.768(e)(4).

(iii) If corrective action is expected to take longer than 120 days to complete after the initial exceedance, the owner or operator must submit the root cause analysis, corrective action analysis, and corresponding implementation timeline to the Administrator, according to § 60.767(g)(7) and § 60.767(j). The owner or operator must keep records according to § 60.768(e)(5).

(4) [Reserved]

(5) For the purpose of identifying whether excess air infiltration into the landfill is occurring, the owner or operator must monitor each well monthly for temperature as provided in § 60.763(c). If a well exceeds the operating parameter for temperature, action must be initiated to correct the exceedance

within 5 calendar days. Any attempted corrective measure must not cause exceedances of other operational or performance standards.

(i) If a landfill gas temperature less than 55 degrees Celsius (131 degrees Fahrenheit) cannot be achieved within 15 calendar days of the first measurement of landfill gas temperature greater than 55 degrees Celsius (131 degrees Fahrenheit), the owner or operator must conduct a root cause analysis and correct the exceedance as soon as practicable, but no later than 60 days after a landfill gas temperature greater than 55 degrees Celsius (131 degrees Fahrenheit) was first measured. The owner or operator must keep records according to § 60.768(e)(3).

(ii) If corrective actions cannot be fully implemented within 60 days following the positive pressure or elevated temperature measurement for which the root cause analysis was required, the owner or operator must also conduct a corrective action analysis and develop an implementation schedule to complete the corrective action(s) as soon as practicable, but no more than 120 days following the measurement of landfill gas temperature greater than 55 degrees Celsius (131 degrees Fahrenheit) or positive pressure. The owner or operator must submit the items listed in § 60.767(g)(7) as part of the next annual report. The owner or operator must keep records according to § 60.768(e)(4).

(iii) If corrective action is expected to take longer than 120 days to complete after the initial exceedance, the owner or operator must submit the root cause analysis, corrective action analysis, and corresponding implementation timeline to the Administrator, according to § 60.767(g)(7) and § 60.767(j). The owner or operator must keep records according to § 60.768(e)(5).

(6) An owner or operator seeking to demonstrate compliance with § 60.762(b)(2)(ii)(C)(4) through the use of a collection system not conforming to the specifications provided in § 60.769 must provide information satisfactory to the Administrator as specified in § 60.767(c)(3) demonstrating that off-site migration is being controlled.

(b) For purposes of compliance with § 60.763(a), each owner or operator of a controlled landfill must place each well or design component as specified in the approved design plan as provided in § 60.767(c). Each well must be installed no later than 60 days after the date on which the initial solid waste has been in place for a period of:

- (1) Five (5) years or more if active; or
- (2) Two (2) years or more if closed or at final grade.

(c) The following procedures must be used for compliance with the surface methane operational standard as provided in § 60.763(d).

(1) After installation and startup of the gas collection system, the owner or operator must monitor surface concentrations of methane along the entire perimeter of the collection area and along a pattern that traverses the landfill at 30 meter intervals (or a site-specific established spacing) for each collection area on a quarterly basis using an organic vapor analyzer, flame ionization detector, or other portable monitor meeting the specifications provided in paragraph (d) of this section.

(2) The background concentration must be determined by moving the probe inlet upwind and downwind outside the boundary of the landfill at a distance of at least 30 meters from the perimeter wells.

(3) Surface emission monitoring must be performed in accordance with section 8.3.1 of Method 21 of appendix A of this part, except that the probe inlet must be placed within 5 to 10 centimeters of the ground. Monitoring must be performed during typical meteorological conditions.

(4) Any reading of 500 parts per million or more above background at any location must be recorded as a monitored exceedance and the actions specified in paragraphs (c)(4)(i) through (v) of this section must be taken. As long as the specified actions are taken, the exceedance is not a violation of the operational requirements of § 60.763(d).

(i) The location of each monitored exceedance must be marked and the location and concentration recorded.

(ii) Cover maintenance or adjustments to the vacuum of the adjacent wells to increase the gas collection in the vicinity of each exceedance must be made and the location must be re-monitored within 10 calendar days of detecting the exceedance.

(iii) If the re-monitoring of the location shows a second exceedance, additional corrective action must be taken and the location must be monitored again within 10 days of the second exceedance. If the re-monitoring shows a third exceedance for the same location, the action specified in paragraph (c)(4)(v) of this section must be taken, and no further monitoring of that location is required until the action specified in paragraph (c)(4)(v) of this section has been taken.

(iv) Any location that initially showed an exceedance but has a methane concentration less than 500 ppm methane above background at the 10-day re-monitoring specified in paragraph (c)(4)(ii) or (iii) of this section must be re-monitored 1 month from the initial exceedance. If the 1-month re-monitoring shows a concentration less than 500 parts per million above background, no further monitoring of that location is required until the next quarterly monitoring period. If the 1-month re-monitoring shows an exceedance, the actions specified in paragraph (c)(4)(iii) or (v) of this section must be taken.

(v) For any location where monitored methane concentration equals or exceeds 500 parts per million above background three times within a quarterly period, a new well or other collection device must be installed within 120 calendar days of the initial exceedance. An alternative remedy to the exceedance, such as upgrading the blower, header pipes or control device, and a corresponding timeline for installation may be submitted to the Administrator for approval.

(5) The owner or operator must implement a program to monitor for cover integrity and implement cover repairs as necessary on a monthly basis.

(d) Each owner or operator seeking to comply with the provisions in paragraph (c) of this section or § 60.764(a)(6) must comply with the following instrumentation specifications and procedures for surface emission monitoring devices:

(1) The portable analyzer must meet the instrument specifications provided in section 6 of Method 21 of appendix A of this part, except that “methane” replaces all references to “VOC”.

- (2) The calibration gas must be methane, diluted to a nominal concentration of 500 parts per million in air.
- (3) To meet the performance evaluation requirements in section 8.1 of Method 21 of appendix A of this part, the instrument evaluation procedures of section 8.1 of Method 21 of appendix A of this part must be used.
- (4) The calibration procedures provided in sections 8 and 10 of Method 21 of appendix A of this part must be followed immediately before commencing a surface monitoring survey.
- (e) The provisions of this subpart apply at all times, including periods of startup, shutdown or malfunction. During periods of startup, shutdown, and malfunction, you must comply with the work practice specified in § 60.763(e) in lieu of the compliance provisions in § 60.765.

§ 60.766 Monitoring of operations.

Except as provided in § 60.767(c)(2):

- (a) Each owner or operator seeking to comply with § 60.762(b)(2)(ii)(C) for an active gas collection system must install a sampling port and a thermometer, other temperature measuring device, or an access port for temperature measurements at each wellhead and:

- (1) Measure the gauge pressure in the gas collection header on a monthly basis as provided in § 60.765(a)(3); and

- (2) Monitor nitrogen or oxygen concentration in the landfill gas on a monthly basis as follows:

- (i) The nitrogen level must be determined using Method 3C, unless an alternative test method is established as allowed by § 60.767(c)(2).

- (ii) Unless an alternative test method is established as allowed by § 60.767(c)(2), the oxygen level must be determined by an oxygen meter using Method 3A, 3C, or ASTM D6522–11 (incorporated by reference, see § 60.17). Determine the oxygen level by an oxygen meter using Method 3A, 3C, or ASTM D6522–11 (if sample location is prior to combustion) except that:

- (A) The span must be set between 10 and 12 percent oxygen;

- (B) A data recorder is not required;

- (C) Only two calibration gases are required, a zero and span;

- (D) A calibration error check is not required;

- (E) The allowable sample bias, zero drift, and calibration drift are ± 10 percent.

- (iii) A portable gas composition analyzer may be used to monitor the oxygen levels provided:

- (A) The analyzer is calibrated; and

- (B) The analyzer meets all quality assurance and quality control requirements for Method 3A or ASTM D6522–11 (incorporated by reference, see § 60.17).

- (3) Monitor temperature of the landfill gas on a monthly basis as provided in 60.765(a)(5). The temperature measuring device must be calibrated annually using the procedure in 40 CFR part 60, appendix A–1, Method 2, section 10.3 such that a minimum of two temperature points, bracket within

10 percent of all landfill absolute temperature measurements or two fixed points of ice bath and boiling water, corrected for barometric pressure, are used.

(b) Each owner or operator seeking to comply with § 60.762(b)(2)(iii) using an enclosed combustor must calibrate, maintain, and operate according to the manufacturer's specifications, the following equipment:

(1) A temperature monitoring device equipped with a continuous recorder and having a minimum accuracy of ± 1 percent of the temperature being measured expressed in degrees Celsius or ± 0.5 degrees Celsius, whichever is greater. A temperature monitoring device is not required for boilers or process heaters with design heat input capacity equal to or greater than 44 megawatts.

(2) A device that records flow to the control device and bypass of the control device (if applicable). The owner or operator must:

(i) Install, calibrate, and maintain a gas flow rate measuring device that must record the flow to the control device at least every 15 minutes; and

(ii) Secure the bypass line valve in the closed position with a car-seal or a lock-and-key type configuration. A visual inspection of the seal or closure mechanism must be performed at least once every month to ensure that the valve is maintained in the closed position and that the gas flow is not diverted through the bypass line.

(c) Each owner or operator seeking to comply with § 60.762(b)(2)(iii) using a non-enclosed flare must install, calibrate, maintain, and operate according to the manufacturer's specifications the following equipment:

(1) A heat sensing device, such as an ultraviolet beam sensor or thermocouple, at the pilot light or the flame itself to indicate the continuous presence of a flame.

(2) A device that records flow to the flare and bypass of the flare (if applicable). The owner or operator must:

(i) Install, calibrate, and maintain a gas flow rate measuring device that records the flow to the control device at least every 15 minutes; and

(ii) Secure the bypass line valve in the closed position with a car-seal or a lock-and-key type configuration. A visual inspection of the seal or closure mechanism must be performed at least once every month to ensure that the valve is maintained in the closed position and that the gas flow is not diverted through the bypass line.

(d) Each owner or operator seeking to demonstrate compliance with § 60.762(b)(2)(iii) using a device other than a non-enclosed flare or an enclosed combustor or a treatment system must provide information satisfactory to the Administrator as provided in § 60.767(c)(2) describing the operation of the control device, the operating parameters that would indicate proper performance, and appropriate monitoring procedures. The Administrator must review the information and either approve it, or request that additional information be submitted. The Administrator may specify additional appropriate monitoring procedures.

(e) Each owner or operator seeking to install a collection system that does not meet the specifications in § 60.769 or seeking to monitor alternative parameters to those required by §§ 60.763 through 60.766 must provide information satisfactory to the Administrator as provided in § 60.767(c)(2) and (3) describing the

design and operation of the collection system, the operating parameters that would indicate proper performance, and appropriate monitoring procedures. The Administrator may specify additional appropriate monitoring procedures.

(f) Each owner or operator seeking to demonstrate compliance with the 500 parts per million surface methane operational standard in § 60.763(d) must monitor surface concentrations of methane according to the procedures in § 60.765(c) and the instrument specifications in § 60.765(d). Any closed landfill that has no monitored exceedances of the operational standard in three consecutive quarterly monitoring periods may skip to annual monitoring. Any methane reading of 500 ppm or more above background detected during the annual monitoring returns the frequency for that landfill to quarterly monitoring.

(g) Each owner or operator seeking to demonstrate compliance with § 60.762(b)(2)(iii) using a landfill gas treatment system must maintain and operate all monitoring systems associated with the treatment system in accordance with the site-specific treatment system monitoring plan required in § 60.768(b)(5)(ii) and must calibrate, maintain, and operate according to the manufacturer's specifications a device that records flow to the treatment system and bypass of the treatment system (if applicable). The owner or operator must:

(1) Install, calibrate, and maintain a gas flow rate measuring device that records the flow to the treatment system at least every 15 minutes; and

(2) Secure the bypass line valve in the closed position with a car-seal or a lock-and-key type configuration. A visual inspection of the seal or closure mechanism must be performed at least once every month to ensure that the valve is maintained in the closed position and that the gas flow is not diverted through the bypass line.

(h) The monitoring requirements of paragraphs (b), (c) (d) and (g) of this section apply at all times the affected source is operating, except for periods of monitoring system malfunctions, repairs associated with monitoring system malfunctions, and required monitoring system quality assurance or quality control activities. A monitoring system malfunction is any sudden, infrequent, not reasonably preventable failure of the monitoring system to provide valid data. Monitoring system failures that are caused in part by poor maintenance or careless operation are not malfunctions. You are required to complete monitoring system repairs in response to monitoring system malfunctions and to return the monitoring system to operation as expeditiously as practicable.

§ 60.767 Reporting requirements.

(a) *Design capacity report.* Each owner or operator subject to the requirements of this subpart must submit an initial design capacity report to the Administrator.

(1) *Submission.* The initial design capacity report fulfills the requirements of the notification of the date construction is commenced as required by § 60.7(a)(1) and must be submitted no later than:

(i) November 28, 2016, for landfills that commenced construction, modification, or reconstruction after July 17, 2014 but before August 29, 2016; or

(ii) Ninety days after the date of commenced construction, modification, or reconstruction for landfills that commence construction, modification, or reconstruction after August 29, 2016.

(2) *Initial design capacity report.* The initial design capacity report must contain the following information:

- (i) A map or plot of the landfill, providing the size and location of the landfill, and identifying all areas where solid waste may be landfilled according to the permit issued by the state, local, or tribal agency responsible for regulating the landfill.
- (ii) The maximum design capacity of the landfill. Where the maximum design capacity is specified in the permit issued by the state, local, or tribal agency responsible for regulating the landfill, a copy of the permit specifying the maximum design capacity may be submitted as part of the report. If the maximum design capacity of the landfill is not specified in the permit, the maximum design capacity must be calculated using good engineering practices. The calculations must be provided, along with the relevant parameters as part of the report. The landfill may calculate design capacity in either megagrams or cubic meters for comparison with the exemption values. If the owner or operator chooses to convert the design capacity from volume to mass or from mass to volume to demonstrate its design capacity is less than 2.5 million megagrams or 2.5 million cubic meters, the calculation must include a site-specific density, which must be recalculated annually. Any density conversions must be documented and submitted with the design capacity report. The state, tribal, local agency or Administrator may request other reasonable information as may be necessary to verify the maximum design capacity of the landfill.

(3) *Amended design capacity report.* An amended design capacity report must be submitted to the Administrator providing notification of an increase in the design capacity of the landfill, within 90 days of an increase in the maximum design capacity of the landfill to meet or exceed 2.5 million megagrams and 2.5 million cubic meters. This increase in design capacity may result from an increase in the permitted volume of the landfill or an increase in the density as documented in the annual recalculation required in § 60.768(f).

(b) *NMOC emission rate report.* Each owner or operator subject to the requirements of this subpart must submit an NMOC emission rate report following the procedure specified in paragraph (i)(2) of this section to the Administrator initially and annually thereafter, except as provided for in paragraph (b)(1)(ii) of this section. The Administrator may request such additional information as may be necessary to verify the reported NMOC emission rate.

(1) The NMOC emission rate report must contain an annual or 5-year estimate of the NMOC emission rate calculated using the formula and procedures provided in § 60.764(a) or (b), as applicable.

(i) The initial NMOC emission rate report may be combined with the initial design capacity report required in paragraph (a) of this section and must be submitted no later than indicated in paragraphs (b)(1)(i)(A) and (B) of this section. Subsequent NMOC emission rate reports must be submitted annually thereafter, except as provided for in paragraph (b)(1)(ii) of this section.

(A) November 28, 2016, for landfills that commenced construction, modification, or reconstruction after July 17, 2014, but before August 29, 2016, or

(B) Ninety days after the date of commenced construction, modification, or reconstruction for landfills that commence construction, modification, or reconstruction after August 29, 2016.

(ii) If the estimated NMOC emission rate as reported in the annual report to the Administrator is less than 34 megagrams per year in each of the next 5 consecutive years, the owner or operator may elect to submit, following the procedure specified in paragraph (i)(2) of this section, an estimate of the NMOC emission rate for the next 5-year period in lieu of the annual report. This estimate must include the current amount of solid waste-in-place and the estimated waste acceptance rate for each year of the 5 years for which an NMOC emission rate is estimated. All data and calculations upon which this estimate is based must be provided to the Administrator. This estimate must be revised at least once every 5 years. If the actual waste acceptance rate exceeds the estimated waste acceptance rate in any year reported in the 5-year estimate, a revised 5-year estimate must be submitted to the Administrator. The revised estimate must cover the 5-year period beginning with the year in which the actual waste acceptance rate exceeded the estimated waste acceptance rate.

(2) The NMOC emission rate report must include all the data, calculations, sample reports and measurements used to estimate the annual or 5-year emissions.

(3) Each owner or operator subject to the requirements of this subpart is exempted from the requirements to submit an NMOC emission rate report, after installing a collection and control system that complies with § 60.762(b)(2), during such time as the collection and control system is in operation and in compliance with §§ 60.763 and 60.765.

(c) *Collection and control system design plan.* Each owner or operator subject to the provisions of § 60.762(b)(2) must submit a collection and control system design plan to the Administrator for approval according to the schedule in paragraph (c)(4) of this section. The collection and control system design plan must be prepared and approved by a professional engineer and must meet the following requirements:

(1) The collection and control system as described in the design plan must meet the design requirements in § 60.762(b)(2).

(2) The collection and control system design plan must include any alternatives to the operational standards, test methods, procedures, compliance measures, monitoring, recordkeeping or reporting provisions of §§ 60.763 through 60.768 proposed by the owner or operator.

(3) The collection and control system design plan must either conform with specifications for active collection systems in § 60.769 or include a demonstration to the Administrator's satisfaction of the sufficiency of the alternative provisions to § 60.769.

(4) Each owner or operator of an MSW landfill having a design capacity equal to or greater than 2.5 million megagrams and 2.5 million cubic meters must submit a collection and control system design plan to the Administrator for approval within 1 year of the first NMOC emission rate report in which the NMOC emission rate equals or exceeds 34 megagrams per year, except as follows:

(i) If the owner or operator elects to recalculate the NMOC emission rate after Tier 2 NMOC sampling and analysis as provided in § 60.764(a)(3) and the resulting rate is less than 34 megagrams per year, annual periodic reporting must be resumed, using the Tier 2 determined site-specific NMOC concentration, until the calculated emission rate is equal to or greater than 34 megagrams per year or the landfill is closed. The revised NMOC emission rate report, with the recalculated emission rate based on NMOC sampling and analysis, must be submitted,

following the procedures in paragraph (i)(2) of this section, within 180 days of the first calculated exceedance of 34 megagrams per year.

(ii) If the owner or operator elects to recalculate the NMOC emission rate after determining a site-specific methane generation rate constant k , as provided in Tier 3 in § 60.764(a)(4), and the resulting NMOC emission rate is less than 34 Mg/yr, annual periodic reporting must be resumed. The resulting site-specific methane generation rate constant k must be used in the emission rate calculation until such time as the emissions rate calculation results in an exceedance. The revised NMOC emission rate report based on the provisions of § 60.764(a)(4) and the resulting site-specific methane generation rate constant k must be submitted, following the procedure specified in paragraph (i)(2) of this section, to the Administrator within 1 year of the first calculated emission rate equaling or exceeding 34 megagrams per year.

(iii) If the owner or operator elects to demonstrate that site-specific surface methane emissions are below 500 parts per million methane, based on the provisions of § 60.764(a)(6), then the owner or operator must submit annually a Tier 4 surface emissions report as specified in this paragraph following the procedure specified in paragraph (i)(2) of this section until a surface emissions readings of 500 parts per million methane or greater is found. If the Tier 4 surface emissions report shows no surface emissions readings of 500 parts per million methane or greater for four consecutive quarters at a closed landfill, then the landfill owner or operator may reduce Tier 4 monitoring from a quarterly to an annual frequency. The Administrator may request such additional information as may be necessary to verify the reported instantaneous surface emission readings. The Tier 4 surface emissions report must clearly identify the location, date and time (to nearest second), average wind speeds including wind gusts, and reading (in parts per million) of any value 500 parts per million methane or greater, other than non-repeatable, momentary readings. For location, you must determine the latitude and longitude coordinates using an instrument with an accuracy of at least 4 meters. The coordinates must be in decimal degrees with at least five decimal places. The Tier 4 surface emission report must also include the results of the most recent Tier 1 and Tier 2 results in order to verify that the landfill does not exceed 50 Mg/yr of NMOC.

(A) The initial Tier 4 surface emissions report must be submitted annually, starting within 30 days of completing the fourth quarter of Tier 4 surface emissions monitoring that demonstrates that site-specific surface methane emissions are below 500 parts per million methane, and following the procedure specified in paragraph (i)(2) of this section.

(B) The Tier 4 surface emissions report must be submitted within 1 year of the first measured surface exceedance of 500 parts per million methane, following the procedure specified in paragraph (i)(2) of this section.

(5) The landfill owner or operator must notify the Administrator that the design plan is completed and submit a copy of the plan's signature page. The Administrator has 90 days to decide whether the design plan should be submitted for review. If the Administrator chooses to review the plan, the approval process continues as described in paragraph (c)(6) of this section. However, if the Administrator indicates that submission is not required or does not respond within 90 days, the landfill owner or operator can continue to implement the plan with the recognition that the owner or

operator is proceeding at their own risk. In the event that the design plan is required to be modified to obtain approval, the owner or operator must take any steps necessary to conform any prior actions to the approved design plan and any failure to do so could result in an enforcement action.

(6) Upon receipt of an initial or revised design plan, the Administrator must review the information submitted under paragraphs (c)(1) through (3) of this section and either approve it, disapprove it, or request that additional information be submitted. Because of the many site-specific factors involved with landfill gas system design, alternative systems may be necessary. A wide variety of system designs are possible, such as vertical wells, combination horizontal and vertical collection systems, or horizontal trenches only, leachate collection components, and passive systems. If the Administrator does not approve or disapprove the design plan, or does not request that additional information be submitted within 90 days of receipt, then the owner or operator may continue with implementation of the design plan, recognizing they would be proceeding at their own risk.

(7) If the owner or operator chooses to demonstrate compliance with the emission control requirements of this subpart using a treatment system as defined in this subpart, then the owner or operator must prepare a site-specific treatment system monitoring plan as specified in § 60.768(b)(5).

(d) *Revised design plan.* The owner or operator who has already been required to submit a design plan under paragraph (c) of this section, subpart WWW of this part, or a Federal plan or EPA-approved and effective state plan or tribal plan that implements subparts Cc or Cf of this part, must submit a revised design plan to the Administrator for approval as follows:

(1) At least 90 days before expanding operations to an area not covered by the previously approved design plan.

(2) Prior to installing or expanding the gas collection system in a way that is not consistent with the design plan that was submitted to the Administrator according to paragraph (c) of this section.

(e) *Closure report.* Each owner or operator of a controlled landfill must submit a closure report to the Administrator within 30 days of waste acceptance cessation. The Administrator may request additional information as may be necessary to verify that permanent closure has taken place in accordance with the requirements of 40 CFR 258.60. If a closure report has been submitted to the Administrator, no additional wastes may be placed into the landfill without filing a notification of modification as described under § 60.7(a)(4).

(f) *Equipment removal report.* Each owner or operator of a controlled landfill must submit an equipment removal report to the Administrator 30 days prior to removal or cessation of operation of the control equipment.

(1) The equipment removal report must contain all of the following items:

(i) A copy of the closure report submitted in accordance with paragraph (e) of this section;

(ii) A copy of the initial performance test report demonstrating that the 15-year minimum control period has expired, unless the report of the results of the performance test has been submitted to the EPA via the EPA's CDX, or information that demonstrates that the GCCS will be unable to operate for 15 years due to declining gas flows. In the equipment removal report, the process unit(s) tested, the pollutant(s) tested, and the date that such performance test was

conducted may be submitted in lieu of the performance test report if the report has been previously submitted to the EPA's CDX; and

(iii) Dated copies of three successive NMOC emission rate reports demonstrating that the landfill is no longer producing 34 megagrams or greater of NMOC per year, unless the NMOC emission rate reports have been submitted to the EPA via the EPA's CDX. If the NMOC emission rate reports have been previously submitted to the EPA's CDX, a statement that the NMOC emission rate reports have been submitted electronically and the dates that the reports were submitted to the EPA's CDX may be submitted in the equipment removal report in lieu of the NMOC emission rate reports.

(2) The Administrator may request such additional information as may be necessary to verify that all of the conditions for removal in § 60.762(b)(2)(v) have been met.

(g) *Annual report.* The owner or operator of a landfill seeking to comply with § 60.762(b)(2) using an active collection system designed in accordance with § 60.762(b)(2)(ii) must submit to the Administrator, following the procedure specified in paragraph (i)(2) of this section, annual reports of the recorded information in paragraphs (g)(1) through (7) of this section. The initial annual report must be submitted within 180 days of installation and startup of the collection and control system and must include the initial performance test report required under § 60.8, as applicable, unless the report of the results of the performance test has been submitted to the EPA via the EPA's CDX. In the initial annual report, the process unit(s) tested, the pollutant(s) tested, and the date that such performance test was conducted may be submitted in lieu of the performance test report if the report has been previously submitted to the EPA's CDX. For enclosed combustion devices and flares, reportable exceedances are defined under § 60.768(c). If complying with the operational provisions of §§ 63.1958, 63.1960, and 63.1961 of this chapter, as allowed at § 60.762(b)(2)(iv), the owner or operator must follow the semi-annual reporting requirements in § 63.1981(h) of this chapter in lieu of this paragraph.

(1) Value and length of time for exceedance of applicable parameters monitored under § 60.766(a), (b), (c), (d), and (g).

(2) Description and duration of all periods when the gas stream was diverted from the control device or treatment system through a bypass line or the indication of bypass flow as specified under § 60.766.

(3) Description and duration of all periods when the control device or treatment system was not operating and length of time the control device or treatment system was not operating.

(4) All periods when the collection system was not operating.

(5) The location of each exceedance of the 500 parts per million methane concentration as provided in § 60.763(d) and the concentration recorded at each location for which an exceedance was recorded in the previous month. For location, you must determine the latitude and longitude coordinates using an instrument with an accuracy of at least 4 meters. The coordinates must be in decimal degrees with at least five decimal places.

(6) The date of installation and the location of each well or collection system expansion added pursuant to § 60.765(a)(3), (a)(5), (b), and (c)(4).

(7) For any corrective action analysis for which corrective actions are required in § 60.765(a)(3) or (5) and that take more than 60 days to correct the exceedance, the root cause analysis conducted,

including a description of the recommended corrective action(s), the date for corrective action(s) already completed following the positive pressure or elevated temperature reading, and, for action(s) not already completed, a schedule for implementation, including proposed commencement and completion dates.

(h) *Initial performance test report.* Each owner or operator seeking to comply with § 60.762(b)(2)(iii) must include the following information with the initial performance test report required under § 60.8:

- (1) A diagram of the collection system showing collection system positioning including all wells, horizontal collectors, surface collectors, or other gas extraction devices, including the locations of any areas excluded from collection and the proposed sites for the future collection system expansion;
- (2) The data upon which the sufficient density of wells, horizontal collectors, surface collectors, or other gas extraction devices and the gas mover equipment sizing are based;
- (3) The documentation of the presence of asbestos or nondegradable material for each area from which collection wells have been excluded based on the presence of asbestos or nondegradable material;
- (4) The sum of the gas generation flow rates for all areas from which collection wells have been excluded based on nonproductivity and the calculations of gas generation flow rate for each excluded area; and
- (5) The provisions for increasing gas mover equipment capacity with increased gas generation flow rate, if the present gas mover equipment is inadequate to move the maximum flow rate expected over the life of the landfill; and
- (6) The provisions for the control of off-site migration.

(i) *Electronic reporting.* The owner or operator must submit reports electronically according to paragraphs (i)(1) and (2) of this section.

(1) Within 60 days after the date of completing each performance test (as defined in § 60.8), the owner or operator must submit the results of each performance test according to the following procedures:

- (i) For data collected using test methods supported by the EPA's Electronic Reporting Tool (ERT) as listed on the EPA's ERT Web site (https://www3.epa.gov/ttn/chief/ert/ert__info.html) at the time of the test, you must submit the results of the performance test to the EPA via the Compliance and Emissions Data Reporting Interface (CEDRI). CEDRI can be accessed through the EPA's Central Data Exchange (CDX) (<https://cdx.epa.gov/>). Performance test data must be submitted in a file format generated through the use of the EPA's ERT or an alternative file format consistent with the extensible markup language (XML) schema listed on the EPA's ERT Web site, once the XML schema is available. If you claim that some of the performance test information being submitted is confidential business information (CBI), you must submit a complete file generated through the use of the EPA's ERT or an alternate electronic file consistent with the XML schema listed on the EPA's ERT Web site, including information claimed to be CBI, on a compact disc, flash drive or other commonly used electronic storage media to the EPA. The electronic media must be clearly marked as CBI and mailed to U.S. EPA/OAQPS/CORE CBI Office, Attention: Group Leader, Measurement Policy Group, MD C404–

02, 4930 Old Page Rd., Durham, NC 27703. The same ERT or alternate file with the CBI omitted must be submitted to the EPA via the EPA's CDX as described earlier in this paragraph.

(ii) For data collected using test methods that are not supported by the EPA's ERT as listed on the EPA's ERT Web site at the time of the test, you must submit the results of the performance test to the Administrator at the appropriate address listed in § 60.4.

(2) Each owner or operator required to submit reports following the procedure specified in this paragraph must submit reports to the EPA via the CEDRI. (CEDRI can be accessed through the EPA's CDX.) The owner or operator must use the appropriate electronic report in CEDRI for this subpart or an alternate electronic file format consistent with the XML schema listed on the CEDRI Web site (<https://www3.epa.gov/ttn/chief/cedri/index.html>). If the reporting form specific to this subpart is not available in CEDRI at the time that the report is due, the owner or operator must submit the report to the Administrator at the appropriate address listed in § 60.4. Once the form has been available in CEDRI for 90 calendar days, the owner or operator must begin submitting all subsequent reports via CEDRI. The reports must be submitted by the deadlines specified in this subpart, regardless of the method in which the reports are submitted.

(j) *Corrective action and the corresponding timeline.* The owner or operator must submit according to paragraphs (j)(1) and (2) of this section. If complying with the operational provisions of §§ 63.1958, 63.1960, and 63.1961 of this chapter, as allowed at § 60.762(b)(2)(iv), the owner or operator must follow the corrective action and the corresponding timeline requirements in § 63.1981(j) of this chapter in lieu of this paragraph.

(1) For corrective action that is required according to § 60.765(a)(3)(iii) or (a)(5)(iii) and is expected to take longer than 120 days after the initial exceedance to complete, you must submit the root cause analysis, corrective action analysis, and corresponding implementation timeline to the Administrator as soon as practicable but no later than 75 days after the first measurement of positive pressure or temperature monitoring value of 55 degrees Celsius (131 degrees Fahrenheit). The Administrator must approve the plan for corrective action and the corresponding timeline.

(2) For corrective action that is required according to § 60.765(a)(3)(iii) or (a)(5)(iii) and is not completed within 60 days after the initial exceedance, you must submit a notification to the Administrator as soon as practicable but no later than 75 days after the first measurement of positive pressure or temperature exceedance.

(k) *Liquids addition.* The owner or operator of an affected landfill with a design capacity equal to or greater than 2.5 million megagrams and 2.5 million cubic meters that has employed leachate recirculation or added liquids based on a Research, Development, and Demonstration permit (issued through Resource Conservation and Recovery Act, subtitle D, part 258) within the last 10 years must submit to the Administrator, annually, following the procedure specified in paragraph (i)(2) of this section, the following information:

(1) Volume of leachate recirculated (gallons per year) and the reported basis of those estimates (records or engineering estimates).

(2) Total volume of all other liquids added (gallons per year) and the reported basis of those estimates (records or engineering estimates).

(3) Surface area (acres) over which the leachate is recirculated (or otherwise applied).

(4) Surface area (acres) over which any other liquids are applied.

(5) The total waste disposed (megagrams) in the areas with recirculated leachate and/or added liquids based on on-site records to the extent data are available, or engineering estimates and the reported basis of those estimates.

(6) The annual waste acceptance rates (megagrams per year) in the areas with recirculated leachate and/or added liquids, based on on-site records to the extent data are available, or engineering estimates.

(7) The initial report must contain items in paragraph (k)(1) through (6) of this section per year for the initial annual reporting period as well as for each of the previous 10 years, to the extent historical data are available in on-site records, and the report must be submitted no later than:

(i) September 27, 2017, for landfills that commenced construction, modification, or reconstruction after July 17, 2014 but before August 29, 2016 containing data for the first 12 months after August 29, 2016; or

(ii) Thirteen (13) months after the date of commenced construction, modification, or reconstruction for landfills that commence construction, modification, or reconstruction after August 29, 2016 containing data for the first 12 months after August 29, 2016.

(8) Subsequent annual reports must contain items in paragraph (k)(1) through (6) of this section for the 365-day period following the 365-day period included in the previous annual report, and the report must be submitted no later than 365 days after the date the previous report was submitted.

(9) Landfills may cease annual reporting of items in paragraphs (k)(1) through (7) of this section once they have submitted the closure report in paragraph (e) of this section.

(l) Tier 4 notification.

(1) The owner or operator of an affected landfill with a design capacity equal to or greater than 2.5 million megagrams and 2.5 million cubic meters must provide a notification of the date(s) upon which it intends to demonstrate site-specific surface methane emissions are below 500 parts per million methane, based on the Tier 4 provisions of § 60.764(a)(6). The landfill must also include a description of the wind barrier to be used during the SEM in the notification. Notification must be postmarked not less than 30 days prior to such date.

(2) If there is a delay to the scheduled Tier 4 SEM date due to weather conditions, including not meeting the wind requirements in § 60.764(a)(6)(iii)(A), the owner or operator of a landfill shall notify the Administrator by email or telephone no later than 48 hours before any delay or cancellation in the original test date, and arrange an updated date with the Administrator by mutual agreement.

(m) Each owner or operator that chooses to comply with the provisions in §§ 63.1958, 63.1960, and 63.1961, as allowed at § 60.762(b)(2)(iv), must submit the 24-hour high temperature report according to § 63.1981(k) of this chapter.

§ 60.768 Recordkeeping requirements.

(a) Except as provided in § 60.767(c)(2), each owner or operator of an MSW landfill subject to the provisions of § 60.762(b)(2)(ii) and (iii) must keep for at least 5 years up-to-date, readily accessible, on-site records of the design capacity report that triggered § 60.762(b), the current amount of solid waste in-place, and the year-by-year waste acceptance rate. Off-site records may be maintained if they are retrievable within 4 hours. Either paper copy or electronic formats are acceptable.

(b) Except as provided in § 60.767(c)(2), each owner or operator of a controlled landfill must keep up-to-date, readily accessible records for the life of the control system equipment of the data listed in paragraphs (b)(1) through (5) of this section as measured during the initial performance test or compliance determination. Records of subsequent tests or monitoring must be maintained for a minimum of 5 years. Records of the control device vendor specifications must be maintained until removal.

(1) Where an owner or operator subject to the provisions of this subpart seeks to demonstrate compliance with § 60.762(b)(2)(ii):

(i) The maximum expected gas generation flow rate as calculated in § 60.765(a)(1). The owner or operator may use another method to determine the maximum gas generation flow rate, if the method has been approved by the Administrator.

(ii) The density of wells, horizontal collectors, surface collectors, or other gas extraction devices determined using the procedures specified in § 60.769(a)(1).

(2) Where an owner or operator subject to the provisions of this subpart seeks to demonstrate compliance with § 60.762(b)(2)(iii) through use of an enclosed combustion device other than a boiler or process heater with a design heat input capacity equal to or greater than 44 megawatts:

(i) The average temperature measured at least every 15 minutes and averaged over the same time period of the performance test.

(ii) The percent reduction of NMOC determined as specified in § 60.762(b)(2)(iii)(B) achieved by the control device.

(3) Where an owner or operator subject to the provisions of this subpart seeks to demonstrate compliance with § 60.762(b)(2)(iii)(B)(1) through use of a boiler or process heater of any size: A description of the location at which the collected gas vent stream is introduced into the boiler or process heater over the same time period of the performance testing.

(4) Where an owner or operator subject to the provisions of this subpart seeks to demonstrate compliance with § 60.762(b)(2)(iii)(A) through use of a non-enclosed flare, the flare type (*i.e.*, steam-assisted, air-assisted, or nonassisted), all visible emission readings, heat content determination, flow rate or bypass flow rate measurements, and exit velocity determinations made during the performance test as specified in § 60.18; continuous records of the flare pilot flame or flare flame monitoring and records of all periods of operations during which the pilot flame of the flare flame is absent.

(5) Where an owner or operator subject to the provisions of this subpart seeks to demonstrate compliance with § 60.762(b)(2)(iii) through use of a landfill gas treatment system:

(i) *Bypass records.* Records of the flow of landfill gas to, and bypass of, the treatment system.

(ii) *Site-specific treatment monitoring plan*, to include:

- (A) Monitoring records of parameters that are identified in the treatment system monitoring plan and that ensure the treatment system is operating properly for each intended end use of the treated landfill gas. At a minimum, records should include records of filtration, de-watering, and compression parameters that ensure the treatment system is operating properly for each intended end use of the treated landfill gas.
- (B) Monitoring methods, frequencies, and operating ranges for each monitored operating parameter based on manufacturer's recommendations or engineering analysis for each intended end use of the treated landfill gas.
- (C) Documentation of the monitoring methods and ranges, along with justification for their use.
- (D) Identify who is responsible (by job title) for data collection.
- (E) Processes and methods used to collect the necessary data.
- (F) Description of the procedures and methods that are used for quality assurance, maintenance, and repair of all continuous monitoring systems.

(c) Except as provided in § 60.767(c)(2), each owner or operator of a controlled landfill subject to the provisions of this subpart must keep for 5 years up-to-date, readily accessible continuous records of the equipment operating parameters specified to be monitored in § 60.766 as well as up-to-date, readily accessible records for periods of operation during which the parameter boundaries established during the most recent performance test are exceeded.

(1) The following constitute exceedances that must be recorded and reported under § 60.767(g):

- (i) For enclosed combustors except for boilers and process heaters with design heat input capacity of 44 megawatts (150 million British thermal units per hour) or greater, all 3-hour periods of operation during which the average temperature was more than 28 degrees Celsius (82 degrees Fahrenheit) below the average combustion temperature during the most recent performance test at which compliance with § 60.762(b)(2)(iii) was determined.
- (ii) For boilers or process heaters, whenever there is a change in the location at which the vent stream is introduced into the flame zone as required under paragraph (b)(3) of this section.

(2) Each owner or operator subject to the provisions of this subpart must keep up-to-date, readily accessible continuous records of the indication of flow to the control system and the indication of bypass flow or records of monthly inspections of car-seals or lock-and-key configurations used to seal bypass lines, specified under § 60.766.

(3) Each owner or operator subject to the provisions of this subpart who uses a boiler or process heater with a design heat input capacity of 44 megawatts or greater to comply with § 60.762(b)(2)(iii) must keep an up-to-date, readily accessible record of all periods of operation of the boiler or process heater. (Examples of such records could include records of steam use, fuel use, or monitoring data collected pursuant to other state, local, tribal, or federal regulatory requirements.)

(4) Each owner or operator seeking to comply with the provisions of this subpart by use of a non-enclosed flare must keep up-to-date, readily accessible continuous records of the flame or flare pilot

flame monitoring specified under § 60.766(c), and up-to-date, readily accessible records of all periods of operation in which the flame or flare pilot flame is absent.

(5) Each owner or operator of a landfill seeking to comply with § 60.762(b)(2) using an active collection system designed in accordance with § 60.762(b)(2)(ii) must keep records of periods when the collection system or control device is not operating.

(d) Except as provided in § 60.767(c)(2), each owner or operator subject to the provisions of this subpart must keep for the life of the collection system an up-to-date, readily accessible plot map showing each existing and planned collector in the system and providing a unique identification location label for each collector.

(1) Each owner or operator subject to the provisions of this subpart must keep up-to-date, readily accessible records of the installation date and location of all newly installed collectors as specified under § 60.765(b).

(2) Each owner or operator subject to the provisions of this subpart must keep readily accessible documentation of the nature, date of deposition, amount, and location of asbestos-containing or nondegradable waste excluded from collection as provided in § 60.769(a)(3)(i) as well as any nonproductive areas excluded from collection as provided in § 60.769(a)(3)(ii).

(e) Except as provided in § 60.767(c)(2), each owner or operator subject to the provisions of this subpart must keep for at least 5 years up-to-date, readily accessible records of the items in paragraphs (e)(1) through (5) of this section. Each owner or operator that chooses to comply with the provisions in §§ 63.1958, 63.1960, and 63.1961 of this chapter, as allowed at § 60.762(b)(2)(iv), must keep the records in paragraph (e)(6) of this section and must keep records according to §§ 63.1983(e)(1) through (5) of this chapter in lieu of paragraphs (e)(1) through (5) of this section.

(1) All collection and control system exceedances of the operational standards in § 60.763, the reading in the subsequent month whether or not the second reading is an exceedance, and the location of each exceedance.

(2) Each owner or operator subject to the provisions of this subpart must also keep records of each wellhead temperature monitoring value of 55 degrees Celsius (131 degrees Fahrenheit) or above, each wellhead nitrogen level at or above 20 percent, and each wellhead oxygen level at or above 5 percent.

(3) For any root cause analysis for which corrective actions are required in § 60.765(a)(3)(i) or (a)(5)(i), keep a record of the root cause analysis conducted, including a description of the recommended corrective action(s) taken, and the date(s) the corrective action(s) were completed.

(4) For any root cause analysis for which corrective actions are required in § 60.765(a)(3)(ii) or (a)(5)(ii), keep a record of the root cause analysis conducted, the corrective action analysis, the date for corrective action(s) already completed following the positive pressure reading or high temperature reading, and, for action(s) not already completed, a schedule for implementation, including proposed commencement and completion dates.

(5) For any root cause analysis for which corrective actions are required in § 60.765(a)(3)(iii) or (a)(5)(iii), keep a record of the root cause analysis conducted, the corrective action analysis, the date for corrective action(s) already completed following the positive pressure reading or high temperature reading, for action(s) not already completed, a schedule for implementation, including proposed

commencement and completion dates, and a copy of any comments or final approval on the corrective action analysis or schedule from the regulatory agency.

(6) Each owner or operator that chooses to comply with the provisions in §§ 63.1958, 63.1960, and 63.1961 of this chapter, as allowed at § 60.762(b)(2)(iv), must keep records of the date upon which the owner or operator started complying with the provisions in §§ 63.1958, 63.1960, and 63.1961.

(f) Landfill owners or operators who convert design capacity from volume to mass or mass to volume to demonstrate that landfill design capacity is less than 2.5 million megagrams or 2.5 million cubic meters, as provided in the definition of “design capacity”, must keep readily accessible, on-site records of the annual recalculation of site-specific density, design capacity, and the supporting documentation. Off-site records may be maintained if they are retrievable within 4 hours. Either paper copy or electronic formats are acceptable.

(g) Landfill owners or operators seeking to demonstrate that site-specific surface methane emissions are below 500 parts per million by conducting surface emission monitoring under the Tier 4 procedures specified in § 60.764(a)(6) must keep for at least 5 years up-to-date, readily accessible records of all surface emissions monitoring and information related to monitoring instrument calibrations conducted according to sections 8 and 10 of Method 21 of appendix A of this part, including all of the following items:

(1) Calibration records:

- (i) Date of calibration and initials of operator performing the calibration.
- (ii) Calibration gas cylinder identification, certification date, and certified concentration.
- (iii) Instrument scale(s) used.
- (iv) A description of any corrective action taken if the meter readout could not be adjusted to correspond to the calibration gas value.
- (v) If an owner or operator makes their own calibration gas, a description of the procedure used.

(2) Digital photographs of the instrument setup, including the wind barrier. The photographs must be time and date-stamped and taken at the first sampling location prior to sampling and at the last sampling location after sampling at the end of each sampling day, for the duration of the Tier 4 monitoring demonstration.

(3) Timestamp of each surface scan reading:

- (i) Timestamp should be detailed to the nearest second, based on when the sample collection begins.
- (ii) A log for the length of time each sample was taken using a stopwatch (*e.g.*, the time the probe was held over the area).

(4) Location of each surface scan reading. The owner or operator must determine the coordinates using an instrument with an accuracy of at least 4 meters. Coordinates must be in decimal degrees with at least five decimal places.

(5) Monitored methane concentration (parts per million) of each reading.

- (6) Background methane concentration (parts per million) after each instrument calibration test.
- (7) Adjusted methane concentration using most recent calibration (parts per million).
- (8) For readings taken at each surface penetration, the unique identification location label matching the label specified in paragraph (d) of this section.
- (9) Records of the operating hours of the gas collection system for each destruction device.
- (h) Except as provided in § 60.767(c)(2), each owner or operator subject to the provisions of this subpart must keep for at least 5 years up-to-date, readily accessible records of all collection and control system monitoring data for parameters measured in § 60.766(a)(1), (2), and (3).
- (i) Any records required to be maintained by this subpart that are submitted electronically via the EPA's CDX may be maintained in electronic format.
- (j) For each owner or operator reporting leachate or other liquids addition under § 60.767(k), keep records of any engineering calculations or company records used to estimate the quantities of leachate or liquids added, the surface areas for which the leachate or liquids were applied, and the estimates of annual waste acceptance or total waste in place in the areas where leachate or liquids were applied.

§ 60.769 Specifications for active collection systems.

- (a) Each owner or operator seeking to comply with § 60.762(b)(2)(i) must site active collection wells, horizontal collectors, surface collectors, or other extraction devices at a sufficient density throughout all gas producing areas using the following procedures unless alternative procedures have been approved by the Administrator as provided in § 60.767(c)(2) and (3):
 - (1) The collection devices within the interior must be certified to achieve comprehensive control of surface gas emissions by a professional engineer. The following issues must be addressed in the design: Depths of refuse, refuse gas generation rates and flow characteristics, cover properties, gas system expandability, leachate and condensate management, accessibility, compatibility with filling operations, integration with closure end use, air intrusion control, corrosion resistance, fill settlement, resistance to the refuse decomposition heat, and ability to isolate individual components or sections for repair or troubleshooting without shutting down entire collection system.
 - (2) The sufficient density of gas collection devices determined in paragraph (a)(1) of this section must address landfill gas migration issues and augmentation of the collection system through the use of active or passive systems at the landfill perimeter or exterior.
 - (3) The placement of gas collection devices determined in paragraph (a)(1) of this section must control all gas producing areas, except as provided by paragraphs (a)(3)(i) and (ii) of this section.
 - (i) Any segregated area of asbestos or nondegradable material may be excluded from collection if documented as provided under § 60.768(d). The documentation must provide the nature, date of deposition, location and amount of asbestos or nondegradable material deposited in the area, and must be provided to the Administrator upon request.
 - (ii) Any nonproductive area of the landfill may be excluded from control, provided that the total of all excluded areas can be shown to contribute less than 1 percent of the total amount of NMOC emissions from the landfill. The amount, location, and age of the material must be

documented and provided to the Administrator upon request. A separate NMOC emissions estimate must be made for each section proposed for exclusion, and the sum of all such sections must be compared to the NMOC emissions estimate for the entire landfill.

(A) The NMOC emissions from each section proposed for exclusion must be computed using Equation 7:

$$Q_i = 2 k L_o M_i (e^{-kt_i}) (C_{NMOC}) (3.6 \times 10^{-9}) \quad (\text{Eq. 7})$$

Where:

Q_i = NMOC emission rate from the i^{th} section, megagrams per year.

k = Methane generation rate constant, year^{-1} .

L_o = Methane generation potential, cubic meters per megagram solid waste.

M_i = Mass of the degradable solid waste in the i^{th} section, megagram.

t_i = Age of the solid waste in the i^{th} section, years.

C_{NMOC} = Concentration of nonmethane organic compounds, parts per million by volume.

3.6×10^{-9} = Conversion factor.

(B) If the owner/operator is proposing to exclude, or cease gas collection and control from, nonproductive physically separated (*e.g.*, separately lined) closed areas that already have gas collection systems, NMOC emissions from each physically separated closed area must be computed using either Equation 3 in § 60.764(b) or Equation 7 in paragraph (a)(3)(ii)(A) of this section.

(iii) The values for k and C_{NMOC} determined in field testing must be used if field testing has been performed in determining the NMOC emission rate or the radii of influence (this distance from the well center to a point in the landfill where the pressure gradient applied by the blower or compressor approaches zero). If field testing has not been performed, the default values for k , L_o and C_{NMOC} provided in § 60.764(a)(1) or the alternative values from § 60.764(a)(5) must be used. The mass of nondegradable solid waste contained within the given section may be subtracted from the total mass of the section when estimating emissions provided the nature, location, age, and amount of the nondegradable material is documented as provided in paragraph (a)(3)(i) of this section.

(b) Each owner or operator seeking to comply with § 60.762(b)(2)(ii)(A) construct the gas collection devices using the following equipment or procedures:

(1) The landfill gas extraction components must be constructed of polyvinyl chloride (PVC), high density polyethylene (HDPE) pipe, fiberglass, stainless steel, or other nonporous corrosion resistant material of suitable dimensions to: Convey projected amounts of gases; withstand installation, static, and settlement forces; and withstand planned overburden or traffic loads. The collection system must extend as necessary to comply with emission and migration standards. Collection devices such as wells and horizontal collectors must be perforated to allow gas entry without head loss sufficient to impair performance across the intended extent of control. Perforations must be situated with regard to the need to prevent excessive air infiltration.

(2) Vertical wells must be placed so as not to endanger underlying liners and must address the occurrence of water within the landfill. Holes and trenches constructed for piped wells and horizontal collectors must be of sufficient cross-section so as to allow for their proper construction and completion including, for example, centering of pipes and placement of gravel backfill. Collection devices must be designed so as not to allow indirect short circuiting of air into the cover or refuse into the collection system or gas into the air. Any gravel used around pipe perforations should be of a dimension so as not to penetrate or block perforations.

(3) Collection devices may be connected to the collection header pipes below or above the landfill surface. The connector assembly must include a positive closing throttle valve, any necessary seals and couplings, access couplings and at least one sampling port. The collection devices must be constructed of PVC, HDPE, fiberglass, stainless steel, or other nonporous material of suitable thickness.

(c) Each owner or operator seeking to comply with § 60.762(b)(2)(iii) must convey the landfill gas to a control system in compliance with § 60.762(b)(2)(iii) through the collection header pipe(s). The gas mover equipment must be sized to handle the maximum gas generation flow rate expected over the intended use period of the gas moving equipment using the following procedures:

(1) For existing collection systems, the flow data must be used to project the maximum flow rate. If no flow data exists, the procedures in paragraph (c)(2) of this section must be used.

(2) For new collection systems, the maximum flow rate must be in accordance with § 60.765(a)(1).

Appendix C. 40 CFR Part 60, Subpart A – General Provisions

§ 60.1 Applicability.

(a) Except as provided in subparts B and C, the provisions of this part apply to the owner or operator of any stationary source which contains an affected facility, the construction or modification of which is commenced after the date of publication in this part of any standard (or, if earlier, the date of publication of any proposed standard) applicable to that facility.

(b) Any new or revised standard of performance promulgated pursuant to section 111(b) of the Act shall apply to the owner or operator of any stationary source which contains an affected facility, the construction or modification of which is commenced after the date of publication in this part of such new or revised standard (or, if earlier, the date of publication of any proposed standard) applicable to that facility.

(c) In addition to complying with the provisions of this part, the owner or operator of an affected facility may be required to obtain an operating permit issued to stationary sources by an authorized State air pollution control agency or by the Administrator of the U.S. Environmental Protection Agency (EPA) pursuant to Title V of the Clean Air Act (Act) as amended November 15, 1990 (42 U.S.C. 7661). For more information about obtaining an operating permit see part 70 of this chapter.

(d) *Site-specific standard for Merck & Co., Inc.'s Stonewall Plant in Elkton, Virginia.*

(1) This paragraph applies only to the pharmaceutical manufacturing facility, commonly referred to as the Stonewall Plant, located at Route 340 South, in Elkton, Virginia ("site").

(2) Except for compliance with 40 CFR 60.49b(u), the site shall have the option of either complying directly with the requirements of this part, or reducing the site-wide emissions caps in accordance with the procedures set forth in a permit issued pursuant to 40 CFR 52.2454. If the site chooses the option of reducing the site-wide emissions caps in accordance with the procedures set forth in such permit, the requirements of such permit shall apply in lieu of the otherwise applicable requirements of this part.

(3) Notwithstanding the provisions of paragraph (d)(2) of this section, for any provisions of this part except for Subpart Kb, the owner/operator of the site shall comply with the applicable provisions of this part if the Administrator determines that compliance with the provisions of this part is necessary for achieving the objectives of the regulation and the Administrator notifies the site in accordance with the provisions of the permit issued pursuant to 40 CFR 52.2454.

§ 60.2 Definitions.

The terms used in this part are defined in the Act or in this section as follows:

Act means the Clean Air Act (42 U.S.C. 7401 *et seq.*)

Administrator means the Administrator of the Environmental Protection Agency or his authorized representative.

Affected facility means, with reference to a stationary source, any apparatus to which a standard is applicable.

Alternative method means any method of sampling and analyzing for an air pollutant which is not a reference or equivalent method but which has been demonstrated to the Administrator's satisfaction to, in specific cases, produce results adequate for his determination of compliance.

Approved permit program means a State permit program approved by the Administrator as meeting the requirements of part 70 of this chapter or a Federal permit program established in this chapter pursuant to Title V of the Act (42 U.S.C. 7661).

Capital expenditure means an expenditure for a physical or operational change to an existing facility which exceeds the product of the applicable "annual asset guideline repair allowance percentage" specified in the latest edition of Internal Revenue Service (IRS) Publication 534 and the existing facility's basis, as defined by section 1012 of the Internal Revenue Code. However, the total expenditure for a physical or operational change to an existing facility must not be reduced by any "excluded additions" as defined in IRS Publication 534, as would be done for tax purposes.

Clean coal technology demonstration project means a project using funds appropriated under the heading 'Department of Energy-Clean Coal Technology', up to a total amount of \$2,500,000,000 for commercial demonstrations of clean coal technology, or similar projects funded through appropriations for the Environmental Protection Agency.

Commenced means, with respect to the definition of *new source* in section 111(a)(2) of the Act, that an owner or operator has undertaken a continuous program of construction or modification or that an owner or operator has entered into a contractual obligation to undertake and complete, within a reasonable time, a continuous program of construction or modification.

Construction means fabrication, erection, or installation of an affected facility.

Continuous monitoring system means the total equipment, required under the emission monitoring sections in applicable subparts, used to sample and condition (if applicable), to analyze, and to provide a permanent record of emissions or process parameters.

Electric utility steam generating unit means any steam electric generating unit that is constructed for the purpose of supplying more than one-third of its potential electric output capacity and more than 25 MW electrical output to any utility power distribution system for sale. Any steam supplied to a steam distribution system for the purpose of providing steam to a steam-electric generator that would produce electrical energy for sale is also considered in determining the electrical energy output capacity of the affected facility.

Equivalent method means any method of sampling and analyzing for an air pollutant which has been demonstrated to the Administrator's satisfaction to have a consistent and quantitatively known relationship to the reference method, under specified conditions.

Excess Emissions and Monitoring Systems Performance Report is a report that must be submitted periodically by a source in order to provide data on its compliance with stated emission limits and operating parameters, and on the performance of its monitoring systems.

Existing facility means, with reference to a stationary source, any apparatus of the type for which a standard is promulgated in this part, and the construction or modification of which was commenced before the date of proposal of that standard; or any apparatus which could be altered in such a way as to be of that type.

Force majeure means, for purposes of § 60.8, an event that will be or has been caused by circumstances beyond the control of the affected facility, its contractors, or any entity controlled by the affected facility that prevents the owner or operator from complying with the regulatory requirement to conduct performance tests within the specified timeframe despite the affected facility's best efforts to fulfill the obligation. Examples of such events are acts of nature, acts of war or terrorism, or equipment failure or safety hazard beyond the control of the affected facility.

Isokinetic sampling means sampling in which the linear velocity of the gas entering the sampling nozzle is equal to that of the undisturbed gas stream at the sample point.

Issuance of a part 70 permit will occur, if the State is the permitting authority, in accordance with the requirements of part 70 of this chapter and the applicable, approved State permit program. When the EPA is the permitting authority, issuance of a Title V permit occurs immediately after the EPA takes final action on the final permit.

Malfunction means any sudden, infrequent, and not reasonably preventable failure of air pollution control equipment, process equipment, or a process to operate in a normal or usual manner. Failures that are caused in part by poor maintenance or careless operation are not malfunctions.

Modification means any physical change in, or change in the method of operation of, an existing facility which increases the amount of any air pollutant (to which a standard applies) emitted into the atmosphere by that facility or which results in the emission of any air pollutant (to which a standard applies) into the atmosphere not previously emitted.

Monitoring device means the total equipment, required under the monitoring of operations sections in applicable subparts, used to measure and record (if applicable) process parameters.

Nitrogen oxides means all oxides of nitrogen except nitrous oxide, as measured by test methods set forth in this part.

One-hour period means any 60-minute period commencing on the hour.

Opacity means the degree to which emissions reduce the transmission of light and obscure the view of an object in the background.

Owner or operator means any person who owns, leases, operates, controls, or supervises an affected facility or a stationary source of which an affected facility is a part.

Part 70 permit means any permit issued, renewed, or revised pursuant to part 70 of this chapter.

Particulate matter means any finely divided solid or liquid material, other than uncombined water, as measured by the reference methods specified under each applicable subpart, or an equivalent or alternative method.

Permit program means a comprehensive State operating permit system established pursuant to title V of the Act (42 U.S.C. 7661) and regulations codified in part 70 of this chapter and applicable State regulations, or a comprehensive Federal operating permit system established pursuant to title V of the Act and regulations codified in this chapter.

Permitting authority means:

- (1) The State air pollution control agency, local agency, other State agency, or other agency authorized by the Administrator to carry out a permit program under part 70 of this chapter; or
- (2) The Administrator, in the case of EPA-implemented permit programs under title V of the Act (42 U.S.C. 7661).

Proportional sampling means sampling at a rate that produces a constant ratio of sampling rate to stack gas flow rate.

Reactivation of a very clean coal-fired electric utility steam generating unit means any physical change or change in the method of operation associated with the commencement of commercial operations by a coal-fired utility unit after a period of discontinued operation where the unit:

- (1) Has not been in operation for the two-year period prior to the enactment of the Clean Air Act Amendments of 1990, and the emissions from such unit continue to be carried in the permitting authority's emissions inventory at the time of enactment;
- (2) Was equipped prior to shut-down with a continuous system of emissions control that achieves a removal efficiency for sulfur dioxide of no less than 85 percent and a removal efficiency for particulates of no less than 98 percent;
- (3) Is equipped with low-NO_x burners prior to the time of commencement of operations following reactivation; and
- (4) Is otherwise in compliance with the requirements of the Clean Air Act.

Reference method means any method of sampling and analyzing for an air pollutant as specified in the applicable subpart.

Repowering means replacement of an existing coal-fired boiler with one of the following clean coal technologies: atmospheric or pressurized fluidized bed combustion, integrated gasification combined cycle, magnetohydrodynamics, direct and indirect coal-fired turbines, integrated gasification fuel cells, or as determined by the Administrator, in consultation with the Secretary of Energy, a derivative of one or more of these technologies, and any other technology capable of controlling multiple combustion emissions simultaneously with improved boiler or generation efficiency and with significantly greater waste reduction relative to the performance of technology in widespread commercial use as of November 15, 1990. Repowering shall also include any oil and/or gas-fired unit which has been awarded clean coal technology demonstration funding as of January 1, 1991, by the Department of Energy.

Run means the net period of time during which an emission sample is collected. Unless otherwise specified, a run may be either intermittent or continuous within the limits of good engineering practice.

Shutdown means the cessation of operation of an affected facility for any purpose.

Six-minute period means any one of the 10 equal parts of a one-hour period.

Standard means a standard of performance proposed or promulgated under this part.

Standard conditions means a temperature of 293 K (68F) and a pressure of 101.3 kilopascals (29.92 in Hg).

Startup means the setting in operation of an affected facility for any purpose.

State means all non-Federal authorities, including local agencies, interstate associations, and State-wide programs, that have delegated authority to implement:

- (1) The provisions of this part; and/or
- (2) the permit program established under part 70 of this chapter. The term State shall have its conventional meaning where clear from the context.

Stationary source means any building, structure, facility, or installation which emits or may emit any air pollutant.

Title V permit means any permit issued, renewed, or revised pursuant to Federal or State regulations established to implement title V of the Act (42 U.S.C. 7661). A title V permit issued by a State permitting authority is called a part 70 permit in this part.

Volatile Organic Compound means any organic compound which participates in atmospheric photochemical reactions; or which is measured by a reference method, an equivalent method, an alternative method, or which is determined by procedures specified under any subpart.

§ 60.3 Units and abbreviations.

Used in this part are abbreviations and symbols of units of measure. These are defined as follows:

- (a) System International (SI) units of measure:

A - ampere

g - gram

Hz - hertz

J - joule

K - degree Kelvin

kg - kilogram

m - meter

m³ - cubic meter

mg - milligram - 10⁻³ gram

mm - millimeter - 10⁻³ meter

Mg - megagram - 10⁶ gram

mol - mole

N - newton

ng - nanogram - 10⁻⁹ gram

nm - nanometer - 10⁻⁹ meter

Pa - pascal

s - second

V - volt

W - watt

Ω - ohm

μg - microgram - 10^{-6} gram

(b) Other units of measure:

Btu - British thermal unit

$^{\circ}\text{C}$ - degree Celsius (centigrade)

cal - calorie

cfm - cubic feet per minute

cu ft - cubic feet

dcf - dry cubic feet

dcm - dry cubic meter

dscf - dry cubic feet at standard conditions

dscm - dry cubic meter at standard conditions

eq - equivalent

$^{\circ}\text{F}$ - degree Fahrenheit

ft - feet

gal - gallon

gr - grain

g-eq - gram equivalent

hr - hour

in - inch

k - 1,000

l - liter

lpm - liter per minute

lb - pound

meq - milliequivalent

min - minute

ml - milliliter

mol. wt. - molecular weight

ppb - parts per billion

ppm - parts per million

psia - pounds per square inch absolute

psig - pounds per square inch gage

°R - degree Rankine

scf - cubic feet at standard conditions

scfh - cubic feet per hour at standard conditions

scm - cubic meter at standard conditions

sec - second

sq ft - square feet

std - at standard conditions

(c) Chemical nomenclature:

CdS - cadmium sulfide

CO - carbon monoxide

CO₂ - carbon dioxide

HCl - hydrochloric acid

Hg - mercury

H₂O - water

H₂S - hydrogen sulfide

H₂SO₄ - sulfuric acid

N₂ - nitrogen

NO - nitric oxide

NO₂ - nitrogen dioxide

NO_x - nitrogen oxides

O₂ - oxygen

SO₂ - sulfur dioxide

SO₃ - sulfur trioxide

SO_x - sulfur oxides

(d) Miscellaneous:

A.S.T.M. - American Society for Testing and Materials

§ 60.4 Address.

(a) All requests, reports, applications, submittals, and other communications to the Administrator pursuant to this part shall be submitted in duplicate to the appropriate Regional Office of the U.S. Environmental

Protection Agency to the attention of the Director of the Division indicated in the following list of EPA Regional Offices.

Region I (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont) Director, Enforcement and Compliance Assurance Division, U.S. EPA Region I, 5 Post Office Square - Suite 100 (04-2), Boston, MA 02109-3912, Attn: Air Compliance Clerk.

Region II (New Jersey, New York, Puerto Rico, Virgin Islands), Director, Air and Waste Management Division, U.S. Environmental Protection Agency, Federal Office Building, 26 Federal Plaza (Foley Square), New York, NY 10278.

Region III (Delaware, District of Columbia, Maryland, Pennsylvania, Virginia, West Virginia), Director, Air Protection Division, Mail Code 3AP00, 1650 Arch Street, Philadelphia, PA 19103-2029.

Region IV (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee), Director, Air, Pesticides and Toxics Management Division, U.S. Environmental Protection Agency, 61 Forsyth St. SW., Suite 9T43, Atlanta, Georgia 30303-8960.

Region V (Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin), Director, Air and Radiation Division, U.S. Environmental Protection Agency, 77 West Jackson Boulevard, Chicago, IL 60604-3590.

Region VI (Arkansas, Louisiana, New Mexico, Oklahoma, Texas); Director; Enforcement and Compliance Assurance Division; U.S. Environmental Protection Agency, 1201 Elm Street, Suite 500, Mail Code 6ECD, Dallas, Texas 75270-2102.

Region VII (Iowa, Kansas, Missouri, Nebraska), Director, Air and Waste Management Division, 11201 Renner Boulevard, Lenexa, Kansas 66219.

Region VIII (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming) Director, Air and Toxics Technical Enforcement Program, Office of Enforcement, Compliance and Environmental Justice, Mail Code 8ENF-AT, 1595 Wynkoop Street, Denver, CO 80202-1129.

Region IX (Arizona, California, Hawaii and Nevada; the territories of American Samoa and Guam; the Commonwealth of the Northern Mariana Islands; the territories of Baker Island, Howland Island, Jarvis Island, Johnston Atoll, Kingman Reef, Midway Atoll, Palmyra Atoll, and Wake Islands; and certain U.S. Government activities in the freely associated states of the Republic of the Marshall Islands, the Federated States of Micronesia, and the Republic of Palau), Director, Air Division, U.S. Environmental Protection Agency, 75 Hawthorne Street, San Francisco, CA 94105.

Region X (Alaska, Oregon, Idaho, Washington), Director, Air and Waste Management Division, U.S. Environmental Protection Agency, 1200 Sixth Avenue, Seattle, WA 98101.

(b) Section 111(c) directs the Administrator to delegate to each State, when appropriate, the authority to implement and enforce standards of performance for new stationary sources located in such State. All information required to be submitted to EPA under paragraph (a) of this section, must also be submitted to the appropriate State Agency of any State to which this authority has been delegated (provided, that each specific delegation may except sources from a certain Federal or State reporting requirement). The appropriate mailing address for those States whose delegation request has been approved is as follows:

(1) [Reserved]

(2) State of Alabama: Alabama Department of Environmental Management, P.O. Box 301463, Montgomery, Alabama 36130-1463.

(3) State of Alaska, Department of Environmental Conservation, Pouch O, Juneau, AK 99811.

(4) Arizona:

Arizona Department of Environmental Quality, 1110 West Washington Street, Phoenix, AZ 85007.

Maricopa County Air Quality Department, 1001 North Central Avenue, Suite 900, Phoenix, AZ 85004.

Pima County Department of Environmental Quality, 33 North Stone Avenue, Suite 700, Tucson, AZ 85701.

Pinal County Air Quality Control District, 31 North Pinal Street, Building F, Florence, AZ 85132.

Note:

For tables listing the delegation status of agencies in Region IX, see paragraph (d) of this section.

(5) State of Arkansas: Chief, Division of Air Pollution Control, Arkansas Department of Pollution Control and Ecology, 8001 National Drive, P.O. Box 9583, Little Rock, AR 72209.

(6) California:

Amador County Air Pollution Control District, 12200-B Airport Road, Jackson, CA 95642.

Antelope Valley Air Quality Management District, 43301 Division Street, Suite 206, Lancaster, CA 93535.

Bay Area Air Quality Management District, 939 Ellis Street, San Francisco, CA 94109.

Butte County Air Quality Management District, 2525 Dominic Drive, Suite J, Chico, CA 95928.

Calaveras County Air Pollution Control District, 891 Mountain Ranch Road, San Andreas, CA 95249.

Colusa County Air Pollution Control District, 100 Sunrise Blvd., Suite A-3, Colusa, CA 95932-3246.

El Dorado County Air Quality Management District, 2850 Fairlane Court, Bldg. C, Placerville, CA 95667-4100.

Eastern Kern Air Pollution Control District, 2700 "M" Street, Suite 302, Bakersfield, CA 93301-2370.

Feather River Air Quality Management District, 1007 Live Oak Blvd., Suite B-3, Yuba City, CA 95991.

Glenn County Air Pollution Control District, 720 N. Colusa Street, P.O. Box 351, Willows, CA 95988-0351.

Great Basin Unified Air Pollution Control District, 157 Short Street, Suite 6, Bishop, CA 93514-3537.

Imperial County Air Pollution Control District, 150 South Ninth Street, El Centro, CA 92243-2801.

Lake County Air Quality Management District, 885 Lakeport Blvd., Lakeport, CA 95453-5405.

Lassen County Air Pollution Control District, 707 Nevada Street, Suite 1, Susanville, CA 96130.

Mariposa County Air Pollution Control District, P.O. Box 5, Mariposa, CA 95338.

Mendocino County Air Quality Management District, 306 E. Gobbi Street, Ukiah, CA 95482-5511.

Modoc County Air Pollution Control District, 619 North Main Street, Alturas, CA 96101.

Mojave Desert Air Quality Management District, 14306 Park Avenue, Victorville, CA 92392-2310.

Monterey Bay Unified Air Pollution Control District, 24580 Silver Cloud Court, Monterey, CA 93940.

North Coast Unified Air Quality Management District, 2300 Myrtle Avenue, Eureka, CA 95501-3327.

Northern Sierra Air Quality Management District, 200 Litton Drive, Suite 320, P.O. Box 2509, Grass Valley, CA 95945-2509.

Northern Sonoma County Air Pollution Control District, 150 Matheson Street, Healdsburg, CA 95448-4908.

Placer County Air Pollution Control District, 3091 County Center Drive, Suite 240, Auburn, CA 95603.

Sacramento Metropolitan Air Quality Management District, 777 12th Street, Third Floor, Sacramento, CA 95814-1908.

San Diego County Air Pollution Control District, 10124 Old Grove Road, San Diego, CA 92131-1649.

San Joaquin Valley Air Pollution Control District, 1990 E. Gettysburg, Fresno, CA 93726.

San Luis Obispo County Air Pollution Control District, 3433 Roberto Court, San Luis Obispo, CA 93401-7126.

Santa Barbara County Air Pollution Control District, 260 North San Antonio Road, Suite A, Santa Barbara, CA 93110-1315.

Shasta County Air Quality Management District, 1855 Placer Street, Suite 101, Redding, CA 96001-1759.

Siskiyou County Air Pollution Control District, 525 So. Foothill Drive, Yreka, CA 96097-3036.

South Coast Air Quality Management District, 21865 Copley Drive, Diamond Bar, CA 91765-4182.

Tehama County Air Pollution Control District, P.O. Box 8069 (1750 Walnut Street), Red Bluff, CA 96080-0038.

Tuolumne County Air Pollution Control District, 22365 Airport, Columbia, CA 95310.

Ventura County Air Pollution Control District, 669 County Square Drive, 2nd Floor, Ventura, CA 93003-5417.

Yolo-Solano Air Quality Management District, 1947 Galileo Court, Suite 103, Davis, CA 95616-4882.

Note:

For tables listing the delegation status of agencies in Region IX, see paragraph (d) of this section.

(7) State of Colorado, Department of Public Health and Environment, 4300 Cherry Creek Drive South, Denver, CO 80222-1530.

Note:

For a table listing Region VIII's NSPS delegation status, see paragraph (c) of this section.

(8) State of Connecticut, Compliance Analysis and Coordination Unit, Bureau of Air Management, Department of Energy and Environmental Protection, 79 Elm Street, 5th Floor, Hartford, CT 06106-5127.

(9) State of Delaware, Department of Natural Resources & Environmental Control, 89 Kings Highway, P.O. Box 1401, Dover, Delaware 19903.

(10) District of Columbia, Department of Public Health, Air Quality Division, 51 N Street, NE., Washington, DC 20002.

(11) State of Florida: Florida Department of Environmental Protection, Division of Air Resources Management, 2600 Blair Stone Road, MS 5500, Tallahassee, Florida 32399-2400.

(12) State of Georgia: Georgia Department of Natural Resources, Environmental Protection Division, Air Protection Branch, 4244 International Parkway, Suite 120, Atlanta, Georgia 30354.

(13) Hawaii:

Clean Air Branch, Hawaii Department of Health, 919 Ala Moana Blvd., Suite 203, Honolulu, HI 96814.

Note:

For tables listing the delegation status of agencies in Region IX, see paragraph (d) of this section.

(14) State of Idaho, Department of Health and Welfare, Statehouse, Boise, ID 83701.

(15) State of Illinois: Illinois Environmental Protection Agency, 1021 North Grand Avenue East, Springfield, Illinois 62794.

(16) State of Indiana: Indiana Department of Environmental Management, Office of Air Quality, 100 North Senate Avenue, Indianapolis, Indiana 46204.

(17) State of Iowa: Iowa Department of Natural Resources, Environmental Protection Division, Air Quality Bureau, 7900 Hickman Road, Suite 1, Urbandale, IA 50322.

(18) State of Kansas: Kansas Department of Health and Environment, Bureau of Air and Radiation, 1000 S.W. Jackson, Suite 310, Topeka, KS 66612-1366.

(19) Commonwealth of Kentucky: Kentucky Department for Environmental Protection, Division for Air Quality, 300 Sower Boulevard, 2nd Floor, Frankfort, Kentucky 40601 or local agency, Louisville Metro Air Pollution Control District, 701 W. Ormsby Ave., Suite 303, Louisville, Kentucky 40203.

(20) State of Louisiana: Louisiana Department of Environmental Quality, P.O. Box 4301, Baton Rouge, Louisiana 70821-4301.

Note:

For a list of delegated standards for Louisiana (excluding Indian country), see paragraph (e)(2) of this section.

(21) State of Maine, Maine Department of Environmental Protection, Bureau of Air Quality, 17 State House Station, Augusta, ME 04333-0017.

(22) State of Maryland, Department of the Environment, 1800 Washington Boulevard, Suite 705, Baltimore, Maryland 21230.

(23) Commonwealth of Massachusetts, Massachusetts Department of Environmental Protection, Division of Air and Climate Programs, One Winter Street, Boston, MA 02108.

(24) State of Michigan: Michigan Department of Natural Resources and Environment, Air Quality Division, P.O. Box 30028, Lansing, Michigan 48909.

(25) State of Minnesota: Minnesota Pollution Control Agency, Division of Air Quality, 520 Lafayette Road North, St. Paul, Minnesota 55155.

(26) State of Mississippi: Hand Deliver or Courier: Mississippi Department of Environmental Quality, Office of Pollution Control, Air Division, 515 East Amite Street, Jackson, Mississippi 39201, Mailing Address: Mississippi Department of Environmental Quality, Office of Pollution Control, Air Division, P.O. Box 2261, Jackson, Mississippi 39225.

(27) State of Missouri: Missouri Department of Natural Resources, Division of Environmental Quality, P.O. Box 176, Jefferson City, MO 65102.

(28) State of Montana, Department of Environmental Quality, 1520 E. 6th Ave., PO Box 200901, Helena, MT 59620-0901.

Note:

For a table listing Region VIII's NSPS delegation status, see paragraph (c) of this section.

(29) State of Nebraska, Nebraska Department of Environmental Control, P.O. Box 94877, State House Station, Lincoln, NE 68509.

Lincoln-Lancaster County Health Department, Division of Environmental Health, 2200 St. Marys Avenue, Lincoln, NE 68502

(30) Nevada:

Nevada Division of Environmental Protection, 901 South Stewart Street, Suite 4001, Carson City, NV 89701-5249.

Clark County Department of Air Quality and Environmental Management, 500 S. Grand Central Parkway, 1st Floor, P.O. Box 555210, Las Vegas, NV 89155-5210.

Washoe County Health District, Air Quality Management Division, 1001 E. 9th Street, Building A, Suite 115A, Reno, NV 89520.

Note:

For tables listing the delegation status of agencies in Region IX, see paragraph (d) of this section.

(31) State of New Hampshire, New Hampshire Department of Environmental Services, Air Resources Division, 29 Hazen Drive, P.O. Box 95, Concord, NH 03302-0095.

(32) State of New Jersey: New Jersey Department of Environmental Protection, Division of Environmental Quality, Enforcement Element, John Fitch Plaza, CN-027, Trenton, NJ 08625.

(1) The following table lists the specific source and pollutant categories that have been delegated to the states in Region II. The (X) symbol is used to indicate each category that has been delegated.

Subpart	State			
	New Jersey	New York	Puerto Rico	Virgin Islands
D Fossil-Fuel Fired Steam Generators for Which Construction Commenced After August 17, 1971 (Steam Generators and Lignite Fired Steam Generators)	X	X	X	X
Da Electric Utility Steam Generating Units for Which Construction Commenced After September 18, 1978	X		X	
Db Industrial-Commercial-Institutional Steam Generating Units	X	X	X	X
E Incinerators	X	X	X	X
F Portland Cement Plants	X	X	X	X

	Subpart	State			
		New Jersey	New York	Puerto Rico	Virgin Islands
G	Nitric Acid Plants	X	X	X	X
H	Sulfuric Acid Plants	X	X	X	X
I	Asphalt Concrete Plants	X	X	X	X
J	Petroleum Refineries - (All Categories)	X	X	X	X
K	Storage Vessels for Petroleum Liquids Constructed After June 11, 1973, and prior to May 19, 1978	X	X	X	X
Ka	Storage Vessels for Petroleum Liquids Constructed After May 18, 1978	X	X	X	
L	Secondary Lead Smelters	X	X	X	X
M	Secondary Brass and Bronze Ingot Production Plants	X	X	X	X
N	Iron and Steel Plants	X	X	X	X
O	Sewage Treatment Plants	X	X	X	X
P	Primary Copper Smelters	X	X	X	X
Q	Primary Zinc Smelters	X	X	X	X
R	Primary Lead Smelters	X	X	X	X
S	Primary Aluminum Reduction Plants	X	X	X	X
T	Phosphate Fertilizer Industry: Wet Process Phosphoric Acid Plants	X	X	X	X
U	Phosphate Fertilizer Industry: Superphosphoric Acid Plants	X	X	X	X
V	Phosphate Fertilizer Industry: Diammonium Phosphate Plants	X	X	X	X
W	Phosphate Fertilizer Industry: Triple Superphosphate Plants	X	X	X	X
X	Phosphate Fertilizer Industry: Granular Triple Superphosphate	X	X	X	X
Y	Coal Preparation Plants	X	X	X	X
Z	Ferroally Production Facilities	X	X	X	X
AA	Steel Plants: Electric Arc Furnaces	X	X	X	X
AAa	Electric Arc Furnaces and Argon-Oxygen Decarburization Vessels in Steel Plants	X	X	X	
BB	Kraft Pulp Mills	X	X	X	
CC	Glass Manufacturing Plants	X	X	X	
DD	Grain Elevators	X	X	X	
EE	Surface Coating of Metal Furniture	X	X	X	

Subpart	State			
	New Jersey	New York	Puerto Rico	Virgin Islands
GG Stationary Gas Turbines	X	X	X	
HH Lime Plants	X	X	X	
KK Lead Acid Battery Manufacturing Plants	X	X		
LL Metallic Mineral Processing Plants	X	X	X	
MM Automobile and Light-Duty Truck Surface Coating Operations	X	X		
NN Phosphate Rock Plants	X	X		
PP Ammonium Sulfate Manufacturing Plants	X	X		
QQ Graphic Art Industry Publication Rotogravure Printing	X	X	X	X
RR Pressure Sensitive Tape and Label Surface Coating Operations	X	X	X	
SS Industrial Surface Coating: Large Appliances	X	X	X	
TT Metal Coil Surface Coating	X	X	X	
UU Asphalt Processing and Asphalt Roofing Manufacture	X	X	X	
VV Equipment Leaks of Volatile Organic Compounds in Synthetic Organic Chemical Manufacturing Industry	X		X	
WW Beverage Can Surface Coating Industry	X	X	X	
XX Bulk Gasoline Terminals	X	X	X	
FFF Flexible Vinyl and Urethane Coating and Printing	X	X	X	
GGG Equipment Leaks of VOC in Petroleum Refineries	X		X	
HHH Synthetic Fiber Production Facilities	X		X	
JJJ Petroleum Dry Cleaners	X	X	X	
KKK Equipment Leaks of VOC from Onshore Natural Gas Processing Plants				
LLL Onshore Natural Gas Processing Plants; SO ₂ Emissions		X		
OOO Nonmetallic Mineral Processing Plants		X	X	
PPP Wool Fiberglass Insulation Manufacturing Plants		X	X	

(33) State of New Mexico: New Mexico Environment Department, P.O. Box 5469, Santa Fe, New Mexico 87502-5469. Note: For a list of delegated standards for New Mexico (excluding Bernalillo County and Indian country), see paragraph (e)(1) of this section.

(34) New York: New York State Department of Environmental Conservation, 50 Wolf Road Albany, New York 12233, attention: Division of Air Resources.

(35) State of North Carolina: North Carolina Department of Environmental Quality, Division of Air Quality, 1641 Mail Service Center, Raleigh, North Carolina 27699-1641 or local agencies, Forsyth County Office of Environmental Assistance and Protection, 201 North Chestnut Street, Winston-Salem, North Carolina 27101-4120; Mecklenburg County Land Use and Environmental Services Agency, Air Quality, 2145 Suttle Avenue, Charlotte, North Carolina 28208; Western North Carolina Regional Air Quality Agency, 125 S. Lexington Ave., Suite 101, Asheville, North Carolina 28801-3661.

(36) State of North Dakota, North Dakota Department of Environmental Quality, 918 East Divide Avenue, Bismarck, ND 58501-1947.

Note:

For a table listing Region VIII's NSPS delegation status, see paragraph (c) of this section.

(37) State of Ohio:

(i) Medina, Summit and Portage Counties; Director, Akron Regional Air Quality Management District, 146 South High Street, Room 904, Akron, OH 44308.

(ii) Stark County; Director, Canton City Health Department, Air Pollution Control Division, 420 Market Avenue North, Canton, Ohio 44702-1544.

(iii) Butler, Clermont, Hamilton, and Warren Counties; Director, Hamilton County Department of Environmental Services, 250 William Howard Taft Road, Cincinnati, Ohio 45219-2660.

(iv) Cuyahoga County; Commissioner, Cleveland Department of Public Health, Division of Air Quality, 75 Erieview Plaza 2nd Floor, Cleveland, Ohio 44114.

(v) Clark, Darke, Greene, Miami, Montgomery, and Preble Counties; Director, Regional Air Pollution Control Agency, 117 South Main Street, Dayton, Ohio 45422-1280.

(vi) Lucas County and the City of Rossford (in Wood County); Director, City of Toledo, Division of Environmental Services, 348 South Erie Street, Toledo, OH 43604.

(vii) Adams, Brown, Lawrence, and Scioto Counties; Portsmouth Local Air Agency, 605 Washington Street, Third Floor, Portsmouth, OH 45662.

(viii) Allen, Ashland, Auglaize, Crawford, Defiance, Erie, Fulton, Hancock, Hardin, Henry, Huron, Marion, Mercer, Ottawa, Paulding, Putnam, Richland, Sandusky, Seneca, Van Wert Williams, Wood (Except City of Rossford), and Wyandot Counties; Ohio Environmental Protection Agency, Northwest District Office, Air Pollution Control, 347 North Dunbridge Road, Bowling Green, Ohio 43402.

(ix) Ashtabula, Carroll, Columbiana, Holmes, Lorain, and Wayne Counties; Ohio Environmental Protection Agency, Northeast District Office, Air Pollution Unit, 2110 East Aurora Road, Twinsburg, OH 44087.

(x) Athens, Belmont, Coshocton, Gallia, Guemsey, Harrison, Hocking, Jackson, Jefferson, Meigs, Monroe, Morgan, Muskingum, Noble, Perry, Pike, Ross, Tuscarawas, Vinton, and Washington Counties; Ohio Environmental Protection Agency, Southeast District Office, Air Pollution Unit, 2195 Front Street, Logan, OH 43138.

(xi) Champaign, Clinton, Highland, Logan, and Shelby Counties; Ohio Environmental Protection Agency, Southwest District Office, Air Pollution Unit, 401 East Fifth Street, Dayton, Ohio 45402-2911.

- (xii) Delaware, Fairfield, Fayette, Franklin, Knox, Licking, Madison, Morrow, Pickaway, and Union Counties; Ohio Environmental Protection Agency, Central District Office, Air Pollution control, 50 West Town Street, Suite 700, Columbus, Ohio 43215.
- (xiii) Geauga and Lake Counties; Lake County General Health District, Air Pollution Control, 33 Mill Street, Painesville, OH 44077.
- (xiv) Mahoning and Trumbull Counties; Mahoning-Trumbull Air Pollution Control Agency, 345 Oak Hill Avenue, Suite 200, Youngstown, OH 44502.
- (38) State of Oklahoma, Oklahoma State Department of Health, Air Quality Service, P.O. Box 53551, Oklahoma City, OK 73152.
- (i) Oklahoma City and County: Director, Oklahoma City-County Health Department, 921 Northeast 23rd Street, Oklahoma City, OK 73105.
- (ii) Tulsa County: Tulsa City-County Health Department, 4616 East Fifteenth Street, Tulsa, OK 74112.
- (39) State of Oregon.
- (i) Oregon Department of Environmental Quality (ODEQ), 811 SW Sixth Avenue, Portland, OR 97204-1390, <http://www.deq.state.or.us>.
- (ii) Lane Regional Air Pollution Authority (LRAPA), 1010 Main Street, Springfield, Oregon 97477, <http://www.lrapa.org>.
- (40)
- (i) City of Philadelphia, Department of Public Health, Air Management Services, 321 University Avenue, Philadelphia, Pennsylvania 19104.
- (ii) Commonwealth of Pennsylvania, Department of Environmental Protection, Bureau of Air Quality Control, P.O. Box 8468, 400 Market Street, Harrisburg, Pennsylvania 17105.
- (iii) Allegheny County Health Department, Bureau of Environmental Quality, Division of Air Quality, 301 39th Street, Pittsburgh, Pennsylvania 15201.
- (41) State of Rhode Island, Rhode Island Department of Environmental Management, Office of Air Resources, 235 Promenade Street, Providence, RI 02908.
- (42) State of South Carolina: South Carolina Department of Health and Environmental Control, 2600 Bull Street, Columbia, South Carolina 29201.
- (43) State of South Dakota, Air Quality Program, Department of Agriculture and Natural Resources, Joe Foss Building, 523 East Capitol, Pierre, SD 57501-3181.
- (44) State of Tennessee: Tennessee Department of Environment and Conservation, Division of Air Pollution Control, William R. Snodgrass Tennessee Tower, 312 Rosa L. Parks Avenue, 15th Floor, Nashville, Tennessee 37243, or local agencies, Knox County Air Quality Management - Department of Public Health, 140 Dameron Avenue, Knoxville, Tennessee 37917; Metro Public Health Department, Pollution Control Division, 2500 Charlotte Ave., Nashville, Tennessee 37209; Chattanooga-Hamilton County Air Pollution Control Bureau, 6125 Preservation Drive, Chattanooga, Tennessee 37416; Shelby County Health Department, Pollution Control Section, 814 Jefferson Avenue, Memphis, Tennessee 38105.

(45) State of Texas, Texas Air Control Board, 6330 Highway 290 East, Austin, TX 78723.

(46) State of Utah, Division of Air Quality, Department of Environmental Quality, P.O. Box 144820, Salt Lake City, UT 84114-4820.

Note:

For a table listing Region VIII's NSPS delegation status, see paragraph (c) of this section.

(47) State of Vermont, Agency of Natural Resources, Department of Environmental Conservation, Air Quality and Climate Division, Davis 2, One National Life Drive, Montpelier, VT 05620-3802.

(48) Commonwealth of Virginia, Department of Environmental Quality, 629 East Main Street, Richmond, Virginia 23219.

(49) **State of Washington.**

(i) Washington State Department of Ecology (Ecology), P.O. Box 47600, Olympia, WA 98504-7600, <http://www.ecy.wa.gov/>

(ii) Benton Clean Air Authority (BCAA), 650 George Washington Way, Richland, WA 99352-4289, <http://www.bcaa.net/>

(iii) Northwest Air Pollution Control Authority (NWAPA), 1600 South Second St., Mount Vernon, WA 98273-5202, <http://www.nwair.org/>

(iv) Olympic Regional Clean Air Agency (ORCAA), 909 Sleater-Kinney Road S.E., Suite 1, Lacey, WA 98503-1128, <http://www.orcaa.org/>

(v) Puget Sound Clean Air Agency (PSCAA), 110 Union Street, Suite 500, Seattle, WA 98101-2038, <http://www.pscleanair.org/>

(vi) Spokane County Air Pollution Control Authority (SCAPCA), West 1101 College, Suite 403, Spokane, WA 99201, <http://www.scapca.org/>

(vii) Southwest Clean Air Agency (SWCAA), 1308 NE. 134th St., Vancouver, WA 98685-2747, <http://www.swcleanair.org/>

(viii) Yakima Regional Clean Air Authority (YRCAA), 6 South 2nd Street, Suite 1016, Yakima, WA 98901, <http://co.yakima.wa.us/cleanair/default.htm>

(ix) The following table lists the delegation status of the New Source Performance Standards for the State of Washington. An "X" indicates the subpart has been delegated, subject to all the conditions and limitations set forth in Federal law and the letters granting delegation. Some authorities cannot be delegated and are retained by EPA. Refer to the letters granting delegation for a discussion of these retained authorities. The dates noted at the end of the table indicate the effective dates of Federal rules that have been delegated. Authority for implementing and enforcing any amendments made to these rules after these effective dates are not delegated.

NSPS Subparts Delegated to Washington Air Agencies

Subpart ¹	Washington
	Ecology ² BCAA ³ NWAPA ⁴ ORCAA ⁵ PSCAA ⁶ SCAPCA ⁷ SWCAA ⁸ YRCAA ⁹

Permit Issued: [month day, year]

Permit Expires: [month day, year]

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Subpart ¹	Washington							
	Ecology ²	BCAA ³	NWAPA ⁴	ORCAA ⁵	PSCAA ⁶	SCAPCA ⁷	SWCAA ⁸	YRCAA ⁹
A General Provisions	X	X	X	X	X	X	X	X
B Adoption and Submittal of State Plans for Designated Facilities								
C Emission Guidelines and Compliance Times								
Cb Large Municipal Waste Combustors that are Constructed on or before September 20, 1994 (Emission Guidelines and Compliance Times)								
Cc Municipal Solid Waste Landfills (Emission Guidelines and Compliance Times)								
Cd Sulfuric Acid Production Units (Emission Guidelines and Compliance Times)								
Ce Hospital/Medical/Infectious Waste Incinerators (Emission Guidelines and Compliance Times)								
D Fossil-Fuel-Fired Steam Generators for which Construction is Commenced after August 17, 1971	X	X	X	X	X	X	X	X
Da Electric Utility Steam Generating Units for which Construction is Commenced after September 18, 1978	X	X	X	X	X	X	X	X
Db Industrial-Commercial-Institutional Steam Generating Units	X	X	X	X	X	X	X	X
Dc Small Industrial-Commercial-Institutional Steam Generating Units	X	X	X	X	X	X	X	X
E Incinerators	X	X	X	X	X	X	X	X
Ea Municipal Waste Combustors for which Construction is Commenced after December 20, 1989 and on or before September 20, 1994	X	X	X	X	X	X	X	X
Eb - Large Municipal Waste Combustors		X		X	X	X		
Ec - Hospital/Medical/Infectious Waste Incinerators	X	X	X	X	X	X		
F Portland Cement Plants	X	X	X	X	X	X	X	X
G Nitric Acid Plants	X	X	X	X	X	X	X	X
H Sulfuric Acid Plants	X	X	X	X	X	X	X	X
I Hot Mix Asphalt Facilities	X	X	X	X	X	X	X	X
J Petroleum Refineries	X	X	X	X	X	X	X	X
K Storage Vessels for Petroleum Liquids for which Construction, Reconstruction, or Modification Commenced	X	X	X	X	X	X	X	X

Subpart ¹	Washington							
	Ecology ²	BCAA ³	NWAPA ⁴	ORCAA ⁵	PSCAA ⁶	SCAPCA ⁷	SWCAA ⁸	YRCAA ⁹
after June 11, 1973 and prior to May 19, 1978								
Ka Storage Vessels for Petroleum Liquids for which Construction, Reconstruction, or Modification Commenced after May 18, 1978 and prior to July 23, 1984	X	X	X	X	X	X	X	X
Kb VOC Liquid Storage Vessels (including Petroleum Liquid Storage Vessels) for which Construction, Reconstruction, or Modification Commenced after July 23, 1984	X	X	X	X	X	X	X	X
L Secondary Lead Smelters	X	X	X	X	X	X	X	X
M Secondary Brass and Bronze Production Plants	X	X	X	X	X	X	X	X
N Primary Emissions from Basic Oxygen Process Furnaces for which Construction is Commenced after June 11, 1973	X	X	X	X	X	X	X	X
Na Secondary Emissions from Basic Oxygen Process Steel-making Facilities for which Construction is Commenced after January 20, 1983	X	X	X	X	X	X	X	X
O Sewage Treatment Plants	X	X	X	X	X	X	X	X
P Primary Copper Smelters	X	X	X	X	X	X	X	X
Q Primary Zinc Smelters	X	X	X	X	X	X	X	X
R Primary Lead Smelters	X	X	X	X	X	X	X	X
S Primary Aluminum Reduction Plants ¹⁰	X							
T Phosphate Fertilizer Industry: Wet Process Phosphoric Acid Plants	X	X	X	X	X	X	X	X
U Phosphate Fertilizer Industry: Superphosphoric Acid Plants	X	X	X	X	X	X	X	X
V Phosphate Fertilizer Industry: Diammonium Phosphate Plants	X	X	X	X	X	X	X	X
W Phosphate Fertilizer Industry: Triple Superphosphate Plants	X	X	X	X	X	X	X	X
X Phosphate Fertilizer Industry: Granular Triple Superphosphate Storage Facilities	X	X	X	X	X	X	X	X
Y Coal Preparation Plants	X	X	X	X	X	X	X	X
Z Ferroalloy Production Facilities	X	X	X	X	X	X	X	X
AA Steel Plants: Electric Arc Furnaces Constructed after October 21, 1974 and on or before August 17, 1983	X	X	X	X	X	X	X	X
AAa Steel Plants: Electric Arc Furnaces and Argon-Oxygen Decarburization Vessels Constructed after August 7, 1983	X	X	X	X	X	X	X	X

Subpart ¹	Washington							
	Ecology ²	BCAA ³	NWAPA ⁴	ORCAA ⁵	PSCAA ⁶	SCAPCA ⁷	SWCAA ⁸	YRCAA ⁹
BB Kraft Pulp Mills ¹¹	X							
CC Glass Manufacturing Plants	X	X	X	X	X	X	X	X
DD Grain Elevators	X	X	X	X	X	X	X	X
EE Surface Coating of Metal Furniture	X	X	X	X	X	X	X	X
GG Stationary Gas Turbines	X	X	X	X	X	X	X	X
HH Lime Manufacturing Plants	X	X	X	X	X	X	X	X
KK Lead-Acid Battery Manufacturing Plants	X	X	X	X	X	X	X	X
LL Metallic Mineral Processing Plants	X	X	X	X	X	X	X	X
MM Automobile and Light Duty Truck Surface Coating Operations	X	X	X	X	X	X	X	X
NN Phosphate Rock Plants	X	X	X	X	X	X	X	X
PP Ammonium Sulfate Manufacture	X	X	X	X	X	X	X	X
QQ Graphic Arts Industry: Publication Rotogravure Printing	X	X	X	X	X	X	X	X
RR Pressure Sensitive Tape and Label Surface Coating Standards	X	X	X	X	X	X	X	X
SS Industrial Surface Coating: Large Appliances	X	X	X	X	X	X	X	X
TT Metal Coil Surface Coating	X	X	X	X	X	X	X	X
UU Asphalt Processing and Asphalt Roof Manufacture	X	X	X	X	X	X	X	X
VV Equipment Leaks of VOC in Synthetic Organic Chemical Manufacturing Industry	X	X	X	X	X	X	X	X
WW Beverage Can Surface Coating Industry	X	X	X	X	X	X	X	X
XX Bulk Gasoline Terminals	X	X	X	X	X	X	X	X
AAA New Residential Wood Heaters								
BBB Rubber Tire Manufacturing Industry	X	X	X	X	X	X	X	X
DDD VOC Emissions from Polymer Manufacturing Industry	X	X	X	X	X	X	X	X
FFF Flexible Vinyl and Urethane Coating and Printing	X	X	X	X	X	X	X	X
GGG Equipment Leaks of VOC in Petroleum Refineries	X	X	X	X	X	X	X	X
HHH Synthetic Fiber Production Facilities	X	X	X	X	X	X	X	X
III VOC Emissions from Synthetic Organic Chemical Manufacturing Industry Air Oxidation Unit Processes	X	X	X	X	X	X	X	X

Subpart ¹	Washington							
	Ecology ²	BCAA ³	NWAPA ⁴	ORCAA ⁵	PSCAA ⁶	SCAPCA ⁷	SWCAA ⁸	YRCAA ⁹
JJJ Petroleum Dry Cleaners	X	X	X	X	X	X	X	X
KKK Equipment Leaks of VOC from Onshore Natural Gas Processing Plants	X	X	X	X	X	X	X	X
LLL Onshore Natural Gas Processing: SO ₂ Emissions	X	X	X	X	X	X	X	X
NNN VOC Emissions from Synthetic Organic Chemical Manufacturing Industry Distillation Operations	X	X	X	X	X	X	X	X
OOO Nonmetallic Mineral Processing Plants			X		X		X	
PPP Wool Fiberglass Insulation Manufacturing Plants	X	X	X	X	X	X	X	X
QQQ VOC Emissions from Petroleum Refinery Wastewater Systems	X	X	X	X	X	X	X	X
RRR VOCs from Synthetic Organic Chemical Manufacturing Industry Reactor Processes	X	X	X	X	X	X	X	X
SSS Magnetic Tape Coating Facilities	X	X	X	X	X	X	X	X
TTT Industrial Surface Coating: Surface Coating of Plastic Parts for Business Machines	X	X	X	X	X	X	X	X
UUU Calciners and Dryers in Mineral Industries	X	X	X	X	X	X	X	X
VVV Polymeric Coating of Supporting Substrates Facilities	X	X	X	X	X	X	X	X
WWW Municipal Solid Waste Landfills	X	X	X	X	X	X	X	X
AAAA Small Municipal Waste Combustion Units for which Construction is Commenced after August 30, 1999 or for which Modification or Reconstruction is Commenced after June 6, 2001	X	X		X	X	X		X
BBBB Small Municipal Waste Combustion Units Constructed on or before August 30, 1999 (Emission Guidelines and Compliance Times)								
CCCC Commercial and Industrial Solid Waste Incineration Units for which Construction is Commenced after November, 30, 1999 or for which Modification or Reconstruction is Commenced on or after June 1, 2001	X	X		X	X	X		X
DDDD Commercial and Industrial Solid Waste Incineration Units that Commenced Construction on or before November 30, 1999 (Emission Guidelines and Compliance Times)								

¹ Any authority within any subpart of this part that is not delegable, is not delegated. Please refer to Attachment B to the delegation letters for a listing of the NSPS authorities excluded from delegation.

² Washington State Department of Ecology, for 40 CFR 60.17(h)(1), (h)(2), (h)(3) and 40 CFR part 60, subpart AAAA, as in effect on June 6, 2001; for 40 CFR part 60, subpart CCCC, as in effect on June 1, 2001; and for all other NSPS delegated, as in effect February 20, 2001.

³ Benton Clean Air Authority, for 40 CFR 60.17(h)(1), (h)(2), (h)(3) and 40 CFR part 60, subpart AAAA, as in effect on June 6, 2001; for 40 CFR part 60, subpart CCCC, as in effect on June 1, 2001; and for all other NSPS delegated, as in effect February 20, 2001.

⁴ Northwest Air Pollution Authority, for all NSPS delegated, as in effect on July 1, 2000.

⁵ Olympic Regional Clean Air Authority, for 40 CFR 60.17(h)(1), (h)(2), (h)(3) and 40 CFR part 60, subpart AAAA, as in effect on June 6, 2001; for 40 CFR part 60, subpart CCCC, as in effect on June 1, 2001; and for all other NSPS delegated, as in effect February 20, 2001.

⁶ Puget Sound Clean Air Authority, for all NSPS delegated, as in effect on July 1, 2002.

⁷ Spokane County Air Pollution Control Authority, for 40 CFR 60.17(h)(1), (h)(2), (h)(3) and 40 CFR part 60, subpart AAAA, as in effect on June 6, 2001; for 40 CFR part 60, subpart CCCC, as in effect on June 1, 2001; and for all other NSPS delegated, as in effect February 20, 2001.

⁸ Southwest Clean Air Agency, for all NSPS delegated, as in effect on July 1, 2000.

⁹ Yakima Regional Clean Air Authority, for 40 CFR 60.17(h)(1), (h)(2), (h)(3) and 40 CFR part 60, subpart AAAA, as in effect on June 6, 2001; for 40 CFR part 60, subpart CCCC, as in effect on June 1, 2001; and for all other NSPS delegated, as in effect February 20, 2001.

¹⁰ Subpart S of this part is not delegated to local agencies in Washington because the Washington State Department of Ecology retains sole authority to regulate Primary Aluminum Plants, pursuant to Washington Administrative Code 173-415-010.

¹¹ Subpart BB of this part is not delegated to local agencies in Washington because the Washington State Department of Ecology retains sole authority to regulate Kraft and Sulfite Pulping Mills, pursuant to Washington State Administrative Code 173-405-012 and 173-410-012.

(50) State of West Virginia, Department of Environmental Protection, Division of Air Quality, 601 57th Street, SE., Charleston, West Virginia 25304.

(51) State of Wisconsin: Wisconsin Department of Natural Resources, 101 South Webster St., P.O. Box 7921, Madison, Wisconsin 53707-7921.

(52) State of Wyoming, Department of Environmental Quality, Air Quality Division, Herschler Building, 122 West 25th Street, Cheyenne, WY 82002.

Note:

For a table listing Region VIII's NSPS delegation status, see paragraph (c) of this section.

(53) Territory of Guam: Guam Environmental Protection Agency, P.O. Box 22439 GMF, Barrigada, Guam 96921.

Note:

For tables listing the delegation status of agencies in Region IX, see paragraph (d) of this section.

(54) Commonwealth of Puerto Rico: Commonwealth of Puerto Rico Environmental Quality Board, P.O. Box 11488, Santurce, PR 00910, Attention: Air Quality Area Director (see table under § 60.4(b)(FF)(1)).

(55) U.S. Virgin Islands: U.S. Virgin Islands Department of Conservation and Cultural Affairs, P.O. Box 578, Charlotte Amalie, St. Thomas, VI 00801.

(56) American Samoa: American Samoa Environmental Protection Agency, P.O. Box PPA, Pago Pago, American Samoa 96799.

Note:

For tables listing the delegation status of agencies in Region IX, see paragraph (d) of this section.

(57) Commonwealth of the Northern Mariana Islands: CNMI Division of Environmental Quality, P.O. Box 501304, Saipan, MP 96950.

Note:

For tables listing the delegation status of agencies in Region IX, see paragraph (d) of this section.

(c) The delegation status table for New Source Performance Standards for Region VIII can be found online at <http://www2.epa.gov/region8/air-program>.

(d) The following tables list the specific part 60 standards that have been delegated unchanged to the air pollution control agencies in Region IX. The (X) symbol is used to indicate each standard that has been delegated. The following provisions of this subpart are not delegated: §§ 60.4(b), 60.8(b), 60.9, 60.11(b), 60.11(e), 60.13(a), 60.13(d)(2), 60.13(g), 60.13(i).

(1) **Arizona.** The following table identifies delegations for Arizona:

Table 3 to Paragraph (d)(1) - Delegation Status for New Source Performance Standards for Arizona

	Subpart	Air pollution control agency			
		Arizona DEQ	Maricopa County	Pima County	Pinal County
A	General Provisions	X	X	X	X
D	Fossil-Fuel Fired Steam Generators Constructed After August 17, 1971	X	X	X	X
Da	Electric Utility Steam Generating Units Constructed After September 18, 1978	X	X	X	X
Db	Industrial-Commercial-Institutional Steam Generating Units	X	X	X	X
Dc	Small Industrial-Commercial-Institutional Steam Generating Units	X	X	X	X
E	Incinerators	X	X	X	X
Ea	Municipal Waste Combustors Constructed After December 20, 1989 and On or Before September 20, 1994	X	X	X	X
Eb	Large Municipal Waste Combustors Constructed After September 20, 1994	X	X	X	
Ec	Hospital/Medical/Infectious Waste Incinerators for Which Construction is Commenced	X	X	X	

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	Subpart	Air pollution control agency			
		Arizona DEQ	Maricopa County	Pima County	Pinal County
	After June 20, 1996				
F	Portland Cement Plants	X		X	X
G	Nitric Acid Plants	X	X	X	X
Ga	Nitric Acid Plants For Which Construction, Reconstruction or Modification Commenced After October 14, 2011		X	X	
H	Sulfuric Acid Plant	X	X	X	X
I	Hot Mix Asphalt Facilities	X	X	X	X
J	Petroleum Refineries	X		X	X
Ja	Petroleum Refineries for Which Construction, Reconstruction, or Modification Commenced After May 14, 2007			X	
K	Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After June 11, 1973, and Prior to May 19, 1978	X	X	X	X
Ka	Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After May 18, 1978, and Prior to July 23, 1984	X	X	X	X
Kb	Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984	X	X	X	X
L	Secondary Lead Smelters	X		X	X
M	Secondary Brass and Bronze Production Plants	X	X	X	X
N	Primary Emissions from Basic Oxygen Process Furnaces for Which Construction is Commenced After June 11, 1973	X	X	X	X
Na	Secondary Emissions from Basic Oxygen Process Steelmaking Facilities for Which Construction is Commenced After January 20, 1983	X	X	X	X
O	Sewage Treatment Plants	X	X	X	X
P	Primary Copper Smelters	X		X	X
Q	Primary Zinc Smelters	X		X	X
R	Primary Lead Smelters	X		X	X
S	Primary Aluminum Reduction Plants	X	X	X	X
T	Phosphate Fertilizer Industry: Wet Process Phosphoric Acid Plants	X	X	X	X
U	Phosphate Fertilizer Industry: Superphosphoric Acid Plants	X	X	X	X

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	Subpart	Air pollution control agency			
		Arizona DEQ	Maricopa County	Pima County	Pinal County
V	Phosphate Fertilizer Industry: Diammonium Phosphate Plants	X	X	X	X
W	Phosphate Fertilizer Industry: Triple Superphosphate Plants	X	X	X	X
X	Phosphate Fertilizer Industry: Granular Triple Superphosphate Storage Facilities	X	X	X	X
Y	Coal Preparation and Processing Plants	X	X	X	X
Z	Ferroalloy Production Facilities	X	X	X	X
AA	Steel Plants: Electric Arc Furnaces Constructed After October 21, 1974 and On or Before August 17, 1983	X	X	X	X
AAa	Steel Plants: Electric Arc Furnaces and Argon-Oxygen Decarburization Vessels Constructed After August 7, 1983	X	X	X	X
BB	Kraft Pulp Mills	X	X	X	X
BBa	Kraft Pulp Mill Sources for which Construction, Reconstruction or Modification Commenced after May 23, 2013		X	X	
CC	Glass Manufacturing Plants	X	X	X	X
DD	Grain Elevators	X	X	X	X
EE	Surface Coating of Metal Furniture	X	X	X	X
FF	(Reserved)				
GG	Stationary Gas Turbines	X	X	X	X
HH	Lime Manufacturing Plants	X	X	X	X
KK	Lead-Acid Battery Manufacturing Plants	X	X	X	X
LL	Metallic Mineral Processing Plants	X	X	X	X
MM	Automobile and Light Duty Trucks Surface Coating Operations	X	X	X	X
NN	Phosphate Rock Plants	X	X	X	X
PP	Ammonium Sulfate Manufacture	X	X	X	X
QQ	Graphic Arts Industry: Publication Rotogravure Printing	X	X	X	X
RR	Pressure Sensitive Tape and Label Surface Coating Operations	X	X	X	X
SS	Industrial Surface Coating: Large Appliances	X	X	X	X

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	Subpart	Air pollution control agency			
		Arizona DEQ	Maricopa County	Pima County	Pinal County
TT	Metal Coil Surface Coating	X	X	X	X
UU	Asphalt Processing and Asphalt Roofing Manufacture	X	X	X	X
VV	Equipment Leaks of VOC in the Synthetic Organic Industry Chemicals Manufacturing	X	X	X	X
VVa	Equipment Leaks of VOC in the Synthetic Organic Industry for Which Construction, Reconstruction, or Chemicals Manufacturing Modification Commenced After November 7, 2006	X	X	X	
WW	Beverage Can Surface Coating Industry	X	X	X	X
XX	Bulk Gasoline Terminals	X	X	X	X
AAA	New Residential Wood Heaters	X	X	X	X
BBB	Rubber Tire Manufacturing Industry	X	X	X	X
CCC	(Reserved)				
DDD	Volatile Organic Compounds (VOC) Emissions from the Polymer Manufacturing Industry	X	X	X	X
EEE	(Reserved)				
FFF	Flexible Vinyl and Urethane Coating and Printing	X	X	X	X
GGG	Equipment Leaks of VOC in Petroleum Refineries	X		X	X
GGGa	Equipment Leaks of VOC in Petroleum Refineries for Which Construction, Reconstruction, or Modification Commenced After November 7, 2006	X		X	
HHH	Synthetic Fiber Production Facilities	X	X	X	X
III	Volatile Organic Compound (VOC) Emissions From the Synthetic Organic Chemical Manufacturing Industry (SOCMI) Air Oxidation Unit Processes	X	X	X	X
JJJ	Petroleum Dry Cleaners	X	X	X	X
KKK	Equipment Leaks of VOC From Onshore Natural Gas Processing Plants	X	X	X	X
LLL	Onshore Natural Gas Processing: SO ₂ Emissions	X	X	X	X
MMM	(Reserved)				
NNN	Volatile Organic Compound (VOC) Emissions From Synthetic Organic Chemical Manufacturing Industry (SOCMI) Distillation Operations	X	X	X	X
OOO	Nonmetallic Mineral Processing Plants	X	X	X	X

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	Subpart	Air pollution control agency			
		Arizona DEQ	Maricopa County	Pima County	Pinal County
PPP	Wool Fiberglass Insulation Manufacturing Plants	X	X	X	X
QQQ	VOC Emissions From Petroleum Refinery Wastewater Systems	X		X	X
RRR	Volatile Organic Compound Emissions from Synthetic Organic Chemical Manufacturing Industry (SOCMI) Reactor Processes	X	X	X	
SSS	Magnetic Tape Coating Facilities	X	X	X	X
TTT	Industrial Surface Coating: Surface Coating of Plastic Parts for Business Machines	X	X	X	X
UUU	Calciners and Dryers in Mineral Industries	X	X	X	
VVV	Polymeric Coating of Supporting Substrates Facilities	X	X	X	X
WWW	Municipal Solid Waste Landfills	X	X	X	
XXX	Municipal Solid Waste Landfills that Commenced Construction, Reconstruction, or Modification After July 17, 2014		X	X	
AAAA	Small Municipal Waste Combustion Units for Which Construction is Commenced After August 30, 1999 or for Which Modification or Reconstruction is Commenced After June 6, 2001	X	X	X	
CCCC	Commercial and Industrial Solid Waste Incineration Units for Which Construction Is Commenced After November 30, 1999 or for Which Modification or Reconstruction Is Commenced on or After June 1, 2001	X	X	X	
EEEE	Other Solid Waste Incineration Units for Which Construction is Commenced After December 9, 2004, or for Which Modification or Reconstruction is Commenced on or After June 16, 2006	X	X	X	
GGGG	(Reserved)				
HHHH	(Reserved)				
IIII	Stationary Compression Ignition Internal Combustion Engines	X	X	X	
JJJJ	Stationary Spark Ignition Internal Combustion Engines		X	X	
KKKK	Stationary Combustion Turbines	X	X	X	
LLLL	New Sewage Sludge Incineration Units			X	
MMMM	Emissions Guidelines and Compliance Times for Existing Sewage Sludge Incineration Units	X			
OOOO	Crude Oil and Natural Gas Production, Transmission, and Distribution		X	X	
OOOOa	Standards of Performance for Crude Oil and Natural Gas Facilities for Which Construction, Modification or Reconstruction Commenced After September 18, 2015		X	X	

	Subpart	Air pollution control agency			
		Arizona DEQ	Maricopa County	Pima County	Pinal County
QQQQ	Standards of Performance for New Residential Hydronic Heaters and Forced-Air Furnaces		X	X	
TTTT	Standards of Performance for Greenhouse Gas Emissions for Electric Generating Units		X	X	

(2) **California.** The following tables identify delegations for each of the local air pollution control agencies of California.

(i) Delegations for Amador County Air Pollution Control District, Antelope Valley Air Quality Management District, Bay Area Air Quality Management District, and Butte County Air Quality Management District are shown in the following table:

Table 4 to Paragraph (d)(2)(i) - Delegation Status for New Source Performance Standards for Amador County APCD, Antelope Valley AQMD, Bay Area AQMD, and Butte County AQMD

	Subpart	Air pollution control agency			
		Amador County APCD	Antelope Valley AQMD	Bay Area AQMD	Butte County AQMD
A	General Provisions		X		
Ba	Adoption and Submittal of State Plans for Designated Facilities		X		
Cf	Emission Guidelines and Compliance Times for Municipal Solid Waste Landfills		X		
D	Fossil-Fuel Fired Steam Generators Constructed After August 17, 1971		X	X	
Da	Electric Utility Steam Generating Units Constructed After September 18, 1978		X	X	
Db	Industrial-Commercial-Institutional Steam Generating Units		X	X	
Dc	Small Industrial-Commercial-Institutional Steam Generating Units		X	X	
E	Incinerators		X	X	
Ea	Municipal Waste Combustors Constructed After December 20, 1989 and On or Before September 20, 1994		X	X	
Eb	Large Municipal Waste Combustors Constructed After September 20, 1994		X		
Ec	Hospital/Medical/Infectious Waste Incinerators for Which Construction is Commenced After June 20, 1996		X		
F	Portland Cement Plants		X	X	
G	Nitric Acid Plants		X	X	
Ga	Nitric Acid Plants For Which Construction, Reconstruction or Modification Commenced After October 14, 2011		X		

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	Subpart	Air pollution control agency			
		Amador County APCD	Antelope Valley AQMD	Bay Area AQMD	Butte County AQMD
H	Sulfuric Acid Plant		X	X	
I	Hot Mix Asphalt Facilities		X	X	
J	Petroleum Refineries		X	X	
Ja	Petroleum Refineries for Which Construction, Reconstruction, or Modification Commenced After May 14, 2007		X		
K	Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After June 11, 1973, and Prior to May 19, 1978		X	X	
Ka	Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After May 18, 1978, and Prior to July 23, 1984		X	X	
Kb	Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984		X	X	
L	Secondary Lead Smelters		X	X	
M	Secondary Brass and Bronze Production Plants		X	X	
N	Primary Emissions from Basic Oxygen Process Furnaces for Which Construction is Commenced After June 11, 1973		X	X	
Na	Secondary Emissions from Basic Oxygen Process Steelmaking Facilities for Which Construction is Commenced After January 20, 1983		X	X	
O	Sewage Treatment Plants		X	X	
P	Primary Copper Smelters		X	X	
Q	Primary Zinc Smelters		X	X	
R	Primary Lead Smelters		X	X	
S	Primary Aluminum Reduction Plants		X	X	
T	Phosphate Fertilizer Industry: Wet Process Phosphoric Acid Plants		X		
U	Phosphate Fertilizer Industry: Superphosphoric Acid Plants		X	X	
V	Phosphate Fertilizer Industry: Diammonium Phosphate Plants		X	X	
W	Phosphate Fertilizer Industry: Triple Superphosphate Plants		X	X	
X	Phosphate Fertilizer Industry: Granular Triple Superphosphate Storage Facilities		X	X	
Y	Coal Preparation and Processing Plants		X	X	
Z	Ferroalloy Production Facilities		X	X	

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	Subpart	Air pollution control agency			
		Amador County APCD	Antelope Valley AQMD	Bay Area AQMD	Butte County AQMD
AA	Steel Plants: Electric Arc Furnaces Constructed After October 21, 1974 and On or Before August 17, 1983		X	X	
AAa	Steel Plants: Electric Arc Furnaces and Argon-Oxygen Decarburization Vessels Constructed After August 7, 1983		X	X	
BB	Kraft Pulp Mills		X	X	
BBa	Kraft Pulp Mill Sources for which Construction, Reconstruction or Modification Commenced after May 23, 2013		X		
CC	Glass Manufacturing Plants		X	X	
DD	Grain Elevators		X	X	
EE	Surface Coating of Metal Furniture		X	X	
FF	(Reserved)				
GG	Stationary Gas Turbines		X	X	
HH	Lime Manufacturing Plants		X	X	
KK	Lead-Acid Battery Manufacturing Plants		X	X	
LL	Metallic Mineral Processing Plants		X	X	
MM	Automobile and Light Duty Trucks Surface Coating Operations		X	X	
NN	Phosphate Rock Plants		X	X	
PP	Ammonium Sulfate Manufacture		X	X	
QQ	Graphic Arts Industry: Publication Rotogravure Printing		X	X	
RR	Pressure Sensitive Tape and Label Surface Coating Operations		X	X	
SS	Industrial Surface Coating: Large Appliances		X	X	
TT	Metal Coil Surface Coating		X	X	
UU	Asphalt Processing and Asphalt Roofing Manufacture		X	X	
VV	Equipment Leaks of VOC in the Synthetic Organic Industry Chemicals Manufacturing		X	X	
VVa	Equipment Leaks of VOC in the Synthetic Organic Industry for Which Construction, Reconstruction, or Chemicals Manufacturing Modification Commenced After November 7, 2006		X		
WW	Beverage Can Surface Coating Industry		X	X	
XX	Bulk Gasoline Terminals				

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	Subpart	Air pollution control agency			
		Amador County APCD	Antelope Valley AQMD	Bay Area AQMD	Butte County AQMD
AAA	New Residential Wood Heaters		X	X	
BBB	Rubber Tire Manufacturing Industry		X	X	
CCC	(Reserved)				
DDD	Volatile Organic Compounds (VOC) Emissions from the Polymer Manufacturing Industry		X	X	
EEE	(Reserved)				
FFF	Flexible Vinyl and Urethane Coating and Printing		X	X	
GGG	Equipment Leaks of VOC in Petroleum Refineries		X	X	
GGGa	Equipment Leaks of VOC in Petroleum Refineries for Which Construction, Reconstruction, or Modification Commenced After November 7, 2006		X		
HHH	Synthetic Fiber Production Facilities		X	X	
III	Volatile Organic Compound (VOC) Emissions From the Synthetic Organic Chemical Manufacturing Industry (SOCMI) Air Oxidation Unit Processes		X		
JJJ	Petroleum Dry Cleaners		X	X	
KKK	Equipment Leaks of VOC From Onshore Natural Gas Processing Plants		X	X	
LLL	Onshore Natural Gas Processing: SO ₂ Emissions		X		
MMM	(Reserved)				
NNN	Volatile Organic Compound (VOC) Emissions From Synthetic Organic Chemical Manufacturing Industry (SOCMI) Distillation Operations		X	X	
OOO	Nonmetallic Mineral Processing Plants		X	X	
PPP	Wool Fiberglass Insulation Manufacturing Plants		X	X	
QQQ	VOC Emissions From Petroleum Refinery Wastewater Systems		X		
RRR	Volatile Organic Compound Emissions from Synthetic Organic Chemical Manufacturing Industry (SOCMI) Reactor Processes		X		
SSS	Magnetic Tape Coating Facilities		X	X	
TTT	Industrial Surface Coating: Surface Coating of Plastic Parts for Business Machines		X	X	
UUU	Calciners and Dryers in Mineral Industries		X	X	
VVV	Polymeric Coating of Supporting Substrates Facilities		X	X	
WWW	Municipal Solid Waste Landfills		X		
XXX	Municipal Solid Waste Landfills that Commenced Construction, Reconstruction, or		X		

	Subpart	Air pollution control agency			
		Amador County APCD	Antelope Valley AQMD	Bay Area AQMD	Butte County AQMD
	Modification After July 17, 2014				
AAAA	Small Municipal Waste Combustion Units for Which Construction is Commenced After August 30, 1999 or for Which Modification or Reconstruction is Commenced After June 6, 2001		X		
CCCC	Commercial and Industrial Solid Waste Incineration Units for Which Construction Is Commenced After November 30, 1999 or for Which Modification or Reconstruction Is Commenced on or After June 1, 2001		X		
DDDD	Emissions Guidelines and Compliance Times for Commercial and Industrial Solid Waste Incineration Units		X		
EEEE	Other Solid Waste Incineration Units for Which Construction is Commenced After December 9, 2004, or for Which Modification or Reconstruction is Commenced on or After June 16, 2006		X		
GGGG	(Reserved)				
HHHH	(Reserved)				
IIII	Stationary Compression Ignition Internal Combustion Engines		X		
JJJJ	Stationary Spark Ignition Internal Combustion Engines		X		
KKKK	Stationary Combustion Turbines		X		
LLLL	New Sewage Sludge Incineration Units		X		
MMMM	Emissions Guidelines and Compliance Times for Existing Sewage Sludge Incineration Units		X		
OOOO	Crude Oil and Natural Gas Production, Transmission, and Distribution		X		
OOOOa	Standards of Performance for Crude Oil and Natural Gas Facilities for Which Construction, Modification or Reconstruction Commenced After September 18, 2015		X		
TTTT	Standards of Performance for Greenhouse Gas Emissions for Electric Generating Units		X		
UUUUa	Emission Guidelines for Greenhouse Gas Emissions From Existing Electric Utility Generating Units		X		

(ii) [Reserved]

(iii) Delegations for Glenn County Air Pollution Control District, Great Basin Unified Air Pollution Control District, Imperial County Air Pollution Control District, and Kern County Air Pollution Control District are shown in the following table:

Delegation Status for New Source Performance Standards for Glenn County APCD, Great Basin Unified APCD, Imperial County APCD, and Kern County APCD

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	Subpart	Air pollution control agency			
		Glenn County APCD	Great Basin Unified APCD	Imperial County APCD	Kern County APCD
A	General Provisions		X		X
D	Fossil-Fuel Fired Steam Generators Constructed After August 17, 1971		X		X
Da	Electric Utility Steam Generating Units Constructed After September 18, 1978		X		X
Db	Industrial-Commercial-Institutional Steam Generating Units		X		X
Dc	Small Industrial Steam Generating Units		X		X
E	Incinerators		X		X
Ea	Municipal Waste Combustors Constructed After December 20, 1989 and On or Before September 20, 1994		X		
Eb	Municipal Waste Combustors Constructed After September 20, 1994				
Ec	Hospital/Medical/Infectious Waste Incinerators for Which Construction is Commenced After June 20, 1996				
F	Portland Cement Plants		X		X
G	Nitric Acid Plants		X		X
H	Sulfuric Acid Plants		X		
I	Hot Mix Asphalt Facilities		X		X
J	Petroleum Refineries		X		X
K	Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After June 11, 1973, and Prior to May 19, 1978		X		X
Ka	Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After May 18, 1978, and Prior to July 23, 1984		X		X
Kb	Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984		X		X
L	Secondary Lead Smelters		X		X
M	Secondary Brass and Bronze Production Plants		X		X
N	Primary Emissions from Basic Oxygen Process Furnaces for Which Construction is Commenced After June 11, 1973		X		X
Na	Secondary Emissions from Basic Oxygen Process Steelmaking Facilities for Which Construction is Commenced After January 20, 1983		X		X

	Subpart	Air pollution control agency			
		Glenn County APCD	Great Basin Unified APCD	Imperial County APCD	Kern County APCD
O	Sewage Treatment Plants		X		X
P	Primary Copper Smelters		X		X
Q	Primary Zinc Smelters		X		X
R	Primary Lead Smelters		X		X
S	Primary Aluminum Reduction Plants		X		X
T	Phosphate Fertilizer Industry: Wet Process Phosphoric Acid Plants		X		X
U	Phosphate Fertilizer Industry: Superphosphoric Acid Plants		X		X
V	Phosphate Fertilizer Industry: Diammonium Phosphate Plants		X		X
W	Phosphate Fertilizer Industry: Triple Superphosphate Plants		X		X
X	Phosphate Fertilizer Industry: Granular Triple Superphosphate Storage Facilities		X		X
Y	Coal Preparation Plants		X		X
Z	Ferroalloy Production Facilities		X		X
AA	Steel Plants: Electric Arc Furnaces Constructed After October 21, 1974 and On or Before August 17, 1983		X		X
AAa	Steel Plants: Electric Arc Furnaces and Argon-Oxygen Decarburization Vessels Constructed After August 7, 1983		X		X
BB	Kraft pulp Mills		X		X
CC	Glass Manufacturing Plants		X		X
DD	Grain Elevators		X		X
EE	Surface Coating of Metal Furniture		X		X
FF	(Reserved)				
GG	Stationary Gas Turbines		X		X
HH	Lime Manufacturing Plants		X		X
KK	Lead-Acid Battery Manufacturing Plants		X		X
LL	Metallic Mineral Processing Plants		X		X
MM	Automobile and Light Duty Trucks Surface Coating Operations		X		X
NN	Phosphate Rock Plants		X		X

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	Subpart	Air pollution control agency			
		Glenn County APCD	Great Basin Unified APCD	Imperial County APCD	Kern County APCD
PP	Ammonium Sulfate Manufacture		X		X
QQ	Graphic Arts Industry: Publication Rotogravure Printing		X		X
RR	Pressure Sensitive Tape and Label Surface Coating Operations		X		X
SS	Industrial Surface Coating: Large Appliances		X		X
TT	Metal Coil Surface Coating		X		X
UU	Asphalt Processing and Asphalt Roofing Manufacture		X		X
VV	Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry		X		X
WW	Beverage Can Surface Coating Industry		X		X
XX	Bulk Gasoline Terminals				
AAA	New Residential Wool Heaters		X		X
BBB	Rubber Tire Manufacturing Industry		X		X
CCC	(Reserved)				
DDD	Volatile Organic Compounds (VOC) Emissions from the Polymer Manufacturing Industry		X		X
EEE	(Reserved)				
FFF	Flexible Vinyl and Urethane Coating and Printing		X		X
GGG	Equipment Leaks of VOC in Petroleum Refineries		X		X
HHH	Synthetic Fiber Production Facilities		X		X
III	Volatile Organic Compound (VOC) Emissions From the Synthetic Organic Chemical Manufacturing Industry (SOCMI) Air Oxidation Unit Processes		X		X
JJJ	Petroleum Dry Cleaners		X		X
KKK	Equipment Leaks of VOC From Onshore Natural Gas Processing Plants		X		X
LLL	Onshore Natural Gas Processing: SO2 Emissions				X
MMM	(Reserved)				
NNN	Volatile Organic Compound (VOC) Emissions From Synthetic Organic Chemical Manufacturing Industry (SOCMI) Distillation Operations		X		X
OOO	Nonmetallic Mineral Processing Plants		X		X
PPP	Wool Fiberglass Insulation Manufacturing Plants		X		X

	Subpart	Air pollution control agency			
		Glenn County APCD	Great Basin Unified APCD	Imperial County APCD	Kern County APCD
QQQ	VOC Emissions From Petroleum Refinery Wastewater Systems		X		X
RRR	Volatile Organic Compound Emissions from Synthetic Organic Chemical Manufacturing Industry (SOCMI) Reactor Processes				X
SSS	Magnetic Tape Coating Facilities		X		X
TTT	Industrial Surface Coating: Surface Coating of Plastic Parts for Business Machines		X	X	
UUU	Calciners and Dryers in Mineral Industries		X		X
VVV	Polymeric Coating of Supporting Substrates Facilities		X		X
WWW	Municipal Solid Waste Landfills				X

(iv) Delegations for Lake County Air Quality Management District, Lassen County Air Pollution Control District, Mariposa County Air Pollution Control District, and Mendocino County Air Pollution Control District are shown in the following table:

Delegation Status for New Source Performance Standards for Lake County Air Quality Management District, Lassen County Air Pollution Control District, Mariposa County Air Pollution Control District, and Mendocino County Air Pollution Control District

	Subpart	Air pollution control agency			
		Lake County AQMD	Lassen County APCD	Mariposa County AQMD	Mendocino County AQMD
A	General Provisions	X			X
D	Fossil-Fuel Fired Steam Generators Constructed After August 17, 1971	X			X
Da	Electric Utility Steam Generating Units Constructed After September 18, 1978	X			X
Db	Industrial-Commercial-Institutional Steam Generating Units	X			
Dc	Small Industrial Steam Generating Units	X			X
E	Incinerators	X			X
Ea	Municipal Waste Combustors Constructed After December 20, 1989 and On or Before September 20, 1994	X			X
Eb	Municipal Waste Combustors Constructed After September 20, 1994				
Ec	Hospital/Medical/Infectious Waste Incinerators for Which Construction is Commenced After June 20, 1996				

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	Subpart	Air pollution control agency			
		Lake County AQMD	Lassen County APCD	Mariposa County AQMD	Mendocino County AQMD
F	Portland Cement Plants	X			X
G	Nitric Acid Plants	X			X
H	Sulfuric Acid Plants	X			X
I	Hot Mix Asphalt Facilities	X			X
J	Petroleum Refineries	X			X
K	Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After June 11, 1973, and Prior to May 19, 1978	X			X
Ka	Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After May 18, 1978, and Prior to July 23, 1984	X			X
Kb	Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984	X			X
L	Secondary Lead Smelters	X			X
M	Secondary Brass and Bronze Production Plants	X			X
N	Primary Emissions from Basic Oxygen Process Furnaces for Which Construction is Commenced After June 11, 1973	X			X
Na	Secondary Emissions from Basic Oxygen Process Steelmaking Facilities for Which Construction is Commenced After January 20, 1983	X			X
O	Sewage Treatment Plants	X			X
P	Primary Copper Smelters	X			X
Q	Primary Zinc Smelters	X			X
R	Primary Lead Smelters	X			X
S	Primary Aluminum Reduction Plants	X			X
T	Phosphate Fertilizer Industry: Wet Process Phosphoric Acid Plants	X			X
U	Phosphate Fertilizer Industry: Superphosphoric Acid Plants	X			X
V	Phosphate Fertilizer Industry: Diammonium Phosphate Plants	X			X
W	Phosphate Fertilizer Industry: Triple Superphosphate Plants	X			X
X	Phosphate Fertilizer Industry: Granular Triple Superphosphate Storage Facilities	X			X

	Subpart	Air pollution control agency			
		Lake County AQMD	Lassen County APCD	Mariposa County AQMD	Mendocino County AQMD
Y	Coal Preparation Plants	X			X
Z	Ferroalloy Production Facilities	X			X
AA	Steel Plants: Electric Arc Furnaces Constructed After October 21, 1974 and On or Before August 17, 1983	X			X
AAa	Steel Plants: Electric Arc Furnaces and Argon-Oxygen Decarburization Vessels Constructed After August 7, 1983	X			X
BB	Kraft Pulp Mills	X			X
CC	Glass Manufacturing Plants	X			X
DD	Grain Elevators	X			X
EE	Surface Coating of Metal Furniture	X			X
FF	(Reserved)				
GG	Stationary Gas Turbines	X			X
HH	Lime Manufacturing Plants	X			X
KK	Lead-Acid Battery Manufacturing Plants	X			X
LL	Metallic Mineral Processing Plants	X			X
MM	Automobile and Light Duty Trucks Surface Coating Operations	X			X
NN	Phosphate Rock Plants	X			X
PP	Ammonium Sulfate Manufacture	X			X
QQ	Graphic Arts Industry: Publication Rotogravure Printing	X			X
RR	Pressure Sensitive Tape and Label Surface Coating Operations	X			X
SS	Industrial Surface Coating: Large Appliances	X			X
TT	Metal Coil Surface Coating	X			X
UU	Asphalt Processing and Asphalt Roofing Manufacture	X			X
VV	Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry	X			X
WW	Beverage Can Surface Coating Industry	X			X
XX	Bulk Gasoline Terminals				
AAA	New Residential Wool Heaters	X			X

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	Subpart	Air pollution control agency			
		Lake County AQMD	Lassen County APCD	Mariposa County AQMD	Mendocino County AQMD
BBB	Rubber Tire Manufacturing Industry	X			X
CCC	(Reserved)				
DDD	Volatile Organic Compounds (VOC) Emissions from the Polymer Manufacturing Industry	X			X
EEE	(Reserved)				
FFF	Flexible Vinyl and Urethane Coating and Printing	X			X
GGG	Equipment Leaks of VOC in Petroleum Refineries	X			X
HHH	Synthetic Fiber Production Facilities	X			X
III	Volatile Organic Compound (VOC) Emissions From the Synthetic Organic Chemical Manufacturing Industry (SOCMI) Air Oxidation Unit Processes	X			X
JJJ	Petroleum Dry Cleaners	X			X
KKK	Equipment Leaks of VOC From Onshore Natural Gas Processing Plants	X			X
LLL	Onshore Natural Gas Processing: SO ₂ Emissions	X			X
MMM	(Reserved)				
NNN	Volatile Organic Compound (VOC) Emissions From Synthetic Organic Chemical Manufacturing Industry (SOCMI) Distillation Operations	X			X
OOO	Nonmetallic Mineral Processing Plants	X			X
PPP	Wool Fiberglass Insulation Manufacturing Plants	X			X
QQQ	VOC Emissions From Petroleum Refinery Wastewater Systems	X			X
RRR	Volatile Organic Compound Emissions from Synthetic Organic Chemical Manufacturing Industry (SOCMI) Reactor Processes	X			
SSS	Magnetic Tape Coating Facilities	X			X
TTT	Industrial Surface Coating: Surface Coating of Plastic Parts for Business Machines				
UUU	Calciners and Dryers in Mineral Industries	X			X
VVV	Polymeric Coating of Supporting Substrates Facilities	X			X
WWW	Municipal Solid Waste Landfills	X			

(v) Delegations for Modoc Air Pollution Control District, Mojave Desert Air Quality Management District, Monterey Bay Unified Air Pollution Control District and North Coast Unified Air Quality Management District are shown in the following table:

Table 7 to Paragraph (d)(2)(v) - Delegation Status for New Source Performance Standards for Modoc County APCD, Mojave Desert AQMD, Monterey Bay Unified APCD, and North Coast Unified AQMD

	Subpart	Air pollution control agency			
		Modoc County APCD	Mojave Desert AQMD	Monterey Bay Unified APCD	North Coast Unified AQMD
A	General Provisions	X	X	X	X
D	Fossil-Fuel Fired Steam Generators Constructed After August 17, 1971	X	X	X	X
Da	Electric Utility Steam Generating Units Constructed After September 18, 1978	X	X	X	X
Db	Industrial-Commercial-Institutional Steam Generating Units	X	X	X	X
Dc	Small Industrial-Commercial-Institutional Steam Generating Units		X	X	
E	Incinerators	X	X	X	X
Ea	Municipal Waste Combustors Constructed After December 20, 1989 and On or Before September 20, 1994		X		
Eb	Large Municipal Waste Combustors Constructed After September 20, 1994		X		
Ec	Hospital/Medical/Infectious Waste Incinerators for Which Construction is Commenced After June 20, 1996		X		
F	Portland Cement Plants	X	X	X	X
G	Nitric Acid Plants	X	X	X	X
Ga	Nitric Acid Plants For Which Construction, Reconstruction or Modification Commenced After October 14, 2011				
H	Sulfuric Acid Plant	X	X	X	X
I	Hot Mix Asphalt Facilities	X	X	X	X
J	Petroleum Refineries	X	X	X	X
Ja	Petroleum Refineries for Which Construction, Reconstruction, or Modification Commenced After May 14, 2007		X		
K	Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After June 11, 1973, and Prior to May 19, 1978	X	X	X	X
Ka	Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After May 18, 1978, and Prior to July 23, 1984	X	X	X	X
Kb	Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for	X	X	X	X

	Subpart	Air pollution control agency			
		Modoc County APCD	Mojave Desert AQMD	Monterey Bay Unified APCD	North Coast Unified AQMD
	Which Construction, Reconstruction, or Modification Commenced After July 23, 1984				
L	Secondary Lead Smelters	X	X	X	X
M	Secondary Brass and Bronze Production Plants	X	X	X	X
N	Primary Emissions from Basic Oxygen Process Furnaces for Which Construction is Commenced After June 11, 1973	X	X	X	X
Na	Secondary Emissions from Basic Oxygen Process Steelmaking Facilities for Which Construction is Commenced After January 20, 1983	X	X	X	X
O	Sewage Treatment Plants	X	X	X	X
P	Primary Copper Smelters	X	X	X	X
Q	Primary Zinc Smelters	X	X	X	X
R	Primary Lead Smelters	X	X	X	X
S	Primary Aluminum Reduction Plants	X	X	X	X
T	Phosphate Fertilizer Industry: Wet Process Phosphoric Acid Plants	X	X	X	X
U	Phosphate Fertilizer Industry: Superphosphoric Acid Plants	X	X	X	X
V	Phosphate Fertilizer Industry: Diammonium Phosphate Plants	X	X	X	X
W	Phosphate Fertilizer Industry: Triple Superphosphate Plants	X	X	X	X
X	Phosphate Fertilizer Industry: Granular Triple Superphosphate Storage Facilities	X	X	X	X
Y	Coal Preparation and Processing Plants	X	X	X	X
Z	Ferroalloy Production Facilities	X	X	X	X
AA	Steel Plants: Electric Arc Furnaces Constructed After October 21, 1974 and On or Before August 17, 1983	X	X	X	X
AAa	Steel Plants: Electric Arc Furnaces and Argon-Oxygen Decarburization Vessels Constructed After August 7, 1983	X	X	X	X
BB	Kraft Pulp Mills	X	X	X	X
CC	Glass Manufacturing Plants	X	X	X	X
DD	Grain Elevators	X	X	X	X
EE	Surface Coating of Metal Furniture	X	X	X	X
FF	(Reserved)				

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	Subpart	Air pollution control agency			
		Modoc County APCD	Mojave Desert AQMD	Monterey Bay Unified APCD	North Coast Unified AQMD
GG	Stationary Gas Turbines	X	X	X	X
HH	Lime Manufacturing Plants	X	X	X	X
KK	Lead-Acid Battery Manufacturing Plants	X	X	X	X
LL	Metallic Mineral Processing Plants	X	X	X	X
MM	Automobile and Light Duty Trucks Surface Coating Operations	X	X	X	X
NN	Phosphate Rock Plants	X	X	X	X
PP	Ammonium Sulfate Manufacture	X	X	X	X
QQ	Graphic Arts Industry: Publication Rotogravure Printing	X	X	X	X
RR	Pressure Sensitive Tape and Label Surface Coating Operations	X	X	X	X
SS	Industrial Surface Coating: Large Appliances	X	X	X	X
TT	Metal Coil Surface Coating	X	X	X	X
UU	Asphalt Processing and Asphalt Roofing Manufacture	X	X	X	X
VV	Equipment Leaks of VOC in the Synthetic Organic Industry Chemicals Manufacturing	X	X	X	X
VVa	Equipment Leaks of VOC in the Synthetic Organic Industry for Which Construction, Reconstruction, or Chemicals Manufacturing Modification Commenced After November 7, 2006		X		
WW	Beverage Can Surface Coating Industry	X	X	X	X
XX	Bulk Gasoline Terminals				
AAA	New Residential Wood Heaters	X	X	X	X
BBB	Rubber Tire Manufacturing Industry	X	X	X	X
CCC	(Reserved)				
DDD	Volatile Organic Compounds (VOC) Emissions from the Polymer Manufacturing Industry	X	X	X	
EEE	(Reserved)				
FFF	Flexible Vinyl and Urethane Coating and Printing	X	X	X	X
GGG	Equipment Leaks of VOC in Petroleum Refineries	X	X	X	X
GGGa	Equipment Leaks of VOC in Petroleum Refineries for Which Construction, Reconstruction, or Modification Commenced After November 7, 2006		X		
HHH	Synthetic Fiber Production Facilities	X	X	X	X

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		Modoc County APCD	Mojave Desert AQMD	Monterey Bay Unified APCD	North Coast Unified AQMD
III	Volatile Organic Compound (VOC) Emissions From the Synthetic Organic Chemical Manufacturing Industry (SOCMI) Air Oxidation Unit Processes		X		
JJJ	Petroleum Dry Cleaners	X	X	X	X
KKK	Equipment Leaks of VOC From Onshore Natural Gas Processing Plants	X	X	X	X
LLL	Onshore Natural Gas Processing: SO ₂ Emissions	X	X	X	X
MMM	(Reserved)				
NNN	Volatile Organic Compound (VOC) Emissions From Synthetic Organic Chemical Manufacturing Industry (SOCMI) Distillation Operations	X	X	X	
OOO	Nonmetallic Mineral Processing Plants	X	X	X	X
PPP	Wool Fiberglass Insulation Manufacturing Plants	X	X	X	X
QQQ	VOC Emissions From Petroleum Refinery Wastewater Systems	X	X	X	X
RRR	Volatile Organic Compound Emissions from Synthetic Organic Chemical Manufacturing Industry (SOCMI) Reactor Processes		X		
SSS	Magnetic Tape Coating Facilities	X	X	X	X
TTT	Industrial Surface Coating: Surface Coating of Plastic Parts for Business Machines	X	X	X	X
UUU	Calciners and Dryers in Mineral Industries		X	X	
VVV	Polymeric Coating of Supporting Substrates Facilities		X	X	X
WWW	Municipal Solid Waste Landfills		X	X	
AAAA	Small Municipal Waste Combustion Units for Which Construction is Commenced After August 30, 1999 or for Which Modification or Reconstruction is Commenced After June 6, 2001		X		
CCCC	Commercial and Industrial Solid Waste Incineration Units for Which Construction Is Commenced After November 30, 1999 or for Which Modification or Reconstruction Is Commenced on or After June 1, 2001		X		
EEEE	Other Solid Waste Incineration Units for Which Construction is Commenced After December 9, 2004, or for Which Modification or Reconstruction is Commenced on or After June 16, 2006		X		
GGGG	(Reserved)				
HHHH	(Reserved)				
IIII	Stationary Compression Ignition Internal Combustion Engines		X	X	

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	Subpart	Air pollution control agency			
		Modoc County APCD	Mojave Desert AQMD	Monterey Bay Unified APCD	North Coast Unified AQMD
JJJJ	Stationary Spark Ignition Internal Combustion Engines		X	X	
KKKK	Stationary Combustion Turbines		X	X	
LLLL	New Sewage Sludge Incineration Units				
OOOO	Crude Oil and Natural Gas Production, Transmission, and Distribution				

(vi) Delegations for Northern Sierra Air Quality Management District, Northern Sonoma County Air Pollution Control District, Placer County Air Pollution Control District, and Sacramento Metropolitan Air Quality Management District are shown in the following table:

Delegation Status for New Source Performance Standards for Northern Sierra Air Quality Management District, Northern Sonoma County Air Pollution Control District, Placer County Air Pollution Control District, and Sacramento Metropolitan Air Quality Management District

	Subpart	Air pollution control agency			
		Northern Sierra AQMD	Northern Sonoma County APCD	Placer County APCD	Sacramento Metropolitan AQMD
A	General Provisions		X		X
D	Fossil-Fuel Fired Steam Generators Constructed After August 17, 1971		X		X
Da	Electric Utility Steam Generating Units Constructed After September 18, 1978		X		X
Db	Industrial-Commercial-Institutional Steam Generating Units				X
Dc	Small Industrial Steam Generating Units				X
E	Incinerators		X		X
Ea	Municipal Waste Combustors Constructed After December 20, 1989 and On or Before September 20, 1994				X
Eb	Municipal Waste Combustors Constructed After September 20, 1994				X
Ec	Hospital/Medical/Infectious Waste Incinerators for Which Construction is Commenced After June 20, 1996				X
F	Portland Cement Plants		X		X
G	Nitric Acid Plants		X		X
H	Sulfuric Acid Plants		X		X

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Subpart		Northern Sierra AQMD	Northern Sonoma County APCD	Placer County APCD	Sacramento Metropolitan AQMD
I	Hot Mix Asphalt Facilities		X		X
J	Petroleum Refineries		X		X
K	Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After June 11, 1973, and Prior to May 19, 1978		X		X
Ka	Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After May 18, 1978, and Prior to July 23, 1984		X		X
Kb	Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984				X
L	Secondary Lead Smelters		X		X
M	Secondary Brass and Bronze Production Plants		X		X
N	Primary Emissions from Basic Oxygen Process Furnaces for Which Construction is Commenced After June 11, 1973		X		X
Na	Secondary Emissions from Basic Oxygen Process Steelmaking Facilities for Which Construction is Commenced After January 20, 1983				X
O	Sewage Treatment Plants		X		X
P	Primary Copper Smelters		X		X
Q	Primary Zinc Smelters		X		X
R	Primary Lead Smelters		X		X
S	Primary Aluminum Reduction Plants		X		X
T	Phosphate Fertilizer Industry: Wet Process Phosphoric Acid Plants		X		X
U	Phosphate Fertilizer Industry: Superphosphoric Acid Plants		X		X
V	Phosphate Fertilizer Industry: Diammonium Phosphate Plants		X		X
W	Phosphate Fertilizer Industry: Triple Superphosphate Plants		X		X
X	Phosphate Fertilizer Industry: Granular Triple Superphosphate Storage Facilities		X		X
Y	Coal Preparation Plants		X		X
Z	Ferroalloy Production Facilities		X		X

		Air pollution control agency			
	Subpart	Northern Sierra AQMD	Northern Sonoma County APCD	Placer County APCD	Sacramento Metropolitan AQMD
AA	Steel Plants: Electric Arc Furnaces Constructed After October 21, 1974 and On or Before August 17, 1983		X		X
AAa	Steel Plants: Electric Arc Furnaces and Argon-Oxygen Decarburization Vessels Constructed After August 7, 1983				X
BB	Kraft pulp Mills		X		X
CC	Glass Manufacturing Plants		X		X
DD	Grain Elevators		X		X
EE	Surface Coating of Metal Furniture				X
FF	(Reserved)				
GG	Stationary Gas Turbines		X		X
HH	Lime Manufacturing Plants		X		X
KK	Lead-Acid Battery Manufacturing Plants				X
LL	Metallic Mineral Processing Plants				X
MM	Automobile and Light Duty Trucks Surface Coating Operations		X		X
NN	Phosphate Rock Plants				X
PP	Ammonium Sulfate Manufacture		X		X
QQ	Graphic Arts Industry: Publication Rotogravure Printing				X
RR	Pressure Sensitive Tape and Label Surface Coating Operations				X
SS	Industrial Surface Coating: Large Appliances				X
TT	Metal Coil Surface Coating				X
UU	Asphalt Processing and Asphalt Roofing Manufacture				X
VV	Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry				X
WW	Beverage Can Surface Coating Industry				X
XX	Bulk Gasoline Terminals				
AAA	New Residential Wool Heaters				X
BBB	Rubber Tire Manufacturing Industry				X
CCC	(Reserved)				

Air pollution control agency

Subpart		Northern Sierra AQMD	Northern Sonoma County APCD	Placer County APCD	Sacramento Metropolitan AQMD
DDD	Volatile Organic Compounds (VOC) Emissions from the Polymer Manufacturing Industry				X
EEE	(Reserved)				
FFF	Flexible Vinyl and Urethane Coating and Printing				X
GGG	Equipment Leaks of VOC in Petroleum Refineries				X
HHH	Synthetic Fiber Production Facilities				X
III	Volatile Organic Compound (VOC) Emissions From the Synthetic Organic Chemical Manufacturing Industry (SOCMI) Air Oxidation Unit Processes				X
JJJ	Petroleum Dry Cleaners				X
KKK	Equipment Leaks of VOC From Onshore Natural Gas Processing Plants				X
LLL	Onshore Natural Gas Processing: SO ₂ Emissions				X
MMM	(Reserved)				
NNN	Volatile Organic Compound (VOC) Emissions From Synthetic Organic Chemical Manufacturing Industry (SOCMI) Distillation Operations				X
OOO	Nonmetallic Mineral Processing Plants				X
PPP	Wool Fiberglass Insulation Manufacturing Plants				X
QQQ	VOC Emissions From Petroleum Refinery Wastewater Systems				X
RRR	Volatile Organic Compound Emissions from Synthetic Organic Chemical Manufacturing Industry (SOCMI) Reactor Processes				X
SSS	Magnetic Tape Coating Facilities				X
TTT	Industrial Surface Coating: Surface Coating of Plastic Parts for Business Machines				X
UUU	Calciners and Dryers in Mineral Industries				X
VVV	Polymeric Coating of Supporting Substrates Facilities				X
WWW	Municipal Solid Waste Landfills				X

(vii) Delegations for San Diego County Air Pollution Control District, San Joaquin Valley Unified Air Pollution Control District, San Luis Obispo County Air Pollution Control District, and Santa Barbara County Air Pollution Control District are shown in the following table:

Table 9 to Paragraph (d)(2)(vii) - Delegation Status for New Source Performance Standards for San Diego County APCD, San Joaquin Valley Unified APCD, San Luis Obispo County APCD, and Santa Barbara County APCD

	Subpart	Air pollution control agency			
		San Diego County APCD	San Joaquin Valley Unified APCD	San Luis Obispo County APCD	Santa Barbara County APCD
A	General Provisions	X	X	X	X
D	Fossil-Fuel Fired Steam Generators Constructed After August 17, 1971	X	X	X	X
Da	Electric Utility Steam Generating Units Constructed After September 18, 1978	X	X	X	X
Db	Industrial-Commercial-Institutional Steam Generating Units	X	X	X	X
Dc	Small Industrial-Commercial-Institutional Steam Generating Units	X	X	X	X
E	Incinerators	X	X	X	X
Ea	Municipal Waste Combustors Constructed After December 20, 1989 and On or Before September 20, 1994	X	X	X	
Eb	Large Municipal Waste Combustors Constructed After September 20, 1994	X	X		X
Ec	Hospital/Medical/Infectious Waste Incinerators for Which Construction is Commenced After June 20, 1996	X			X
F	Portland Cement Plants	X	X	X	
G	Nitric Acid Plants	X	X	X	
Ga	Nitric Acid Plants For Which Construction, Reconstruction or Modification Commenced After October 14, 2011				
H	Sulfuric Acid Plant	X	X	X	
I	Hot Mix Asphalt Facilities	X	X	X	X
J	Petroleum Refineries	X	X	X	X
Ja	Petroleum Refineries for Which Construction, Reconstruction, or Modification Commenced After May 14, 2007				X
K	Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After June 11, 1973, and Prior to May 19, 1978	X	X	X	X
Ka	Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After May 18, 1978, and Prior to July 23, 1984	X	X	X	X
Kb	Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984	X	X	X	X
L	Secondary Lead Smelters	X	X	X	X

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	Subpart	Air pollution control agency			
		San Diego County APCD	San Joaquin Valley Unified APCD	San Luis Obispo County APCD	Santa Barbara County APCD
M	Secondary Brass and Bronze Production Plants	X	X	X	X
N	Primary Emissions from Basic Oxygen Process Furnaces for Which Construction is Commenced After June 11, 1973	X	X	X	
Na	Secondary Emissions from Basic Oxygen Process Steelmaking Facilities for Which Construction is Commenced After January 20, 1983	X	X	X	
O	Sewage Treatment Plants	X	X	X	X
P	Primary Copper Smelters	X	X	X	
Q	Primary Zinc Smelters	X	X	X	
R	Primary Lead Smelters	X	X	X	
S	Primary Aluminum Reduction Plants	X	X	X	
T	Phosphate Fertilizer Industry: Wet Process Phosphoric Acid Plants	X	X	X	
U	Phosphate Fertilizer Industry: Superphosphoric Acid Plants	X	X	X	
V	Phosphate Fertilizer Industry: Diammonium Phosphate Plants	X	X	X	
W	Phosphate Fertilizer Industry: Triple Superphosphate Plants	X	X	X	
X	Phosphate Fertilizer Industry: Granular Triple Superphosphate Storage Facilities	X	X	X	
Y	Coal Preparation and Processing Plants	X	X	X	
Z	Ferroalloy Production Facilities	X	X	X	
AA	Steel Plants: Electric Arc Furnaces Constructed After October 21, 1974 and On or Before August 17, 1983	X	X	X	
AAa	Steel Plants: Electric Arc Furnaces and Argon-Oxygen Decarburization Vessels Constructed After August 7, 1983	X	X	X	
BB	Kraft Pulp Mills	X	X	X	
CC	Glass Manufacturing Plants	X	X	X	X
DD	Grain Elevators	X	X	X	X
EE	Surface Coating of Metal Furniture	X	X	X	
FF	(Reserved)				
GG	Stationary Gas Turbines	X	X	X	X

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	Subpart	Air pollution control agency			
		San Diego County APCD	San Joaquin Valley Unified APCD	San Luis Obispo County APCD	Santa Barbara County APCD
HH	Lime Manufacturing Plants	X	X	X	
KK	Lead-Acid Battery Manufacturing Plants	X	X	X	
LL	Metallic Mineral Processing Plants	X	X	X	
MM	Automobile and Light Duty Trucks Surface Coating Operations	X	X	X	
NN	Phosphate Rock Plants	X	X	X	
PP	Ammonium Sulfate Manufacture	X	X	X	
QQ	Graphic Arts Industry: Publication Rotogravure Printing	X	X	X	
RR	Pressure Sensitive Tape and Label Surface Coating Operations	X	X	X	
SS	Industrial Surface Coating: Large Appliances	X	X	X	
TT	Metal Coil Surface Coating	X	X	X	
UU	Asphalt Processing and Asphalt Roofing Manufacture	X	X	X	
VV	Equipment Leaks of VOC in the Synthetic Organic Industry Chemicals Manufacturing	X	X	X	
VVa	Equipment Leaks of VOC in the Synthetic Organic Industry for Which Construction, Reconstruction, or Chemicals Manufacturing Modification Commenced After November 7, 2006				X
WW	Beverage Can Surface Coating Industry	X	X	X	
XX	Bulk Gasoline Terminals				
AAA	New Residential Wood Heaters	X	X	X	X
BBB	Rubber Tire Manufacturing Industry	X	X	X	
CCC	(Reserved)				
DDD	Volatile Organic Compounds (VOC) Emissions from the Polymer Manufacturing Industry	X	X		
EEE	(Reserved)				
FFF	Flexible Vinyl and Urethane Coating and Printing	X	X	X	
GGG	Equipment Leaks of VOC in Petroleum Refineries	X	X	X	
GGGa	Equipment Leaks of VOC in Petroleum Refineries for Which Construction, Reconstruction, or Modification Commenced After November 7, 2006				X
HHH	Synthetic Fiber Production Facilities	X	X	X	

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	Subpart	Air pollution control agency			
		San Diego County APCD	San Joaquin Valley Unified APCD	San Luis Obispo County APCD	Santa Barbara County APCD
III	Volatile Organic Compound (VOC) Emissions From the Synthetic Organic Chemical Manufacturing Industry (SOCMI) Air Oxidation Unit Processes	X	X		
JJJ	Petroleum Dry Cleaners	X	X	X	
KKK	Equipment Leaks of VOC From Onshore Natural Gas Processing Plants	X	X	X	
LLL	Onshore Natural Gas Processing: SO ₂ Emissions	X	X	X	
MMM	(Reserved)				
NNN	Volatile Organic Compound (VOC) Emissions From Synthetic Organic Chemical Manufacturing Industry (SOCMI) Distillation Operations	X	X		
OOO	Nonmetallic Mineral Processing Plants	X	X	X	X
PPP	Wool Fiberglass Insulation Manufacturing Plants	X	X	X	
QQQ	VOC Emissions From Petroleum Refinery Wastewater Systems	X	X	X	
RRR	Volatile Organic Compound Emissions from Synthetic Organic Chemical Manufacturing Industry (SOCMI) Reactor Processes	X	X	X	
SSS	Magnetic Tape Coating Facilities	X	X	X	
TTT	Industrial Surface Coating: Surface Coating of Plastic Parts for Business Machines	X	X	X	
UUU	Calciners and Dryers in Mineral Industries	X	X	X	X
VVV	Polymeric Coating of Supporting Substrates Facilities	X	X	X	X
WWW	Municipal Solid Waste Landfills	X	X	X	X
AAAA	Small Municipal Waste Combustion Units for Which Construction is Commenced After August 30, 1999 or for Which Modification or Reconstruction is Commenced After June 6, 2001	X			X
CCCC	Commercial and Industrial Solid Waste Incineration Units for Which Construction Is Commenced After November 30, 1999 or for Which Modification or Reconstruction Is Commenced on or After June 1, 2001	X			X
EEEE	Other Solid Waste Incineration Units for Which Construction is Commenced After December 9, 2004, or for Which Modification or Reconstruction is Commenced on or After June 16, 2006	X			X
GGGG	(Reserved)				
HHHH	(Reserved)				
IIII	Stationary Compression Ignition Internal Combustion Engines	X			X

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	Subpart	Air pollution control agency			
		San Diego County APCD	San Joaquin Valley Unified APCD	San Luis Obispo County APCD	Santa Barbara County APCD
JJJJ	Stationary Spark Ignition Internal Combustion Engines	X			X
KKKK	Stationary Combustion Turbines	X			X
LLLL	New Sewage Sludge Incineration Units				
OOOO	Crude Oil and Natural Gas Production, Transmission, and Distribution				
QQQQ	Standards of Performance for New Residential Hydronic Heaters and Forced-Air Furnaces	X			
TTTT	Standards of Performance for Greenhouse Gas Emissions for Electric Generating Units	X			

(viii) Delegations for Shasta County Air Quality Management District, Siskiyou County Air Pollution Control District, South Coast Air Quality Management District, and Tehama County Air Pollution Control District are shown in the following table:

Delegation Status for New Source Performance Standards for Shasta County AQMD, Siskiyou County APCD, South Coast AQMD, and Tehama County APCD

	Subpart	Air pollution control agency			
		Shasta County AQMD	Siskiyou County APCD	South Coast AQMD	Tehama County APCD
A	General Provisions	X	X	X	
D	Fossil-Fuel Fired Steam Generators Constructed After August 17, 1971	X		X	
Da	Electric Utility Steam Generating Units Constructed After September 18, 1978			X	
Db	Industrial-Commercial-Institutional Steam Generating Units			X	
Dc	Small Industrial-Commercial-Institutional Steam Generating Units			X	
E	Incinerators	X		X	
Ea	Municipal Waste Combustors Constructed After December 20, 1989 and On or Before September 20, 1994			X	
Eb	Large Municipal Waste Combustors Constructed After September 20, 1994			X	
Ec	Hospital/Medical/Infectious Waste Incinerators for Which Construction is Commenced After June 20, 1996			X	
F	Portland Cement Plants	X		X	
G	Nitric Acid Plants	X		X	

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	Subpart	Air pollution control agency			
		Shasta County AQMD	Siskiyou County APCD	South Coast AQMD	Tehama County APCD
Ga	Nitric Acid Plants For Which Construction, Reconstruction or Modification Commenced After October 14, 2011				
H	Sulfuric Acid Plant	X		X	
I	Hot Mix Asphalt Facilities	X		X	
J	Petroleum Refineries	X		X	
Ja	Petroleum Refineries for Which Construction, Reconstruction, or Modification Commenced After May 14, 2007			X	
K	Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After June 11, 1973, and Prior to May 19, 1978	X		X	
Ka	Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After May 18, 1978, and Prior to July 23, 1984			X	
Kb	Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984			X	
L	Secondary Lead Smelters	X		X	
M	Secondary Brass and Bronze Production Plants	X		X	
N	Primary Emissions from Basic Oxygen Process Furnaces for Which Construction is Commenced After June 11, 1973	X		X	
Na	Secondary Emissions from Basic Oxygen Process Steelmaking Facilities for Which Construction is Commenced After January 20, 1983			X	
O	Sewage Treatment Plants	X		X	
P	Primary Copper Smelters	X		X	
Q	Primary Zinc Smelters	X		X	
R	Primary Lead Smelters	X		X	
S	Primary Aluminum Reduction Plants	X		X	
T	Phosphate Fertilizer Industry: Wet Process Phosphoric Acid Plants	X		X	
U	Phosphate Fertilizer Industry: Superphosphoric Acid Plants	X		X	
V	Phosphate Fertilizer Industry: Diammonium Phosphate Plants	X		X	
W	Phosphate Fertilizer Industry: Triple Superphosphate Plants	X		X	
X	Phosphate Fertilizer Industry: Granular Triple Superphosphate Storage Facilities	X		X	

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	Subpart	Air pollution control agency			
		Shasta County AQMD	Siskiyou County APCD	South Coast AQMD	Tehama County APCD
Y	Coal Preparation and Processing Plants	X		X	
Z	Ferroalloy Production Facilities	X		X	
AA	Steel Plants: Electric Arc Furnaces Constructed After October 21, 1974 and On or Before August 17, 1983	X		X	
AAa	Steel Plants: Electric Arc Furnaces and Argon-Oxygen Decarburization Vessels Constructed After August 7, 1983			X	
BB	Kraft Pulp Mills	X		X	
CC	Glass Manufacturing Plants			X	
DD	Grain Elevators	X		X	
EE	Surface Coating of Metal Furniture			X	
FF	(Reserved)				
GG	Stationary Gas Turbines			X	
HH	Lime Manufacturing Plants	X		X	
KK	Lead-Acid Battery Manufacturing Plants			X	
LL	Metallic Mineral Processing Plants			X	
MM	Automobile and Light Duty Trucks Surface Coating Operations			X	
NN	Phosphate Rock Plants			X	
PP	Ammonium Sulfate Manufacture			X	
QQ	Graphic Arts Industry: Publication Rotogravure Printing			X	
RR	Pressure Sensitive Tape and Label Surface Coating Operations			X	
SS	Industrial Surface Coating: Large Appliances			X	
TT	Metal Coil Surface Coating			X	
UU	Asphalt Processing and Asphalt Roofing Manufacture			X	
VV	Equipment Leaks of VOC in the Synthetic Organic Industry Chemicals Manufacturing			X	
VVa	Equipment Leaks of VOC in the Synthetic Organic Industry for Which Construction, Reconstruction, or Chemicals Manufacturing Modification Commenced After November 7, 2006			X	
WW	Beverage Can Surface Coating Industry			X	

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	Subpart	Air pollution control agency			
		Shasta County AQMD	Siskiyou County APCD	South Coast AQMD	Tehama County APCD
XX	Bulk Gasoline Terminals				
AAA	New Residential Wood Heaters		X	X	
BBB	Rubber Tire Manufacturing Industry		X	X	
CCC	(Reserved)				
DDD	Volatile Organic Compounds (VOC) Emissions from the Polymer Manufacturing Industry			X	
EEE	(Reserved)				
FFF	Flexible Vinyl and Urethane Coating and Printing			X	
GGG	Equipment Leaks of VOC in Petroleum Refineries			X	
GGGa	Equipment Leaks of VOC in Petroleum Refineries for Which Construction, Reconstruction, or Modification Commenced After November 7, 2006			X	
HHH	Synthetic Fiber Production Facilities			X	
III	Volatile Organic Compound (VOC) Emissions From the Synthetic Organic Chemical Manufacturing Industry (SOCMI) Air Oxidation Unit Processes			X	
JJJ	Petroleum Dry Cleaners			X	
KKK	Equipment Leaks of VOC From Onshore Natural Gas Processing Plants			X	
LLL	Onshore Natural Gas Processing: SO ₂ Emissions			X	
MMM	(Reserved)				
NNN	Volatile Organic Compound (VOC) Emissions From Synthetic Organic Chemical Manufacturing Industry (SOCMI) Distillation Operations			X	
OOO	Nonmetallic Mineral Processing Plants			X	
PPP	Wool Fiberglass Insulation Manufacturing Plants			X	
QQQ	VOC Emissions From Petroleum Refinery Wastewater Systems		X	X	
RRR	Volatile Organic Compound Emissions from Synthetic Organic Chemical Manufacturing Industry (SOCMI) Reactor Processes			X	
SSS	Magnetic Tape Coating Facilities		X	X	
TTT	Industrial Surface Coating: Surface Coating of Plastic Parts for Business Machines		X	X	
UUU	Calciners and Dryers in Mineral Industries			X	

	Subpart	Air pollution control agency			
		Shasta County AQMD	Siskiyou County APCD	South Coast AQMD	Tehama County APCD
VVV	Polymeric Coating of Supporting Substrates Facilities			X	
WWW	Municipal Solid Waste Landfills			X	
AAAA	Small Municipal Waste Combustion Units for Which Construction is Commenced After August 30, 1999 or for Which Modification or Reconstruction is Commenced After June 6, 2001	X	X	X	
CCCC	Commercial and Industrial Solid Waste Incineration Units for Which Construction Is Commenced After November 30, 1999 or for Which Modification or Reconstruction Is Commenced on or After June 1, 2001			X	
EEEE	Other Solid Waste Incineration Units for Which Construction is Commenced After December 9, 2004, or for Which Modification or Reconstruction is Commenced on or After June 16, 2006			X	
GGGG	(Reserved)				
HHHH	(Reserved)				
IIII	Stationary Compression Ignition Internal Combustion Engines			X	
JJJJ	Stationary Spark Ignition Internal Combustion Engines			X	
KKKK	Stationary Combustion Turbines			X	
LLLL	New Sewage Sludge Incineration Units				
OOOO	Crude Oil and Natural Gas Production, Transmission, and Distribution				

(ix) Delegations for Tuolumne County Air Pollution Control District, Ventura County Air Pollution Control District, and Yolo-Solano Air Quality Management District are shown in the following table:

Table 11 to Paragraph (d)(2)(ix) - Delegation Status for New Source Performance Standards for Tuolumne County APCD, Ventura County APCD, and Yolo-Solano AQMD

	Subpart	Air pollution control agency		
		Tuolumne County APCD	Ventura County APCD	Yolo-Solano AQMD
A	General Provisions		X	X
D	Fossil-Fuel Fired Steam Generators Constructed After August 17, 1971		X	X
Da	Electric Utility Steam Generating Units Constructed After September 18, 1978		X	

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	Subpart	Air pollution control agency		
		Tuolumne County APCD	Ventura County APCD	Yolo-Solano AQMD
Db	Industrial-Commercial-Institutional Steam Generating Units		X	X
Dc	Small Industrial-Commercial-Institutional Steam Generating Units		X	
E	Incinerators		X	
Ea	Municipal Waste Combustors Constructed After December 20, 1989 and On or Before September 20, 1994		X	
Eb	Large Municipal Waste Combustors Constructed After September 20, 1994			
Ec	Hospital/Medical/Infectious Waste Incinerators for Which Construction is Commenced After June 20, 1996			
F	Portland Cement Plants		X	
G	Nitric Acid Plants		X	
H	Sulfuric Acid Plant		X	
I	Hot Mix Asphalt Facilities		X	X
J	Petroleum Refineries		X	X
K	Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After June 11, 1973, and Prior to May 19, 1978		X	X
Ka	Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After May 18, 1978, and Prior to July 23, 1984		X	
Kb	Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984		X	
L	Secondary Lead Smelters		X	
M	Secondary Brass and Bronze Production Plants		X	
N	Primary Emissions from Basic Oxygen Process Furnaces for Which Construction is Commenced After June 11, 1973		X	
Na	Secondary Emissions from Basic Oxygen Process Steelmaking Facilities for Which Construction is Commenced After January 20, 1983		X	
O	Sewage Treatment Plants		X	
P	Primary Copper Smelters		X	

	Subpart	Air pollution control agency		
		Tuolumne County APCD	Ventura County APCD	Yolo-Solano AQMD
Q	Primary Zinc Smelters		X	
R	Primary Lead Smelters		X	
S	Primary Aluminum Reduction Plants		X	
T	Phosphate Fertilizer Industry: Wet Process Phosphoric Acid Plants		X	
U	Phosphate Fertilizer Industry: Superphosphoric Acid Plants		X	
V	Phosphate Fertilizer Industry: Diammonium Phosphate Plants		X	
W	Phosphate Fertilizer Industry: Triple Superphosphate Plants		X	
X	Phosphate Fertilizer Industry: Granular Triple Superphosphate Storage Facilities		X	
Y	Coal Preparation and Processing Plants		X	
Z	Ferroalloy Production Facilities		X	
AA	Steel Plants: Electric Arc Furnaces Constructed After October 21, 1974 and On or Before August 17, 1983		X	X
AAa	Steel Plants: Electric Arc Furnaces and Argon-Oxygen Decarburization Vessels Constructed After August 7, 1983		X	
BB	Kraft Pulp Mills		X	
CC	Glass Manufacturing Plants		X	
DD	Grain Elevators		X	
EE	Surface Coating of Metal Furniture		X	
FF	(Reserved)			
GG	Stationary Gas Turbines		X	
HH	Lime Manufacturing Plants		X	
KK	Lead-Acid Battery Manufacturing Plants		X	
LL	Metallic Mineral Processing Plants		X	
MM	Automobile and Light Duty Trucks Surface Coating Operations		X	

	Subpart	Air pollution control agency		
		Tuolumne County APCD	Ventura County APCD	Yolo-Solano AQMD
NN	Phosphate Rock Plants		X	
PP	Ammonium Sulfate Manufacture		X	
QQ	Graphic Arts Industry: Publication Rotogravure Printing		X	
RR	Pressure Sensitive Tape and Label Surface Coating Operations		X	
SS	Industrial Surface Coating: Large Appliances		X	
TT	Metal Coil Surface Coating		X	
UU	Asphalt Processing and Asphalt Roofing Manufacture		X	
VV	Equipment Leaks of VOC in the Synthetic Organic Industry Chemicals Manufacturing		X	
WW	Beverage Can Surface Coating Industry		X	
XX	Bulk Gasoline Terminals			
AAA	New Residential Wood Heaters		X	
BBB	Rubber Tire Manufacturing Industry		X	
CCC	(Reserved)			
DDD	Volatile Organic Compounds (VOC) Emissions from the Polymer Manufacturing Industry		X	
EEE	(Reserved)			
FFF	Flexible Vinyl and Urethane Coating and Printing		X	
GGG	Equipment Leaks of VOC in Petroleum Refineries		X	
GGGa	Equipment Leaks of VOC in Petroleum Refineries for Which Construction, Reconstruction, or Modification Commenced After November 7, 2006			
HHH	Synthetic Fiber Production Facilities		X	
III	Volatile Organic Compound (VOC) Emissions From the Synthetic Organic Chemical Manufacturing Industry (SOCMI) Air Oxidation Unit Processes		X	
JJJ	Petroleum Dry Cleaners		X	
KKK	Equipment Leaks of VOC From Onshore Natural Gas Processing Plants		X	

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	Subpart	Air pollution control agency		
		Tuolumne County APCD	Ventura County APCD	Yolo-Solano AQMD
LLL	Onshore Natural Gas Processing: SO ₂ Emissions		X	
MMM	(Reserved)			
NNN	Volatile Organic Compound (VOC) Emissions From Synthetic Organic Chemical Manufacturing Industry (SOCMI) Distillation Operations		X	
OOO	Nonmetallic Mineral Processing Plants		X	X
PPP	Wool Fiberglass Insulation Manufacturing Plants		X	
QQQ	VOC Emissions From Petroleum Refinery Wastewater Systems		X	
RRR	Volatile Organic Compound Emissions from Synthetic Organic Chemical Manufacturing Industry (SOCMI) Reactor Processes		X	
SSS	Magnetic Tape Coating Facilities		X	
TTT	Industrial Surface Coating: Surface Coating of Plastic Parts for Business Machines		X	
UUU	Calciners and Dryers in Mineral Industries		X	
VVV	Polymeric Coating of Supporting Substrates Facilities		X	
WWW	Municipal Solid Waste Landfills	X	X	

(3) **Hawaii.** The following table identifies delegations for Hawaii:

Delegation Status for New Source Performance Standards for Hawaii:

Delegation Status for New Source Performance Standards for Hawaii

	Subpart	Hawaii
A	General Provisions	X
D	Fossil-Fuel Fired Steam Generators Constructed After August 17, 1971	X
Da	Electric Utility Steam Generating Units Constructed After September 18, 1978	X
Db	Industrial-Commercial-Institutional Steam Generating Units	X
Dc	Small Industrial Steam Generating Units	X
E	Incinerators	X
Ea	Municipal Waste Combustors Constructed After December 20, 1989 and On or Before September 20, 1994	X

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	Subpart	Hawaii
Eb	Municipal Waste Combustors Constructed After September 20, 1994	X
Ec	Hospital/Medical/Infectious Waste Incinerators for Which Construction is Commenced After June 20, 1996	X
F	Portland Cement Plants	X
G	Nitric Acid Plants	
H	Sulfuric Acid Plants	
I	Hot Mix Asphalt Facilities	X
J	Petroleum Refineries	X
Ja	Petroleum Refineries for Which Construction, Reconstruction, or Modification Commenced After May 14, 2007	
K	Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After June 11, 1973, and Prior to May 19, 1978	X
Ka	Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After May 18, 1978, and Prior to July 23, 1984	X
Kb	Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984	X
L	Secondary Lead Smelters	
M	Secondary Brass and Bronze Production Plants	
N	Primary Emissions from Basic Oxygen Process Furnaces for Which Construction is Commenced After June 11, 1973	
Na	Secondary Emissions from Basic Oxygen Process Steelmaking Facilities for Which Construction is Commenced After January 20, 1983	
O	Sewage Treatment Plants	X
P	Primary Copper Smelters	
Q	Primary Zinc Smelters	
R	Primary Lead Smelters	
S	Primary Aluminum Reduction Plants	
T	Phosphate Fertilizer Industry: Wet Process Phosphoric Acid Plants	
U	Phosphate Fertilizer Industry: Superphosphoric Acid Plants	
V	Phosphate Fertilizer Industry: Diammonium Phosphate Plants	
W	Phosphate Fertilizer Industry: Triple Superphosphate Plants	
X	Phosphate Fertilizer Industry: Granular Triple Superphosphate Storage Facilities	
Y	Coal Preparation Plants	X
Z	Ferroalloy Production Facilities	

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	Subpart	Hawaii
AA	Steel Plants: Electric Arc Furnaces Constructed After October 21, 1974 and On or Before August 17, 1983	X
AAa	Steel Plants: Electric Arc Furnaces and Argon-Oxygen Decarburization Vessels Constructed After August 7, 1983	X
BB	Kraft pulp Mills	
CC	Glass Manufacturing Plants	
DD	Grain Elevators	
EE	Surface Coating of Metal Furniture	
FF	(Reserved)	
GG	Stationary Gas Turbines	X
HH	Lime Manufacturing Plants	
KK	Lead-Acid Battery Manufacturing Plants	
LL	Metallic Mineral Processing Plants	
MM	Automobile and Light Duty Trucks Surface Coating Operations	
NN	Phosphate Rock Plants	
PP	Ammonium Sulfate Manufacture	
QQ	Graphic Arts Industry: Publication Rotogravure Printing	
RR	Pressure Sensitive Tape and Label Surface Coating Operations	
SS	Industrial Surface Coating: Large Appliances	
TT	Metal Coil Surface Coating	
UU	Asphalt Processing and Asphalt Roofing Manufacture	
VV	Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry	X
VVa	Equipment Leaks of VOC in the Synthetic Organic Chemicals Manufacturing Industry for Which Construction, Reconstruction, or Modification Commenced After November 7, 2006	
WW	Beverage Can Surface Coating Industry	X
XX	Bulk Gasoline Terminals	X
AAA	New Residential Wool Heaters	
BBB	Rubber Tire Manufacturing Industry	
CCC	(Reserved)	
DDD	Volatile Organic Compounds (VOC) Emissions from the Polymer Manufacturing Industry	
EEE	(Reserved)	
FFF	Flexible Vinyl and Urethane Coating and Printing	

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	Subpart	Hawaii
GGG	Equipment Leaks of VOC in Petroleum Refineries	X
GGGa	Equipment Leaks of VOC in Petroleum Refineries for Which Construction, Reconstruction, or Modification Commenced After November 7, 2006	
HHH	Synthetic Fiber Production Facilities	
III	Volatile Organic Compound (VOC) Emissions From the Synthetic Organic Chemical Manufacturing Industry (SOCMI) Air Oxidation Unit Processes	
JJJ	Petroleum Dry Cleaners	X
KKK	Equipment Leaks of VOC From Onshore Natural Gas Processing Plants	
LLL	Onshore Natural Gas Processing: SO ₂ Emissions	
MMM	(Reserved)	
NNN	Volatile Organic Compound (VOC) Emissions From Synthetic Organic Chemical Manufacturing Industry (SOCMI) Distillation Operations	X
OOO	Nonmetallic Mineral Processing Plants	X
PPP	Wool Fiberglass Insulation Manufacturing Plants	
QQQ	VOC Emissions From Petroleum Refinery Wastewater	X
RRR	Volatile Organic Compound Emissions from Synthetic Organic Chemical Manufacturing Industry (SOCMI) Reactor Processes	
SSS	Magnetic Tape Coating Facilities	
TTT	Industrial Surface Coating: Surface Coating of Plastic Parts for Business Machines	
UUU	Calciners and Dryers in Mineral Industries	X
VVV	Polymeric Coating of Supporting Substrates Facilities	X
WWW	Municipal Solid Waste Landfills	X
AAAA	Small Municipal Waste Combustion Units for Which Construction is Commenced After August 30, 1999 or for Which Modification or Reconstruction is Commenced After June 6, 2001	X
CCCC	Commercial and Industrial Solid Waste Incineration Units for Which Construction Is Commenced After November 30, 1999 or for Which Modification or Reconstruction Is Commenced on or After June 1, 2001	X
EEEE	Other Solid Waste Incineration Units for Which Construction is Commenced After December 9, 2004, or for Which Modification or Reconstruction is Commenced on or After June 16, 2006	
GGGG	(Reserved)	
IIII	Stationary Compression Ignition Internal Combustion Engines	
JJJJ	Stationary Spark Ignition Internal Combustion Engines	
KKKK	Stationary Combustion Turbines	

(4) **Nevada.** The following table identifies delegations for Nevada:

Table 12 to Paragraph (d)(4) - Delegation Status for New Source Performance Standards for Nevada

	Subpart	Air pollution control agency		
		Nevada DEP	Clark County	Washoe County
A	General Provisions	X	X	X
Cf	Emission Guidelines and Compliance Times for Municipal Solid Waste Landfills	X		
D	Fossil-Fuel Fired Steam Generators Constructed After August 17, 1971	X	X	X
Da	Electric Utility Steam Generating Units Constructed After September 18, 1978	X	X	
Db	Industrial-Commercial-Institutional Steam Generating Units	X	X	
Dc	Small Industrial-Commercial-Institutional Steam Generating Units	X	X	
E	Incinerators	X	X	X
Ea	Municipal Waste Combustors Constructed After December 20, 1989 and On or Before September 20, 1994	X	X	
Eb	Large Municipal Waste Combustors Constructed After September 20, 1994	X	X	
Ec	Hospital/Medical/Infectious Waste Incinerators for Which Construction is Commenced After June 20, 1996	X	X	
F	Portland Cement Plants	X	X	X
G	Nitric Acid Plants	X	X	
Ga	Nitric Acid Plants For Which Construction, Reconstruction or Modification Commenced After October 14, 2011	X		
H	Sulfuric Acid Plant	X	X	
I	Hot Mix Asphalt Facilities	X	X	X
J	Petroleum Refineries	X	X	
Ja	Petroleum Refineries for Which Construction, Reconstruction, or Modification Commenced After May 14, 2007	X		
K	Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After June 11, 1973, and Prior to May 19, 1978	X	X	X
Ka	Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After May 18, 1978, and Prior to July 23, 1984	X	X	X
Kb	Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage Vessels) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984	X	X	
L	Secondary Lead Smelters	X	X	X

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	Subpart	Air pollution control agency		
		Nevada DEP	Clark County	Washoe County
M	Secondary Brass and Bronze Production Plants	X	X	
N	Primary Emissions from Basic Oxygen Process Furnaces for Which Construction is Commenced After June 11, 1973	X	X	
Na	Secondary Emissions from Basic Oxygen Process Steelmaking Facilities for Which Construction is Commenced After January 20, 1983	X	X	
O	Sewage Treatment Plants	X	X	X
P	Primary Copper Smelters	X	X	X
Q	Primary Zinc Smelters	X	X	X
R	Primary Lead Smelters	X	X	X
S	Primary Aluminum Reduction Plants	X	X	
T	Phosphate Fertilizer Industry: Wet Process Phosphoric Acid Plants		X	
U	Phosphate Fertilizer Industry: Superphosphoric Acid Plants		X	
V	Phosphate Fertilizer Industry: Diammonium Phosphate Plants		X	
W	Phosphate Fertilizer Industry: Triple Superphosphate Plants		X	
X	Phosphate Fertilizer Industry: Granular Triple Superphosphate Storage Facilities		X	
Y	Coal Preparation and Processing Plants	X	X	X
Z	Ferroalloy Production Facilities	X	X	
AA	Steel Plants: Electric Arc Furnaces Constructed After October 21, 1974 and On or Before August 17, 1983	X	X	
AAa	Steel Plants: Electric Arc Furnaces and Argon-Oxygen Decarburization Vessels Constructed After August 7, 1983	X	X	
BB	Kraft Pulp Mills		X	
CC	Glass Manufacturing Plants	X	X	
DD	Grain Elevators	X	X	X
EE	Surface Coating of Metal Furniture	X	X	X
FF	(Reserved)			
GG	Stationary Gas Turbines	X	X	X
HH	Lime Manufacturing Plants	X	X	X
KK	Lead-Acid Battery Manufacturing Plants	X	X	X

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	Subpart	Air pollution control agency		
		Nevada DEP	Clark County	Washoe County
LL	Metallic Mineral Processing Plants	X	X	X
MM	Automobile and Light Duty Trucks Surface Coating Operations	X	X	X
NN	Phosphate Rock Plants	X	X	X
PP	Ammonium Sulfate Manufacture	X	X	
QQ	Graphic Arts Industry: Publication Rotogravure Printing	X	X	X
RR	Pressure Sensitive Tape and Label Surface Coating Operations	X	X	
SS	Industrial Surface Coating: Large Appliances	X	X	X
TT	Metal Coil Surface Coating	X	X	X
UU	Asphalt Processing and Asphalt Roofing Manufacture	X	X	X
VV	Equipment Leaks of VOC in the Synthetic Organic Industry Chemicals Manufacturing	X	X	X
VVa	Equipment Leaks of VOC in the Synthetic Organic Industry for Which Construction, Reconstruction, or Chemicals Manufacturing Modification Commenced After November 7, 2006	X	X	
WW	Beverage Can Surface Coating Industry	X	X	
XX	Bulk Gasoline Terminals	X	X	
AAA	New Residential Wood Heaters		X	
BBB	Rubber Tire Manufacturing Industry	X	X	
CCC	(Reserved)			
DDD	Volatile Organic Compounds (VOC) Emissions from the Polymer Manufacturing Industry	X	X	
EEE	(Reserved)			
FFF	Flexible Vinyl and Urethane Coating and Printing	X	X	
GGG	Equipment Leaks of VOC in Petroleum Refineries	X	X	
GGGa	Equipment Leaks of VOC in Petroleum Refineries for Which Construction, Reconstruction, or Modification Commenced After November 7, 2006	X	X	
HHH	Synthetic Fiber Production Facilities	X	X	
III	Volatile Organic Compound (VOC) Emissions From the Synthetic Organic Chemical Manufacturing Industry (SOCMI) Air Oxidation Unit Processes	X	X	
JJJ	Petroleum Dry Cleaners	X	X	X
KKK	Equipment Leaks of VOC From Onshore Natural Gas Processing Plants	X	X	

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	Subpart	Air pollution control agency		
		Nevada DEP	Clark County	Washoe County
LLL	Onshore Natural Gas Processing: SO ₂ Emissions	X	X	
MMM	(Reserved)			
NNN	Volatile Organic Compound (VOC) Emissions From Synthetic Organic Chemical Manufacturing Industry (SOCMI) Distillation Operations	X	X	
OOO	Nonmetallic Mineral Processing Plants	X	X	
PPP	Wool Fiberglass Insulation Manufacturing Plants	X	X	
QQQ	VOC Emissions From Petroleum Refinery Wastewater Systems	X	X	
RRR	Volatile Organic Compound Emissions from Synthetic Organic Chemical Manufacturing Industry (SOCMI) Reactor Processes	X	X	
SSS	Magnetic Tape Coating Facilities	X	X	
TTT	Industrial Surface Coating: Surface Coating of Plastic Parts for Business Machines	X	X	X
UUU	Calciners and Dryers in Mineral Industries	X	X	X
VVV	Polymeric Coating of Supporting Substrates Facilities	X	X	X
WWW	Municipal Solid Waste Landfills	X	X	X
XXX	Municipal Solid Waste Landfills that Commenced Construction, Reconstruction, or Modification after July 17, 2014	X		
AAAA	Small Municipal Waste Combustion Units for Which Construction is Commenced After August 30, 1999 or for Which Modification or Reconstruction is Commenced After June 6, 2001	X	X	X
CCCC	Commercial and Industrial Solid Waste Incineration Units for Which Construction Is Commenced After November 30, 1999 or for Which Modification or Reconstruction Is Commenced on or After June 1, 2001	X	X	X
EEEE	Other Solid Waste Incineration Units for Which Construction is Commenced After December 9, 2004, or for Which Modification or Reconstruction is Commenced on or After June 16, 2006	X	X	X
GGGG	(Reserved)			
HHHH	(Reserved)			
IIII	Stationary Compression Ignition Internal Combustion Engines	X	X	X
JJJJ	Stationary Spark Ignition Internal Combustion Engines	X	X	X
KKKK	Stationary Combustion Turbines	X	X	X
LLLL	New Sewage Sludge Incineration Units		X	
OOOO	Crude Oil and Natural Gas Production, Transmission, and Distribution	X		

(5) **Guam.** The following table identifies delegations as of June 15, 2001:

Delegation Status for New Source Performance Standards for Guam

Subpart	Guam
A General Provisions	X
D Fossil-Fuel Fired Steam Generators Constructed After August 17, 1971	X
Da Electric Utility Steam Generating Units Constructed After September 18, 1978	
Db Industrial-Commercial-Institutional Steam Generating Units	
Dc Small Industrial Steam Generating Units	
E Incinerators	
Ea Municipal Waste Combustors Constructed After December 20, 1989 and On or Before September 20, 1994	
Eb Municipal Waste Combustors Constructed After September 20, 1994	
Ec Hospital/Medical/Infectious Waste Incinerators for Which Construction is Commenced After June 20, 1996	
F Portland Cement Plants	X
G Nitric Acid Plants	
H Sulfuric Acid Plants	
I Hot Mix Asphalt Facilities	X
J Petroleum Refineries	X
K Storage Vessels for Petroleum Liquids for Which Construction, Reconstruction, or Modification Commenced After June 11, 1973, and Prior to May 19, 1978	X

(e) The following lists the specific part 60 standards that have been delegated unchanged to the air pollution control agencies in Region 6.

(1) **New Mexico.** The New Mexico Environment Department has been delegated all part 60 standards promulgated by the EPA, except subpart AAA - Standards of Performance for New Residential Wood Heaters; and subpart QQQQ - Standards of Performance for New Residential Hydronic Heaters and Forced-Air Furnaces, as amended in the Federal Register through January 15, 2017.

(2) **Louisiana.** The Louisiana Department of Environmental Quality has been delegated all part 60 standards promulgated by EPA, except subpart AAA - Standards of Performance for New Residential Wood Heaters, as amended in the Federal Register through July 1, 2013.

Delegation Status for Part 60 Standards - State of Louisiana

[Excluding Indian Country]

Subpart	Source category	LDEQ ¹
A	General Provisions	Yes
Ce	Emission Guidelines and Compliance Times for Hospital/Medical/Infectious Waste Incinerators	Yes
D	Fossil Fueled Steam Generators (>250 MM BTU/hr)	Yes

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Subpart	Source category	LDEQ ¹
Da	Electric Utility Steam Generating Units (>250 MM BTU/hr)	Yes
Db	Industrial-Commercial-Institutional Steam Generating Units (100 to 250 MM BTU/hr)	Yes
Dc	Industrial-Commercial-Institutional Small Steam Generating Units (10 to 100 MM BTU/hr)	Yes
E	Incinerators (>50 tons per day)	Yes
Ea	Municipal Waste Combustors	Yes
Eb	Large Municipal Waste Combustors	Yes
Ec	Hospital/Medical/Infectious Waste Incinerators	Yes
F	Portland Cement Plants	Yes
G	Nitric Acid Plants	Yes
Ga	Nitric Acid Plants (after October 14, 2011)	Yes
H	Sulfuric Acid Plants	Yes
I	Hot Mix Asphalt Facilities	Yes
J	Petroleum Refineries	Yes
Ja	Petroleum Refineries (After May 14, 2007)	Yes
K	Storage Vessels for Petroleum Liquids (After 6/11/73 & Before 5/19/78)	Yes
Ka	Storage Vessels for Petroleum Liquids (After 6/11/73 & Before 5/19/78)	Yes
Kb	Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Stg/Vessels) After 7/23/84	Yes
L	Secondary Lead Smelters Yes	Yes
M	Secondary Brass and Bronze Production Plants	Yes
N	Primary Emissions from Basic Oxygen Process Furnaces (Construction Commenced After June 11, 1973)	Yes
Na	Secondary Emissions from Basic Oxygen Process Steelmaking Facilities Construction is Commenced After January 20, 1983	Yes
O	Sewage Treatment Plants	Yes
P	Primary Copper Smelters	Yes
Q	Primary Zinc Smelters	Yes
R	Primary Lead Smelters	Yes
S	Primary Aluminum Reduction Plants	Yes
T	Phosphate Fertilizer Industry: Wet Process Phosphoric Plants	Yes
U	Phosphate Fertilizer Industry: Superphosphoric Acid Plants	Yes
V	Phosphate Fertilizer Industry: Diammonium Phosphate Plants	Yes

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Subpart	Source category	LDEQ ¹
W	Phosphate Fertilizer Industry: Triple Superphosphate Plants	Yes
X	Phosphate Fertilizer Industry: Granular Triple Superphosphate Storage Facilities	Yes
Y	Coal Preparation Plants	Yes
Z	Ferroalloy Production Facilities	Yes
AA	Steel Plants: Electric Arc Furnaces After 10/21/74 & On or Before 8/17/83	Yes
AAa	Steel Plants: Electric Arc Furnaces & Argon-Oxygen Decarburization Vessels After 8/07/83	Yes
BB	Kraft Pulp Mills	Yes
CC	Glass Manufacturing Plants	Yes
DD	Grain Elevators	Yes
EE	Surface Coating of Metal Furniture	Yes
GG	Stationary Gas Turbines	Yes
HH	Lime Manufacturing Plants	Yes
KK	Lead-Acid Battery Manufacturing Plants	Yes
LL	Metallic Mineral Processing Plants	Yes
MM	Automobile & Light Duty Truck Surface Coating Operations	Yes
NN	Phosphate Manufacturing Plants	Yes
PP	Ammonium Sulfate Manufacture	Yes
QQ	Graphic Arts Industry: Publication Rotogravure Printing	Yes
RR	Pressure Sensitive Tape and Label Surface Coating Operations	Yes
SS	Industrial Surface Coating: Large Appliances	Yes
TT	Metal Coil Surface Coating	Yes
UU	Asphalt Processing and Asphalt Roofing Manufacture	Yes
VV	VOC Equipment Leaks in the SOCM I Industry	Yes
VVa	VOC Equipment Leaks in the SOCM I Industry (After November 7, 2006)	Yes
XX	Bulk Gasoline Terminals	Yes
AAA	New Residential Wood Heaters	No
BBB	Rubber Tire Manufacturing Industry	Yes
DDD	Volatile Organic Compound (VOC) Emissions from the Polymer Manufacturing Industry	Yes
FFF	Flexible Vinyl and Urethane Coating and Printing	Yes

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Subpart	Source category	LDEQ ¹
GGG	VOC Equipment Leaks in Petroleum Refineries	Yes
HHH	Synthetic Fiber Production	Yes
III	VOC Emissions from the SOCM I Air Oxidation Unit Processes	Yes
JJJ	Petroleum Dry Cleaners	Yes
KKK	VOC Equipment Leaks From Onshore Natural Gas Processing Plants	Yes
LLL	Onshore Natural Gas Processing: SO ₂ Emissions	Yes
NNN	VOC Emissions from SOCM I Distillation Operations	Yes
OOO	Nonmetallic Mineral Processing Plants	Yes
PPP	Wool Fiberglass Insulation Manufacturing Plants	Yes
QQQ	VOC Emissions From Petroleum Refinery Wastewater Systems	Yes
RRR	VOC Emissions from SOCM I Reactor Processes	Yes
SSS	Magnetic Tape Coating Operations	Yes
TTT	Industrial Surface Coating: Plastic Parts for Business Machines	Yes
UUU	Calciners and Dryers in Mineral Industries	Yes
VVV	Polymeric Coating of Supporting Substrates Facilities	Yes
WWW	Municipal Solid Waste Landfills	Yes
AAAA	Small Municipal Waste Combustion Units (Construction is Commenced After 8/30/99 or Modification/Reconstruction is Commenced After 6/06/2001)	Yes
CCCC	Commercial & Industrial Solid Waste Incineration Units (Construction is Commenced After 11/30/1999 or Modification/Reconstruction is Commenced on or After 6/01/2001)	Yes
DDDD	Emission Guidelines & Compliance Times for Commercial & Industrial Solid Waste Incineration Units (Commenced Construction On or Before 11/30/1999)	Yes
EEEE	Other Solid Waste Incineration Units (Constructed after 12/09/2004 or Modification/Reconstruction is commenced on or after 06/16/2004)	Yes
IIII	Stationary Compression Ignition Internal Combustion Engines	Yes
JJJJ	Stationary Spark Ignition Internal Combustion Engines	Yes
KKKK	Stationary Combustion Turbines (Construction Commenced After 02/18/2005)	Yes
LLLL	New Sewage Sludge Incineration Units	Yes
MMMM	Emission Guidelines and Compliance Times for Existing Sewage Sludge Incineration Units	Yes
OOOO	Crude Oil and Natural Gas Production, Transmission and Distribution	Yes

¹ The Louisiana Department of Environmental Quality (LDEQ) has been delegated all Part 60 standards promulgated by EPA, except subpart AAA - Standards of Performance for New Residential Wood Heaters - as amended in the Federal Register through July 1, 2013.

(3) **Albuquerque-Bernalillo County Air Quality Control Board.** The Albuquerque-Bernalillo County Air Quality Control Board has been delegated all part 60 standards promulgated by the EPA, except subpart AAA of this part and subpart QQQQ of this part as amended through January 23, 2017.

Editorial Note: For Federal Register citations affecting § 60.4, see the List of CFR Sections Affected, which appears in the Finding Aids section of the printed volume and at www.govinfo.gov.

§ 60.5 Determination of construction or modification.

- (a) When requested to do so by an owner or operator, the Administrator will make a determination of whether action taken or intended to be taken by such owner or operator constitutes construction (including reconstruction) or modification or the commencement thereof within the meaning of this part.
- (b) The Administrator will respond to any request for a determination under paragraph (a) of this section within 30 days of receipt of such request.

§ 60.6 Review of plans.

- (a) When requested to do so by an owner or operator, the Administrator will review plans for construction or modification for the purpose of providing technical advice to the owner or operator.
- (b)
 - (1) A separate request shall be submitted for each construction or modification project.
 - (2) Each request shall identify the location of such project, and be accompanied by technical information describing the proposed nature, size, design, and method of operation of each affected facility involved in such project, including information on any equipment to be used for measurement or control of emissions.
- (c) Neither a request for plans review nor advice furnished by the Administrator in response to such request shall
 - (1) relieve an owner or operator of legal responsibility for compliance with any provision of this part or of any applicable State or local requirement, or
 - (2) prevent the Administrator from implementing or enforcing any provision of this part or taking any other action authorized by the Act.

§ 60.7 Notification and record keeping.

- (a) Any owner or operator subject to the provisions of this part shall furnish the Administrator written notification or, if acceptable to both the Administrator and the owner or operator of a source, electronic notification, as follows:
 - (1) A notification of the date construction (or reconstruction as defined under § 60.15) of an affected facility is commenced postmarked no later than 30 days after such date. This requirement shall not apply in the case of mass-produced facilities which are purchased in completed form.
 - (2) [Reserved]

(3) A notification of the actual date of initial startup of an affected facility postmarked within 15 days after such date.

(4) A notification of any physical or operational change to an existing facility which may increase the emission rate of any air pollutant to which a standard applies, unless that change is specifically exempted under an applicable subpart or in § 60.14(e). This notice shall be postmarked 60 days or as soon as practicable before the change is commenced and shall include information describing the precise nature of the change, present and proposed emission control systems, productive capacity of the facility before and after the change, and the expected completion date of the change. The Administrator may request additional relevant information subsequent to this notice.

(5) A notification of the date upon which demonstration of the continuous monitoring system performance commences in accordance with § 60.13(c). Notification shall be postmarked not less than 30 days prior to such date.

(6) A notification of the anticipated date for conducting the opacity observations required by § 60.11(e)(1) of this part. The notification shall also include, if appropriate, a request for the Administrator to provide a visible emissions reader during a performance test. The notification shall be postmarked not less than 30 days prior to such date.

(7) A notification that continuous opacity monitoring system data results will be used to determine compliance with the applicable opacity standard during a performance test required by § 60.8 in lieu of Method 9 observation data as allowed by § 60.11(e)(5) of this part. This notification shall be postmarked not less than 30 days prior to the date of the performance test.

(b) Any owner or operator subject to the provisions of this part shall maintain records of the occurrence and duration of any startup, shutdown, or malfunction in the operation of an affected facility; any malfunction of the air pollution control equipment; or any periods during which a continuous monitoring system or monitoring device is inoperative.

(c) Each owner or operator required to install a continuous monitoring device shall submit excess emissions and monitoring systems performance report (excess emissions are defined in applicable subparts) and-or summary report form (see paragraph (d) of this section) to the Administrator semiannually, except when: more frequent reporting is specifically required by an applicable subpart; or the Administrator, on a case-by-case basis, determines that more frequent reporting is necessary to accurately assess the compliance status of the source. All reports shall be postmarked by the 30th day following the end of each six-month period. Written reports of excess emissions shall include the following information:

(1) The magnitude of excess emissions computed in accordance with § 60.13(h), any conversion factor(s) used, and the date and time of commencement and completion of each time period of excess emissions. The process operating time during the reporting period.

(2) Specific identification of each period of excess emissions that occurs during startups, shutdowns, and malfunctions of the affected facility. The nature and cause of any malfunction (if known), the corrective action taken or preventative measures adopted.

(3) The date and time identifying each period during which the continuous monitoring system was inoperative except for zero and span checks and the nature of the system repairs or adjustments.

(4) When no excess emissions have occurred or the continuous monitoring system(s) have not been inoperative, repaired, or adjusted, such information shall be stated in the report.

(d) The summary report form shall contain the information and be in the format shown in figure 1 unless otherwise specified by the Administrator. One summary report form shall be submitted for each pollutant monitored at each affected facility.

(1) If the total duration of excess emissions for the reporting period is less than 1 percent of the total operating time for the reporting period and CMS downtime for the reporting period is less than 5 percent of the total operating time for the reporting period, only the summary report form shall be submitted and the excess emission report described in § 60.7(c) need not be submitted unless requested by the Administrator.

(2) If the total duration of excess emissions for the reporting period is 1 percent or greater of the total operating time for the reporting period or the total CMS downtime for the reporting period is 5 percent or greater of the total operating time for the reporting period, the summary report form and the excess emission report described in § 60.7(c) shall both be submitted.

Figure 1 - Summary Report - Gaseous and Opacity Excess Emission and Monitoring System Performance

Pollutant (Circle One - SO₂/NO_x/TRS/H₂S/CO/Opacity)

Reporting period dates: From _____ to _____

Company:

Emission Limitation

Address:

Monitor Manufacturer and Model No.

Date of Latest CMS Certification or Audit

Process Unit(s) Description:

Total source operating time in reporting period¹

Emission data summary ¹	CMS performance summary ¹
1. Duration of excess emissions in reporting period due to: a. Startup/shutdown b. Control equipment problems c. Process problems d. Other known causes e. Unknown causes 2. Total duration of excess emission 3. Total duration of excess emissions × (100) [Total source operating time] ²	1. CMS downtime in reporting period due to: a. Monitor equipment malfunctions b. Non-Monitor equipment malfunctions c. Quality assurance calibration d. Other known causes e. Unknown causes 2. Total CMS Downtime 3. [Total CMS Downtime] × (100) [Total source operating time] ²

¹ For opacity, record all times in minutes. For gases, record all times in hours.

² For the reporting period: If the total duration of excess emissions is 1 percent or greater of the total operating time or the total CMS downtime is 5 percent or greater of the total operating time, both the summary report form and the excess emission report described in § 60.7(c) shall be submitted.

On a separate page, describe any changes since last quarter in CMS, process or controls. I certify that the information contained in this report is true, accurate, and complete.

Name

Signature

Title

Date

(e)(1) Notwithstanding the frequency of reporting requirements specified in paragraph (c) of this section, an owner or operator who is required by an applicable subpart to submit excess emissions and monitoring systems performance reports (and summary reports) on a quarterly (or more frequent) basis may reduce the frequency of reporting for that standard to semiannual if the following conditions are met:

(i) For 1 full year (e.g., 4 quarterly or 12 monthly reporting periods) the affected facility's excess emissions and monitoring systems reports submitted to comply with a standard under this part continually demonstrate that the facility is in compliance with the applicable standard;

(ii) The owner or operator continues to comply with all recordkeeping and monitoring requirements specified in this subpart and the applicable standard; and

(iii) The Administrator does not object to a reduced frequency of reporting for the affected facility, as provided in paragraph (e)(2) of this section.

(2) The frequency of reporting of excess emissions and monitoring systems performance (and summary) reports may be reduced only after the owner or operator notifies the Administrator in writing of his or her intention to make such a change and the Administrator does not object to the intended change. In deciding whether to approve a reduced frequency of reporting, the Administrator may review information concerning the source's entire previous performance history during the required recordkeeping period prior to the intended change, including performance test results, monitoring data, and evaluations of an owner or operator's conformance with operation and maintenance requirements. Such information may be used by the Administrator to make a judgment about the source's potential for noncompliance in the future. If the Administrator disapproves the owner or operator's request to reduce the frequency of reporting, the Administrator will notify the owner or operator in writing within 45 days after receiving notice of the owner or operator's intention. The notification from the Administrator to the owner or operator will specify the grounds on which the

disapproval is based. In the absence of a notice of disapproval within 45 days, approval is automatically granted.

(3) As soon as monitoring data indicate that the affected facility is not in compliance with any emission limitation or operating parameter specified in the applicable standard, the frequency of reporting shall revert to the frequency specified in the applicable standard, and the owner or operator shall submit an excess emissions and monitoring systems performance report (and summary report, if required) at the next appropriate reporting period following the noncomplying event. After demonstrating compliance with the applicable standard for another full year, the owner or operator may again request approval from the Administrator to reduce the frequency of reporting for that standard as provided for in paragraphs (e)(1) and (e)(2) of this section.

(f) Any owner or operator subject to the provisions of this part shall maintain a file of all measurements, including continuous monitoring system, monitoring device, and performance testing measurements; all continuous monitoring system performance evaluations; all continuous monitoring system or monitoring device calibration checks; adjustments and maintenance performed on these systems or devices; and all other information required by this part recorded in a permanent form suitable for inspection. The file shall be retained for at least two years following the date of such measurements, maintenance, reports, and records, except as follows:

(1) This paragraph applies to owners or operators required to install a continuous emissions monitoring system (CEMS) where the CEMS installed is automated, and where the calculated data averages do not exclude periods of CEMS breakdown or malfunction. An automated CEMS records and reduces the measured data to the form of the pollutant emission standard through the use of a computerized data acquisition system. In lieu of maintaining a file of all CEMS subhourly measurements as required under paragraph (f) of this section, the owner or operator shall retain the most recent consecutive three averaging periods of subhourly measurements and a file that contains a hard copy of the data acquisition system algorithm used to reduce the measured data into the reportable form of the standard.

(2) This paragraph applies to owners or operators required to install a CEMS where the measured data is manually reduced to obtain the reportable form of the standard, and where the calculated data averages do not exclude periods of CEMS breakdown or malfunction. In lieu of maintaining a file of all CEMS subhourly measurements as required under paragraph (f) of this section, the owner or operator shall retain all subhourly measurements for the most recent reporting period. The subhourly measurements shall be retained for 120 days from the date of the most recent summary or excess emission report submitted to the Administrator.

(3) The Administrator or delegated authority, upon notification to the source, may require the owner or operator to maintain all measurements as required by paragraph (f) of this section, if the Administrator or the delegated authority determines these records are required to more accurately assess the compliance status of the affected source.

(g) If notification substantially similar to that in paragraph (a) of this section is required by any other State or local agency, sending the Administrator a copy of that notification will satisfy the requirements of paragraph (a) of this section.

(h) Individual subparts of this part may include specific provisions which clarify or make inapplicable the provisions set forth in this section.

§ 60.8 Performance tests.

(a) Except as specified in paragraphs (a)(1), (a)(2), (a)(3), and (a)(4) of this section, within 60 days after achieving the maximum production rate at which the affected facility will be operated, but not later than 180 days after initial startup of such facility, or at such other times specified by this part, and at such other times as may be required by the Administrator under section 114 of the Act, the owner or operator of such facility shall conduct performance test(s) and furnish the Administrator a written report of the results of such performance test(s).

(1) If a force majeure is about to occur, occurs, or has occurred for which the affected owner or operator intends to assert a claim of force majeure, the owner or operator shall notify the Administrator, in writing as soon as practicable following the date the owner or operator first knew, or through due diligence should have known that the event may cause or caused a delay in testing beyond the regulatory deadline, but the notification must occur before the performance test deadline unless the initial force majeure or a subsequent force majeure event delays the notice, and in such cases, the notification shall occur as soon as practicable.

(2) The owner or operator shall provide to the Administrator a written description of the force majeure event and a rationale for attributing the delay in testing beyond the regulatory deadline to the force majeure; describe the measures taken or to be taken to minimize the delay; and identify a date by which the owner or operator proposes to conduct the performance test. The performance test shall be conducted as soon as practicable after the force majeure occurs.

(3) The decision as to whether or not to grant an extension to the performance test deadline is solely within the discretion of the Administrator. The Administrator will notify the owner or operator in writing of approval or disapproval of the request for an extension as soon as practicable.

(4) Until an extension of the performance test deadline has been approved by the Administrator under paragraphs (a)(1), (2), and (3) of this section, the owner or operator of the affected facility remains strictly subject to the requirements of this part.

(b) Performance tests shall be conducted and data reduced in accordance with the test methods and procedures contained in each applicable subpart unless the Administrator

(1) specifies or approves, in specific cases, the use of a reference method with minor changes in methodology,

(2) approves the use of an equivalent method,

(3) approves the use of an alternative method the results of which he has determined to be adequate for indicating whether a specific source is in compliance,

(4) waives the requirement for performance tests because the owner or operator of a source has demonstrated by other means to the Administrator's satisfaction that the affected facility is in compliance with the standard, or

(5) approves shorter sampling times and smaller sample volumes when necessitated by process variables or other factors. Nothing in this paragraph shall be construed to abrogate the Administrator's authority to require testing under section 114 of the Act.

(c) Performance tests shall be conducted under such conditions as the Administrator shall specify to the plant operator based on representative performance of the affected facility. The owner or operator shall make available to the Administrator such records as may be necessary to determine the conditions of the performance tests. Operations during periods of startup, shutdown, and malfunction shall not constitute representative conditions for the purpose of a performance test nor shall emissions in excess of the level of the applicable emission limit during periods of startup, shutdown, and malfunction be considered a violation of the applicable emission limit unless otherwise specified in the applicable standard.

(d) The owner or operator of an affected facility shall provide the Administrator at least 30 days prior notice of any performance test, except as specified under other subparts, to afford the Administrator the opportunity to have an observer present. If after 30 days notice for an initially scheduled performance test, there is a delay (due to operational problems, etc.) in conducting the scheduled performance test, the owner or operator of an affected facility shall notify the Administrator (or delegated State or local agency) as soon as possible of any delay in the original test date, either by providing at least 7 days prior notice of the rescheduled date of the performance test, or by arranging a rescheduled date with the Administrator (or delegated State or local agency) by mutual agreement.

(e) The owner or operator of an affected facility shall provide, or cause to be provided, performance testing facilities as follows:

(1) Sampling ports adequate for test methods applicable to such facility. This includes

(i) constructing the air pollution control system such that volumetric flow rates and pollutant emission rates can be accurately determined by applicable test methods and procedures and

(ii) providing a stack or duct free of cyclonic flow during performance tests, as demonstrated by applicable test methods and procedures.

(2) Safe sampling platform(s).

(3) Safe access to sampling platform(s).

(4) Utilities for sampling and testing equipment.

(f) Unless otherwise specified in the applicable subpart, each performance test shall consist of three separate runs using the applicable test method.

(1) Each run shall be conducted for the time and under the conditions specified in the applicable standard. For the purpose of determining compliance with an applicable standard, the arithmetic means of results of the three runs shall apply. In the event that a sample is accidentally lost or conditions occur in which one of the three runs must be discontinued because of forced shutdown, failure of an irreplaceable portion of the sample train, extreme meteorological conditions, or other circumstances, beyond the owner or operator's control, compliance may, upon the Administrator's approval, be determined using the arithmetic mean of the results of the two other runs.

(2) Contents of report (electronic or paper submitted copy). Unless otherwise specified in a relevant standard or test method, or as otherwise approved by the Administrator in writing, the report for a

performance test shall include the elements identified in paragraphs (f)(2)(i) through (vi) of this section.

- (i) General identification information for the facility including a mailing address, the physical address, the owner or operator or responsible official (where applicable) and his/her email address, and the appropriate Federal Registry System (FRS) number for the facility.
- (ii) Purpose of the test including the applicable regulation(s) requiring the test, the pollutant(s) and other parameters being measured, the applicable emission standard and any process parameter component, and a brief process description.
- (iii) Description of the emission unit tested including fuel burned, control devices, and vent characteristics; the appropriate source classification code (SCC); the permitted maximum process rate (where applicable); and the sampling location.
- (iv) Description of sampling and analysis procedures used and any modifications to standard procedures, quality assurance procedures and results, record of process operating conditions that demonstrate the applicable test conditions are met, and values for any operating parameters for which limits were being set during the test.
- (v) Where a test method requires you record or report, the following shall be included: Record of preparation of standards, record of calibrations, raw data sheets for field sampling, raw data sheets for field and laboratory analyses, chain-of-custody documentation, and example calculations for reported results.
- (vi) Identification of the company conducting the performance test including the primary office address, telephone number, and the contact for this test program including his/her email address.

(g) The performance testing shall include a test method performance audit (PA) during the performance test. The PAs consist of blind audit samples supplied by an accredited audit sample provider and analyzed during the performance test in order to provide a measure of test data bias. Gaseous audit samples are designed to audit the performance of the sampling system as well as the analytical system and must be collected by the sampling system during the compliance test just as the compliance samples are collected. If a liquid or solid audit sample is designed to audit the sampling system, it must also be collected by the sampling system during the compliance test. If multiple sampling systems or sampling trains are used during the compliance test for any of the test methods, the tester is only required to use one of the sampling systems per method to collect the audit sample. The audit sample must be analyzed by the same analyst using the same analytical reagents and analytical system and at the same time as the compliance samples. Retests are required when there is a failure to produce acceptable results for an audit sample. However, if the audit results do not affect the compliance or noncompliance status of the affected facility, the compliance authority may waive the reanalysis requirement, further audits, or retests and accept the results of the compliance test. Acceptance of the test results shall constitute a waiver of the reanalysis requirement, further audits, or retests. The compliance authority may also use the audit sample failure and the compliance test results as evidence to determine the compliance or noncompliance status of the affected facility. A blind audit sample is a sample whose value is known only to the sample provider and is not revealed to the tested facility until after they report the measured value of the audit sample. For pollutants that exist in the gas phase at ambient temperature, the audit sample

shall consist of an appropriate concentration of the pollutant in air or nitrogen that can be introduced into the sampling system of the test method at or near the same entry point as a sample from the emission source. If no gas phase audit samples are available, an acceptable alternative is a sample of the pollutant in the same matrix that would be produced when the sample is recovered from the sampling system as required by the test method. For samples that exist only in a liquid or solid form at ambient temperature, the audit sample shall consist of an appropriate concentration of the pollutant in the same matrix that would be produced when the sample is recovered from the sampling system as required by the test method. An accredited audit sample provider (AASP) is an organization that has been accredited to prepare audit samples by an independent, third party accrediting body.

(1) The source owner, operator, or representative of the tested facility shall obtain an audit sample, if commercially available, from an AASP for each test method used for regulatory compliance purposes. No audit samples are required for the following test methods: Methods 3A and 3C of appendix A-3 of part 60, Methods 6C, 7E, 9, and 10 of appendix A-4 of part 60, Methods 18 and 19 of appendix A-6 of part 60, Methods 20, 22, and 25A of appendix A-7 of part 60, Methods 30A and 30B of appendix A-8 of part 60, and Methods 303, 318, 320, and 321 of appendix A of part 63 of this chapter. If multiple sources at a single facility are tested during a compliance test event, only one audit sample is required for each method used during a compliance test. The compliance authority responsible for the compliance test may waive the requirement to include an audit sample if they believe that an audit sample is not necessary. "Commercially available" means that two or more independent AASPs have blind audit samples available for purchase. If the source owner, operator, or representative cannot find an audit sample for a specific method, the owner, operator, or representative shall consult the EPA Web site at the following URL, www.epa.gov/ttn/emc, to confirm whether there is a source that can supply an audit sample for that method. If the EPA Web site does not list an available audit sample at least 60 days prior to the beginning of the compliance test, the source owner, operator, or representative shall not be required to include an audit sample as part of the quality assurance program for the compliance test. When ordering an audit sample, the source owner, operator, or representative shall give the sample provider an estimate for the concentration of each pollutant that is emitted by the source or the estimated concentration of each pollutant based on the permitted level and the name, address, and phone number of the compliance authority. The source owner, operator, or representative shall report the results for the audit sample along with a summary of the emission test results for the audited pollutant to the compliance authority and shall report the results of the audit sample to the AASP. The source owner, operator, or representative shall make both reports at the same time and in the same manner or shall report to the compliance authority first and then report to the AASP. If the method being audited is a method that allows the samples to be analyzed in the field and the tester plans to analyze the samples in the field, the tester may analyze the audit samples prior to collecting the emission samples provided a representative of the compliance authority is present at the testing site. The tester may request and the compliance authority may grant a waiver to the requirement that a representative of the compliance authority must be present at the testing site during the field analysis of an audit sample. The source owner, operator, or representative may report the results of the audit sample to the compliance authority and report the results of the audit sample to the AASP prior to collecting any emission samples. The test protocol and final test report shall document whether an audit sample was ordered and utilized and the pass/fail results as applicable.

(2) An AASP shall have and shall prepare, analyze, and report the true value of audit samples in accordance with a written technical criteria document that describes how audit samples will be prepared and distributed in a manner that will ensure the integrity of the audit sample program. An acceptable technical criteria document shall contain standard operating procedures for all of the following operations:

- (i) Preparing the sample;
- (ii) Confirming the true concentration of the sample;
- (iii) Defining the acceptance limits for the results from a well qualified tester. This procedure must use well established statistical methods to analyze historical results from well qualified testers. The acceptance limits shall be set so that there is 95 percent confidence that 90 percent of well qualified labs will produce future results that are within the acceptance limit range.
- (iv) Providing the opportunity for the compliance authority to comment on the selected concentration level for an audit sample;
- (v) Distributing the sample to the user in a manner that guarantees that the true value of the sample is unknown to the user;
- (vi) Recording the measured concentration reported by the user and determining if the measured value is within acceptable limits;
- (vii) The AASP shall report the results from each audit sample in a timely manner to the compliance authority and then to the source owner, operator, or representative. The AASP shall make both reports at the same time and in the same manner or shall report to the compliance authority first and then report to the source owner, operator, or representative. The results shall include the name of the facility tested, the date on which the compliance test was conducted, the name of the company performing the sample collection, the name of the company that analyzed the compliance samples including the audit sample, the measured result for the audit sample, and whether the testing company passed or failed the audit. The AASP shall report the true value of the audit sample to the compliance authority. The AASP may report the true value to the source owner, operator, or representative if the AASP's operating plan ensures that no laboratory will receive the same audit sample twice.
- (viii) Evaluating the acceptance limits of samples at least once every two years to determine in cooperation with the voluntary consensus standard body if they should be changed;
- (ix) Maintaining a database, accessible to the compliance authorities, of results from the audit that shall include the name of the facility tested, the date on which the compliance test was conducted, the name of the company performing the sample collection, the name of the company that analyzed the compliance samples including the audit sample, the measured result for the audit sample, the true value of the audit sample, the acceptance range for the measured value, and whether the testing company passed or failed the audit.

(3) The accrediting body shall have a written technical criteria document that describes how it will ensure that the AASP is operating in accordance with the AASP technical criteria document that

describes how audit samples are to be prepared and distributed. This document shall contain standard operating procedures for all of the following operations:

- (i) Checking audit samples to confirm their true value as reported by the AASP;
- (ii) Performing technical systems audits of the AASP's facilities and operating procedures at least once every two years;
- (iii) Providing standards for use by the voluntary consensus standard body to approve the accrediting body that will accredit the audit sample providers.

(4) The technical criteria documents for the accredited sample providers and the accrediting body shall be developed through a public process guided by a voluntary consensus standards body (VCSB). The VCSB shall operate in accordance with the procedures and requirements in the Office of Management and Budget Circular A-119. A copy of Circular A-119 is available upon request by writing the Office of Information and Regulatory Affairs, Office of Management and Budget, 725 17th Street, NW., Washington, DC 20503, by calling (202) 395-6880 or downloading online at http://standards.gov/standards__gov/a119.cfm. The VCSB shall approve all accrediting bodies. The Administrator will review all technical criteria documents. If the technical criteria documents do not meet the minimum technical requirements in paragraphs (g)(2) through (4) of this section, the technical criteria documents are not acceptable and the proposed audit sample program is not capable of producing audit samples of sufficient quality to be used in a compliance test. All acceptable technical criteria documents shall be posted on the EPA Web site at the following URL, <http://www.epa.gov/ttn/emc>.

(h) Unless otherwise specified in the applicable subpart, each test location must be verified to be free of cyclonic flow and evaluated for the existence of emission gas stratification and the required number of sampling traverse points. If other procedures are not specified in the applicable subpart to the regulations, use the appropriate procedures in Method 1 to check for cyclonic flow and Method 7E to evaluate emission gas stratification and selection of sampling points.

- (i) Whenever the use of multiple calibration gases is required by a test method, performance specification, or quality assurance procedure in a part 60 standard or appendix, Method 205 of 40 CFR part 51, appendix M of this chapter, "Verification of Gas Dilution Systems for Field Instrument Calibrations," may be used.

§ 60.9 Availability of information.

The availability to the public of information provided to, or otherwise obtained by, the Administrator under this part shall be governed by part 2 of this chapter. (Information submitted voluntarily to the Administrator for the purposes of §§ 60.5 and 60.6 is governed by §§ 2.201 through 2.213 of this chapter and not by § 2.301 of this chapter.)

§ 60.10 State authority.

The provisions of this part shall not be construed in any manner to preclude any State or political subdivision thereof from:

- (a) Adopting and enforcing any emission standard or limitation applicable to an affected facility, provided that such emission standard or limitation is not less stringent than the standard applicable to such facility.

(b) Requiring the owner or operator of an affected facility to obtain permits, licenses, or approvals prior to initiating construction, modification, or operation of such facility.

§ 60.11 Compliance with standards and maintenance requirements.

(a) Compliance with standards in this part, other than opacity standards, shall be determined in accordance with performance tests established by § 60.8, unless otherwise specified in the applicable standard.

(b) Compliance with opacity standards in this part shall be determined by conducting observations in accordance with Method 9 in appendix A of this part, any alternative method that is approved by the Administrator, or as provided in paragraph (e)(5) of this section. For purposes of determining initial compliance, the minimum total time of observations shall be 3 hours (30 6-minute averages) for the performance test or other set of observations (meaning those fugitive-type emission sources subject only to an opacity standard).

(c) The opacity standards set forth in this part shall apply at all times except during periods of startup, shutdown, malfunction, and as otherwise provided in the applicable standard.

(d) At all times, including periods of startup, shutdown, and malfunction, owners and operators shall, to the extent practicable, maintain and operate any affected facility including associated air pollution control equipment in a manner consistent with good air pollution control practice for minimizing emissions. Determination of whether acceptable operating and maintenance procedures are being used will be based on information available to the Administrator which may include, but is not limited to, monitoring results, opacity observations, review of operating and maintenance procedures, and inspection of the source.

(e) (1) For the purpose of demonstrating initial compliance, opacity observations shall be conducted concurrently with the initial performance test required in § 60.8 unless one of the following conditions apply. If no performance test under § 60.8 is required, then opacity observations shall be conducted within 60 days after achieving the maximum production rate at which the affected facility will be operated but no later than 180 days after initial startup of the facility. If visibility or other conditions prevent the opacity observations from being conducted concurrently with the initial performance test required under § 60.8, the source owner or operator shall reschedule the opacity observations as soon after the initial performance test as possible, but not later than 30 days thereafter, and shall advise the Administrator of the rescheduled date. In these cases, the 30-day prior notification to the Administrator required in § 60.7(a)(6) shall be waived. The rescheduled opacity observations shall be conducted (to the extent possible) under the same operating conditions that existed during the initial performance test conducted under § 60.8. The visible emissions observer shall determine whether visibility or other conditions prevent the opacity observations from being made concurrently with the initial performance test in accordance with procedures contained in Method 9 of appendix B of this part. Opacity readings of portions of plumes which contain condensed, uncombined water vapor shall not be used for purposes of determining compliance with opacity standards. The owner or operator of an affected facility shall make available, upon request by the Administrator, such records as may be necessary to determine the conditions under which the visual observations were made and shall provide evidence indicating proof of current visible observer emission certification. Except as provided in paragraph (e)(5) of this section, the results of continuous monitoring by transmissometer which indicate that the opacity at the time visual observations were made was not in excess of the standard are probative but not conclusive evidence of

the actual opacity of an emission, provided that the source shall meet the burden of proving that the instrument used meets (at the time of the alleged violation) Performance Specification 1 in appendix B of this part, has been properly maintained and (at the time of the alleged violation) that the resulting data have not been altered in any way.

(2) Except as provided in paragraph (e)(3) of this section, the owner or operator of an affected facility to which an opacity standard in this part applies shall conduct opacity observations in accordance with paragraph (b) of this section, shall record the opacity of emissions, and shall report to the Administrator the opacity results along with the results of the initial performance test required under § 60.8. The inability of an owner or operator to secure a visible emissions observer shall not be considered a reason for not conducting the opacity observations concurrent with the initial performance test.

(3) The owner or operator of an affected facility to which an opacity standard in this part applies may request the Administrator to determine and to record the opacity of emissions from the affected facility during the initial performance test and at such times as may be required. The owner or operator of the affected facility shall report the opacity results. Any request to the Administrator to determine and to record the opacity of emissions from an affected facility shall be included in the notification required in § 60.7(a)(6). If, for some reason, the Administrator cannot determine and record the opacity of emissions from the affected facility during the performance test, then the provisions of paragraph (e)(1) of this section shall apply.

(4) An owner or operator of an affected facility using a continuous opacity monitor (transmissometer) shall record the monitoring data produced during the initial performance test required by § 60.8 and shall furnish the Administrator a written report of the monitoring results along with Method 9 and § 60.8 performance test results.

(5) An owner or operator of an affected facility subject to an opacity standard may submit, for compliance purposes, continuous opacity monitoring system (COMS) data results produced during any performance test required under § 60.8 in lieu of Method 9 observation data. If an owner or operator elects to submit COMS data for compliance with the opacity standard, he shall notify the Administrator of that decision, in writing, at least 30 days before any performance test required under § 60.8 is conducted. Once the owner or operator of an affected facility has notified the Administrator to that effect, the COMS data results will be used to determine opacity compliance during subsequent tests required under § 60.8 until the owner or operator notifies the Administrator, in writing, to the contrary. For the purpose of determining compliance with the opacity standard during a performance test required under § 60.8 using COMS data, the minimum total time of COMS data collection shall be averages of all 6-minute continuous periods within the duration of the mass emission performance test. Results of the COMS opacity determinations shall be submitted along with the results of the performance test required under § 60.8. The owner or operator of an affected facility using a COMS for compliance purposes is responsible for demonstrating that the COMS meets the requirements specified in § 60.13(c) of this part, that the COMS has been properly maintained and operated, and that the resulting data have not been altered in any way. If COMS data results are submitted for compliance with the opacity standard for a period of time during which Method 9 data indicates noncompliance, the Method 9 data will be used to determine compliance with the opacity standard.

(6) Upon receipt from an owner or operator of the written reports of the results of the performance tests required by § 60.8, the opacity observation results and observer certification required by § 60.11(e)(1), and the COMS results, if applicable, the Administrator will make a finding concerning compliance with opacity and other applicable standards. If COMS data results are used to comply with an opacity standard, only those results are required to be submitted along with the performance test results required by § 60.8. If the Administrator finds that an affected facility is in compliance with all applicable standards for which performance tests are conducted in accordance with § 60.8 of this part but during the time such performance tests are being conducted fails to meet any applicable opacity standard, he shall notify the owner or operator and advise him that he may petition the Administrator within 10 days of receipt of notification to make appropriate adjustment to the opacity standard for the affected facility.

(7) The Administrator will grant such a petition upon a demonstration by the owner or operator that the affected facility and associated air pollution control equipment was operated and maintained in a manner to minimize the opacity of emissions during the performance tests; that the performance tests were performed under the conditions established by the Administrator; and that the affected facility and associated air pollution control equipment were incapable of being adjusted or operated to meet the applicable opacity standard.

(8) The Administrator will establish an opacity standard for the affected facility meeting the above requirements at a level at which the source will be able, as indicated by the performance and opacity tests, to meet the opacity standard at all times during which the source is meeting the mass or concentration emission standard. The Administrator will promulgate the new opacity standard in the Federal Register.

(f) Special provisions set forth under an applicable subpart shall supersede any conflicting provisions in paragraphs (a) through (e) of this section.

(g) For the purpose of submitting compliance certifications or establishing whether or not a person has violated or is in violation of any standard in this part, nothing in this part shall preclude the use, including the exclusive use, of any credible evidence or information, relevant to whether a source would have been in compliance with applicable requirements if the appropriate performance or compliance test or procedure had been performed.

§ 60.12 Circumvention.

No owner or operator subject to the provisions of this part shall build, erect, install, or use any article, machine, equipment or process, the use of which conceals an emission which would otherwise constitute a violation of an applicable standard. Such concealment includes, but is not limited to, the use of gaseous diluents to achieve compliance with an opacity standard or with a standard which is based on the concentration of a pollutant in the gases discharged to the atmosphere.

§ 60.13 Monitoring requirements.

(a) For the purposes of this section, all continuous monitoring systems required under applicable subparts shall be subject to the provisions of this section upon promulgation of performance specifications for continuous monitoring systems under appendix B to this part and, if the continuous monitoring system is used to demonstrate compliance with emission limits on a continuous basis, appendix F to this part,

unless otherwise specified in an applicable subpart or by the Administrator. Appendix F is applicable December 4, 1987.

(b) All continuous monitoring systems and monitoring devices shall be installed and operational prior to conducting performance tests under § 60.8. Verification of operational status shall, as a minimum, include completion of the manufacturer's written requirements or recommendations for installation, operation, and calibration of the device.

(c) If the owner or operator of an affected facility elects to submit continuous opacity monitoring system (COMS) data for compliance with the opacity standard as provided under § 60.11(e)(5), he shall conduct a performance evaluation of the COMS as specified in Performance Specification 1, appendix B, of this part before the performance test required under § 60.8 is conducted. Otherwise, the owner or operator of an affected facility shall conduct a performance evaluation of the COMS or continuous emission monitoring system (CEMS) during any performance test required under § 60.8 or within 30 days thereafter in accordance with the applicable performance specification in appendix B of this part. The owner or operator of an affected facility shall conduct COMS or CEMS performance evaluations at such other times as may be required by the Administrator under section 114 of the Act.

(1) The owner or operator of an affected facility using a COMS to determine opacity compliance during any performance test required under § 60.8 and as described in § 60.11(e)(5) shall furnish the Administrator two or, upon request, more copies of a written report of the results of the COMS performance evaluation described in paragraph (c) of this section at least 10 days before the performance test required under § 60.8 is conducted.

(2) Except as provided in paragraph (c)(1) of this section, the owner or operator of an affected facility shall furnish the Administrator within 60 days of completion two or, upon request, more copies of a written report of the results of the performance evaluation.

(d) (1) Owners and operators of a CEMS installed in accordance with the provisions of this part, must check the zero (or low level value between 0 and 20 percent of span value) and span (50 to 100 percent of span value) calibration drifts at least once each operating day in accordance with a written procedure. The zero and span must, at a minimum, be adjusted whenever either the 24-hour zero drift or the 24-hour span drift exceeds two times the limit of the applicable performance specification in appendix B of this part. The system must allow the amount of the excess zero and span drift to be recorded and quantified whenever specified. Owners and operators of a COMS installed in accordance with the provisions of this part must check the zero and upscale (span) calibration drifts at least once daily. For a particular COMS, the acceptable range of zero and upscale calibration materials is defined in the applicable version of PS-1 in appendix B of this part. For a COMS, the optical surfaces, exposed to the effluent gases, must be cleaned before performing the zero and upscale drift adjustments, except for systems using automatic zero adjustments. The optical surfaces must be cleaned when the cumulative automatic zero compensation exceeds 4 percent opacity.

(2) Unless otherwise approved by the Administrator, the following procedures must be followed for a COMS. Minimum procedures must include an automated method for producing a simulated zero opacity condition and an upscale opacity condition using a certified neutral density filter or other related technique to produce a known obstruction of the light beam. Such procedures must provide a system check of all active analyzer internal optics with power or curvature, all active electronic circuitry

including the light source and photodetector assembly, and electronic or electro-mechanical systems and hardware and or software used during normal measurement operation.

(e) Except for system breakdowns, repairs, calibration checks, and zero and span adjustments required under paragraph (d) of this section, all continuous monitoring systems shall be in continuous operation and shall meet minimum frequency of operation requirements as follows:

(1) All continuous monitoring systems referenced by paragraph (c) of this section for measuring opacity of emissions shall complete a minimum of one cycle of sampling and analyzing for each successive 10-second period and one cycle of data recording for each successive 6-minute period.

(2) All continuous monitoring systems referenced by paragraph (c) of this section for measuring emissions, except opacity, shall complete a minimum of one cycle of operation (sampling, analyzing, and data recording) for each successive 15-minute period.

(f) All continuous monitoring systems or monitoring devices shall be installed such that representative measurements of emissions or process parameters from the affected facility are obtained. Additional procedures for location of continuous monitoring systems contained in the applicable Performance Specifications of appendix B of this part shall be used.

(g) When the effluents from a single affected facility or two or more affected facilities subject to the same emission standards are combined before being released to the atmosphere, the owner or operator may install applicable continuous monitoring systems on each effluent or on the combined effluent. When the affected facilities are not subject to the same emission standards, separate continuous monitoring systems shall be installed on each effluent. When the effluent from one affected facility is released to the atmosphere through more than one point, the owner or operator shall install an applicable continuous monitoring system on each separate effluent unless the installation of fewer systems is approved by the Administrator. When more than one continuous monitoring system is used to measure the emissions from one affected facility (e.g., multiple breechings, multiple outlets), the owner or operator shall report the results as required from each continuous monitoring system.

(h) (1) Owners or operators of all continuous monitoring systems for measurement of opacity shall reduce all data to 6-minute averages and for continuous monitoring systems other than opacity to 1-hour averages for time periods as defined in § 60.2. Six-minute opacity averages shall be calculated from 36 or more data points equally spaced over each 6-minute period.

(2) For continuous monitoring systems other than opacity, 1-hour averages shall be computed as follows, except that the provisions pertaining to the validation of partial operating hours are only applicable for affected facilities that are required by the applicable subpart to include partial hours in the emission calculations:

(i) Except as provided under paragraph (h)(2)(iii) of this section, for a full operating hour (any clock hour with 60 minutes of unit operation), at least four valid data points are required to calculate the hourly average, *i.e.*, one data point in each of the 15-minute quadrants of the hour.

(ii) Except as provided under paragraph (h)(2)(iii) of this section, for a partial operating hour (any clock hour with less than 60 minutes of unit operation), at least one valid data point in

each 15-minute quadrant of the hour in which the unit operates is required to calculate the hourly average.

(iii) For any operating hour in which required maintenance or quality-assurance activities are performed:

(A) If the unit operates in two or more quadrants of the hour, a minimum of two valid data points, separated by at least 15 minutes, is required to calculate the hourly average; or

(B) If the unit operates in only one quadrant of the hour, at least one valid data point is required to calculate the hourly average.

(iv) If a daily calibration error check is failed during any operating hour, all data for that hour shall be invalidated, unless a subsequent calibration error test is passed in the same hour and the requirements of paragraph (h)(2)(iii) of this section are met, based solely on valid data recorded after the successful calibration.

(v) For each full or partial operating hour, all valid data points shall be used to calculate the hourly average.

(vi) Except as provided under paragraph (h)(2)(vii) of this section, data recorded during periods of continuous monitoring system breakdown, repair, calibration checks, and zero and span adjustments shall not be included in the data averages computed under this paragraph.

(vii) Owners and operators complying with the requirements of § 60.7(f)(1) or (2) must include any data recorded during periods of monitor breakdown or malfunction in the data averages.

(viii) When specified in an applicable subpart, hourly averages for certain partial operating hours shall not be computed or included in the emission averages (e.g., hours with < 30 minutes of unit operation under § 60.47b(d)).

(ix) Either arithmetic or integrated averaging of all data may be used to calculate the hourly averages. The data may be recorded in reduced or nonreduced form (e.g., ppm pollutant and percent O₂ or ng/J of pollutant).

(3) All excess emissions shall be converted into units of the standard using the applicable conversion procedures specified in the applicable subpart. After conversion into units of the standard, the data may be rounded to the same number of significant digits used in the applicable subpart to specify the emission limit.

(i) After receipt and consideration of written application, the Administrator may approve alternatives to any monitoring procedures or requirements of this part including, but not limited to the following:

(1) Alternative monitoring requirements when installation of a continuous monitoring system or monitoring device specified by this part would not provide accurate measurements due to liquid water or other interferences caused by substances in the effluent gases.

(2) Alternative monitoring requirements when the affected facility is infrequently operated.

- (3) Alternative monitoring requirements to accommodate continuous monitoring systems that require additional measurements to correct for stack moisture conditions.
 - (4) Alternative locations for installing continuous monitoring systems or monitoring devices when the owner or operator can demonstrate that installation at alternate locations will enable accurate and representative measurements.
 - (5) Alternative methods of converting pollutant concentration measurements to units of the standards.
 - (6) Alternative procedures for performing daily checks of zero and span drift that do not involve use of span gases or test cells.
 - (7) Alternatives to the A.S.T.M. test methods or sampling procedures specified by any subpart.
 - (8) Alternative continuous monitoring systems that do not meet the design or performance requirements in Performance Specification 1, appendix B, but adequately demonstrate a definite and consistent relationship between its measurements and the measurements of opacity by a system complying with the requirements in Performance Specification 1. The Administrator may require that such demonstration be performed for each affected facility.
 - (9) Alternative monitoring requirements when the effluent from a single affected facility or the combined effluent from two or more affected facilities is released to the atmosphere through more than one point.
- (j) An alternative to the relative accuracy (RA) test specified in Performance Specification 2 of appendix B may be requested as follows:
- (1) An alternative to the reference method tests for determining RA is available for sources with emission rates demonstrated to be less than 50 percent of the applicable standard. A source owner or operator may petition the Administrator to waive the RA test in Section 8.4 of Performance Specification 2 and substitute the procedures in Section 16.0 if the results of a performance test conducted according to the requirements in § 60.8 of this subpart or other tests performed following the criteria in § 60.8 demonstrate that the emission rate of the pollutant of interest in the units of the applicable standard is less than 50 percent of the applicable standard. For sources subject to standards expressed as control efficiency levels, a source owner or operator may petition the Administrator to waive the RA test and substitute the procedures in Section 16.0 of Performance Specification 2 if the control device exhaust emission rate is less than 50 percent of the level needed to meet the control efficiency requirement. The alternative procedures do not apply if the continuous emission monitoring system is used to determine compliance continuously with the applicable standard. The petition to waive the RA test shall include a detailed description of the procedures to be applied. Included shall be location and procedure for conducting the alternative, the concentration or response levels of the alternative RA materials, and the other equipment checks included in the alternative procedure. The Administrator will review the petition for completeness and applicability. The determination to grant a waiver will depend on the intended use of the CEMS data (e.g., data collection purposes other than NSPS) and may require specifications more stringent than in Performance Specification 2 (e.g., the applicable emission limit is more stringent than NSPS).
 - (2) The waiver of a CEMS RA test will be reviewed and may be rescinded at such time, following successful completion of the alternative RA procedure, that the CEMS data indicate that the source

emissions are approaching the level. The criterion for reviewing the waiver is the collection of CEMS data showing that emissions have exceeded 70 percent of the applicable standard for seven, consecutive, averaging periods as specified by the applicable regulation(s). For sources subject to standards expressed as control efficiency levels, the criterion for reviewing the waiver is the collection of CEMS data showing that exhaust emissions have exceeded 70 percent of the level needed to meet the control efficiency requirement for seven, consecutive, averaging periods as specified by the applicable regulation(s) [e.g., §§ 60.45(g) (2) and (3), 60.73(e), and 60.84(e)]. It is the responsibility of the source operator to maintain records and determine the level of emissions relative to the criterion on the waiver of RA testing. If this criterion is exceeded, the owner or operator must notify the Administrator within 10 days of such occurrence and include a description of the nature and cause of the increasing emissions. The Administrator will review the notification and may rescind the waiver and require the owner or operator to conduct a RA test of the CEMS as specified in Section 8.4 of Performance Specification 2.

Editorial Note

Editorial Note: For Federal Register citations affecting § 60.13, see the List of CFR Sections Affected, which appears in the Finding Aids section of the printed volume and at www.govinfo.gov.

§ 60.14 Modification.

(a) Except as provided under paragraphs (e) and (f) of this section, any physical or operational change to an existing facility which results in an increase in the emission rate to the atmosphere of any pollutant to which a standard applies shall be considered a modification within the meaning of section 111 of the Act. Upon modification, an existing facility shall become an affected facility for each pollutant to which a standard applies and for which there is an increase in the emission rate to the atmosphere.

(b) Emission rate shall be expressed as kg/hr of any pollutant discharged into the atmosphere for which a standard is applicable. The Administrator shall use the following to determine emission rate:

(1) Emission factors as specified in the latest issue of "Compilation of Air Pollutant Emission Factors," EPA Publication No. AP-42, or other emission factors determined by the Administrator to be superior to AP-42 emission factors, in cases where utilization of emission factors demonstrates that the emission level resulting from the physical or operational change will either clearly increase or clearly not increase.

(2) Material balances, continuous monitor data, or manual emission tests in cases where utilization of emission factors as referenced in paragraph (b)(1) of this section does not demonstrate to the Administrator's satisfaction whether the emission level resulting from the physical or operational change will either clearly increase or clearly not increase, or where an owner or operator demonstrates to the Administrator's satisfaction that there are reasonable grounds to dispute the result obtained by the Administrator utilizing emission factors as referenced in paragraph (b)(1) of this section. When the emission rate is based on results from manual emission tests or continuous monitoring systems, the procedures specified in appendix C of this part shall be used to determine whether an increase in emission rate has occurred. Tests shall be conducted under such conditions as the Administrator shall specify to the owner or operator based on representative performance of the facility. At least three valid test runs must be conducted before and at least three after the physical or operational change. All operating parameters which may affect emissions must be held constant to the maximum feasible degree for all test runs.

- (c) The addition of an affected facility to a stationary source as an expansion to that source or as a replacement for an existing facility shall not by itself bring within the applicability of this part any other facility within that source.
- (d) [Reserved]
- (e) The following shall not, by themselves, be considered modifications under this part:
- (1) Maintenance, repair, and replacement which the Administrator determines to be routine for a source category, subject to the provisions of paragraph (c) of this section and § 60.15.
 - (2) An increase in production rate of an existing facility, if that increase can be accomplished without a capital expenditure on that facility.
 - (3) An increase in the hours of operation.
 - (4) Use of an alternative fuel or raw material if, prior to the date any standard under this part becomes applicable to that source type, as provided by § 60.1, the existing facility was designed to accommodate that alternative use. A facility shall be considered to be designed to accommodate an alternative fuel or raw material if that use could be accomplished under the facility's construction specifications as amended prior to the change. Conversion to coal required for energy considerations, as specified in section 111(a)(8) of the Act, shall not be considered a modification.
 - (5) The addition or use of any system or device whose primary function is the reduction of air pollutants, except when an emission control system is removed or is replaced by a system which the Administrator determines to be less environmentally beneficial.
 - (6) The relocation or change in ownership of an existing facility.
- (f) Special provisions set forth under an applicable subpart of this part shall supersede any conflicting provisions of this section.
- (g) Within 180 days of the completion of any physical or operational change subject to the control measures specified in paragraph (a) of this section, compliance with all applicable standards must be achieved.
- (h) No physical change, or change in the method of operation, at an existing electric utility steam generating unit shall be treated as a modification for the purposes of this section provided that such change does not increase the maximum hourly emissions of any pollutant regulated under this section above the maximum hourly emissions achievable at that unit during the 5 years prior to the change.
- (i) Repowering projects that are awarded funding from the Department of Energy as permanent clean coal technology demonstration projects (or similar projects funded by EPA) are exempt from the requirements of this section provided that such change does not increase the maximum hourly emissions of any pollutant regulated under this section above the maximum hourly emissions achievable at that unit during the five years prior to the change.
- (j) (1) Repowering projects that qualify for an extension under section 409(b) of the Clean Air Act are exempt from the requirements of this section, provided that such change does not increase the actual hourly emissions of any pollutant regulated under this section above the actual hourly emissions achievable at that unit during the 5 years prior to the change.

(2) This exemption shall not apply to any new unit that:

- (i) Is designated as a replacement for an existing unit;
- (ii) Qualifies under section 409(b) of the Clean Air Act for an extension of an emission limitation compliance date under section 405 of the Clean Air Act; and
- (iii) Is located at a different site than the existing unit.

(k) The installation, operation, cessation, or removal of a temporary clean coal technology demonstration project is exempt from the requirements of this section. A *temporary clean coal control technology demonstration project*, for the purposes of this section is a clean coal technology demonstration project that is operated for a period of 5 years or less, and which complies with the State implementation plan for the State in which the project is located and other requirements necessary to attain and maintain the national ambient air quality standards during the project and after it is terminated.

(l) The reactivation of a very clean coal-fired electric utility steam generating unit is exempt from the requirements of this section.

§ 60.15 Reconstruction.

(a) An existing facility, upon reconstruction, becomes an affected facility, irrespective of any change in emission rate.

(b) "Reconstruction" means the replacement of components of an existing facility to such an extent that:

- (1) The fixed capital cost of the new components exceeds 50 percent of the fixed capital cost that would be required to construct a comparable entirely new facility, and
- (2) It is technologically and economically feasible to meet the applicable standards set forth in this part.

(c) "Fixed capital cost" means the capital needed to provide all the depreciable components.

(d) If an owner or operator of an existing facility proposes to replace components, and the fixed capital cost of the new components exceeds 50 percent of the fixed capital cost that would be required to construct a comparable entirely new facility, he shall notify the Administrator of the proposed replacements. The notice must be postmarked 60 days (or as soon as practicable) before construction of the replacements is commenced and must include the following information:

- (1) Name and address of the owner or operator.
- (2) The location of the existing facility.
- (3) A brief description of the existing facility and the components which are to be replaced.
- (4) A description of the existing air pollution control equipment and the proposed air pollution control equipment.
- (5) An estimate of the fixed capital cost of the replacements and of constructing a comparable entirely new facility.
- (6) The estimated life of the existing facility after the replacements.

(7) A discussion of any economic or technical limitations the facility may have in complying with the applicable standards of performance after the proposed replacements.

(e) The Administrator will determine, within 30 days of the receipt of the notice required by paragraph (d) of this section and any additional information he may reasonably require, whether the proposed replacement constitutes reconstruction.

(f) The Administrator's determination under paragraph (e) shall be based on:

(1) The fixed capital cost of the replacements in comparison to the fixed capital cost that would be required to construct a comparable entirely new facility;

(2) The estimated life of the facility after the replacements compared to the life of a comparable entirely new facility;

(3) The extent to which the components being replaced cause or contribute to the emissions from the facility; and

(4) Any economic or technical limitations on compliance with applicable standards of performance which are inherent in the proposed replacements.

(g) Individual subparts of this part may include specific provisions which refine and delimit the concept of reconstruction set forth in this section.

§ 60.16 Priority list.

Prioritized Major Source Categories

Priority Number¹	Source Category
1.	Synthetic Organic Chemical Manufacturing Industry (SOCMI) and Volatile Organic Liquid Storage Vessels and Handling Equipment (a) SOCMI unit processes (b) Volatile organic liquid (VOL) storage vessels and handling equipment (c) SOCMI fugitive sources (d) SOCMI secondary sources
2.	Industrial Surface Coating: Cans
3.	Petroleum Refineries: Fugitive Sources
4.	Industrial Surface Coating: Paper
5.	Dry Cleaning (a) Perchloroethylene (b) Petroleum solvent
6.	Graphic Arts
7.	Polymers and Resins: Acrylic Resins

Priority Number¹	Source Category
8.	Mineral Wool (Deleted)
9.	Stationary Internal Combustion Engines
10.	Industrial Surface Coating: Fabric
11.	Industrial-Commercial-Institutional Steam Generating Units.
12.	Incineration: Non-Municipal (Deleted)
13.	Non-Metallic Mineral Processing
14.	Metallic Mineral Processing
15.	Secondary Copper (Deleted)
16.	Phosphate Rock Preparation
17.	Foundries: Steel and Gray Iron
18.	Polymers and Resins: Polyethylene
19.	Charcoal Production
20.	Synthetic Rubber (a) Tire manufacture (b) SBR production
21.	Vegetable Oil
22.	Industrial Surface Coating: Metal Coil
23.	Petroleum Transportation and Marketing
24.	By-Product Coke Ovens
25.	Synthetic Fibers
26.	Plywood Manufacture
27.	Industrial Surface Coating: Automobiles
28.	Industrial Surface Coating: Large Appliances
29.	Crude Oil and Natural Gas Production
30.	Secondary Aluminum
31.	Potash (Deleted)
32.	Lightweight Aggregate Industry: Clay, Shale, and Slate ²
33.	Glass
34.	Gypsum

Priority Number¹	Source Category
35.	Sodium Carbonate
36.	Secondary Zinc (Deleted)
37.	Polymers and Resins: Phenolic
38.	Polymers and Resins: Urea-Melamine
39.	Ammonia (Deleted)
40.	Polymers and Resins: Polystyrene
41.	Polymers and Resins: ABS-SAN Resins
42.	Fiberglass
43.	Polymers and Resins: Polypropylene
44.	Textile Processing
45.	Asphalt Processing and Asphalt Roofing Manufacture
46.	Brick and Related Clay Products
47.	Ceramic Clay Manufacturing (Deleted)
48.	Ammonium Nitrate Fertilizer
49.	Castable Refractories (Deleted)
50.	Borax and Boric Acid (Deleted)
51.	Polymers and Resins: Polyester Resins
52.	Ammonium Sulfate
53.	Starch
54.	Perlite
55.	Phosphoric Acid: Thermal Process (Deleted)
56.	Uranium Refining
57.	Animal Feed Defluorination (Deleted)
58.	Urea (for fertilizer and polymers)
59.	Detergent (Deleted)

Other Source Categories

Lead acid battery manufacture³

Organic solvent cleaning³

Industrial surface coating: metal furniture³

Priority Number ¹	Source Category
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Stationary gas turbines⁴

Municipal solid waste landfills⁴

¹ Low numbers have highest priority, e.g., No. 1 is high priority, No. 59 is low priority.

² Formerly titled "Sintering: Clay and Fly Ash".

³ Minor source category, but included on list since an NSPS is being developed for that source category.

⁴ Not prioritized, since an NSPS for this major source category has already been promulgated.

§ 60.17 Incorporations by reference.

(a) Certain material is incorporated by reference into this part with the approval of the Director of the Federal Register under 5 U.S.C. 552(a) and 1 CFR part 51. To enforce any edition other than that specified in this section, the EPA must publish notice of change in the Federal Register and the material must be available to the public. All approved material is available for inspection at the EPA Docket Center, Public Reading Room, EPA WJC West, Room 3334, 1301 Constitution Ave. NW., Washington, DC, telephone number 202-566-1744, and is available from the sources listed below. It is also available for inspection at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, email fedreg.legal@nara.gov, or go to www.archives.gov/federal-register/cfr/ibr-locations.html.

(b) American Gas Association, available through ILI Infodisk, 610 Winters Avenue, Paramus, New Jersey 07652:

(1) American Gas Association Report No. 3: Orifice Metering for Natural Gas and Other Related Hydrocarbon Fluids, Part 1: General Equations and Uncertainty Guidelines (1990), IBR approved for § 60.107a(d).

(2) American Gas Association Report No. 3: Orifice Metering for Natural Gas and Other Related Hydrocarbon Fluids, Part 2: Specification and Installation Requirements (2000), IBR approved for § 60.107a(d).

(3) American Gas Association Report No. 11: Measurement of Natural Gas by Coriolis Meter (2003), IBR approved for § 60.107a(d).

(4) American Gas Association Transmission Measurement Committee Report No. 7: Measurement of Gas by Turbine Meters (Revised February 2006), IBR approved for § 60.107a(d).

(c) American Hospital Association (AHA) Service, Inc., Post Office Box 92683, Chicago, Illinois 60675-2683. You may inspect a copy at the EPA's Air and Radiation Docket and Information Center (Docket A-91-61, Item IV-J-124), Room M-1500, 1200 Pennsylvania Ave. NW., Washington, DC 20460.

(1) An Ounce of Prevention: Waste Reduction Strategies for Health Care Facilities. American Society for Health Care Environmental Services of the American Hospital Association. Chicago, Illinois. 1993. AHA Catalog No. 057007. ISBN 0-87258-673-5. IBR approved for §§ 60.35e and 60.55c.

(2) [Reserved]

(d) The following material is available for purchase from the American National Standards Institute (ANSI), 25 W. 43rd Street, 4th Floor, New York, NY 10036, Telephone (212) 642-4980, and is also available at the following Web site: <http://www.ansi.org>.

(1) ANSI No. C12.20-2010 American National Standard for Electricity Meters - 0.2 and 0.5 Accuracy Classes (Approved August 31, 2010), IBR approved for § 60.5535(d).

(2) [Reserved]

(e) American Petroleum Institute (API), 1220 L Street NW., Washington, DC 20005.

(1) API Publication 2517, Evaporation Loss from External Floating Roof Tanks, Second Edition, February 1980, IBR approved for §§ 60.111(i), 60.111a(f), and 60.116b(e).

(2) API Manual of Petroleum Measurement Standards, Chapter 14 - Natural Gas Fluids Measurement, Section 1 - Collecting and Handling of Natural Gas Samples for Custody Transfer, 7th Edition, May 2016, IBR approved for § 60.4415(a).

(3) API Manual of Petroleum Measurement Standards, Chapter 22 - Testing Protocol, Section 2 - Differential Pressure Flow Measurement Devices, First Edition, August 2005, IBR approved for § 60.107a(d).

(f) American Public Health Association, 1015 18th Street NW., Washington, DC 20036.

(1) "Standard Methods for the Examination of Water and Wastewater," 16th edition, 1985. Method 303F: "Determination of Mercury by the Cold Vapor Technique." Incorporated by reference for appendix A-8 to part 60, Method 29, §§ 9.2.3, 10.3, and 11.1.3.

(2) 2540 G. Total, Fixed, and Volatile Solids in Solid and Semisolid Samples, in Standard Methods for the Examination of Water and Wastewater, 20th Edition, 1998, IBR approved for § 60.154(b).

(g) The following material is available for purchase from the American Society of Mechanical Engineers (ASME), Two Park Avenue, New York, NY 10016-5990, Telephone (800) 843-2763, and is also available at the following Web site: <http://www.asme.org>.

(1) ASME Interim Supplement 19.5 on Instruments and Apparatus: Application, Part II of Fluid Meters, 6th Edition (1971), IBR approved for §§ 60.58a(h), 60.58b(i), 60.1320(a), and 60.1810(a).

(2) ASME MFC-3M-2004, Measurement of Fluid Flow in Pipes Using Orifice, Nozzle, and Venturi, IBR approved for § 60.107a(d).

(3) ASME/ANSI MFC-4M-1986 (Reaffirmed 2008), Measurement of Gas Flow by Turbine Meters, IBR approved for § 60.107a(d).

(4) ASME/ANSI MFC-5M-1985 (Reaffirmed 2006), Measurement of Liquid Flow in Closed Conduits Using Transit-Time Ultrasonic Flowmeters, IBR approved for § 60.107a(d).

(5) ASME MFC-6M-1998 (Reaffirmed 2005), Measurement of Fluid Flow in Pipes Using Vortex Flowmeters, IBR approved for § 60.107a(d).

(6) ASME/ANSI MFC-7M-1987 (Reaffirmed 2006), Measurement of Gas Flow by Means of Critical Flow Venturi Nozzles, IBR approved for § 60.107a(d).

- (7) ASME/ANSI MFC-9M-1988 (Reaffirmed 2006), Measurement of Liquid Flow in Closed Conduits by Weighing Method, IBR approved for § 60.107a(d).
 - (8) ASME MFC-11M-2006, Measurement of Fluid Flow by Means of Coriolis Mass Flowmeters, IBR approved for § 60.107a(d).
 - (9) ASME MFC-14M-2003, Measurement of Fluid Flow Using Small Bore Precision Orifice Meters, IBR approved for § 60.107a(d).
 - (10) ASME MFC-16-2007, Measurement of Liquid Flow in Closed Conduits with Electromagnetic Flowmeters, IBR approved for § 60.107a(d).
 - (11) ASME MFC-18M-2001, Measurement of Fluid Flow Using Variable Area Meters, IBR approved for § 60.107a(d).
 - (12) ASME MFC-22-2007, Measurement of Liquid by Turbine Flowmeters, IBR approved for § 60.107a(d).
 - (13) ASME PTC 4.1-1964 (Reaffirmed 1991), Power Test Codes: Test Code for Steam Generating Units (with 1968 and 1969 Addenda), IBR approved for §§ 60.46b, 60.58a(h), 60.58b(i), 60.1320(a), and 60.1810(a).
 - (14) ASME/ANSI PTC 19.10-1981, Flue and Exhaust Gas Analyses [Part 10, Instruments and Apparatus], (Issued August 31, 1981), IBR approved for §§ 60.56c(b), 60.63(f), 60.106(e), 60.104a(d), (h), (i), and (j), 60.105a(b), (d), (f), and (g), 60.106a(a), 60.107a(a), (c), and (d), tables 1 and 3 to subpart EEEE, tables 2 and 4 to subpart FFFF, table 2 to subpart JJJJ, §§ 60.285a(f), 60.4415(a), 60.2145(s) and (t), 60.2710(s) and (t), 60.2730(q), 60.4900(b), 60.5220(b), tables 1 and 2 to subpart LLLL, tables 2 and 3 to subpart MMMM, §§ 60.5406(c), 60.5406a(c), 60.5407a(g), 60.5413(b), 60.5413a(b), and 60.5413a(d).
 - (15) ASME PTC 22-2014, Gas Turbines: Performance Test Codes, (Issued December 31, 2014), IBR approved for § 60.5580.
 - (16) ASME PTC 46-1996, Performance Test Code on Overall Plant Performance, (Issued October 15, 1997), IBR approved for § 60.5580.
 - (17) ASME QRO-1-1994, Standard for the Qualification and Certification of Resource Recovery Facility Operators, IBR approved for §§ 60.54b(a) and (b), 60.56a, 60.1185(a) and (c), and 60.1675(a) and (c).
- (h) The following material is available for purchase from ASTM International, 100 Barr Harbor Drive, P.O. Box CB700, West Conshohocken, Pennsylvania 19428-2959, (800) 262-1373, <http://www.astm.org>.
- (1) ASTM A99-76, Standard Specification for Ferromanganese, IBR approved for § 60.261.
 - (2) ASTM A99-82 (Reapproved 1987), Standard Specification for Ferromanganese, IBR approved for § 60.261.
 - (3) ASTM A100-69, Standard Specification for Ferrosilicon, IBR approved for § 60.261.
 - (4) ASTM A100-74, Standard Specification for Ferrosilicon, IBR approved for § 60.261.
 - (5) ASTM A100-93, Standard Specification for Ferrosilicon, IBR approved for § 60.261.
 - (6) ASTM A101-73, Standard Specification for Ferrochromium, IBR approved for § 60.261.

- (7) ASTM A101-93, Standard Specification for Ferrochromium, IBR approved for § 60.261.
- (8) ASTM A482-76, Standard Specification for Ferrochromesilicon, IBR approved for § 60.261.
- (9) ASTM A482-93, Standard Specification for Ferrochromesilicon, IBR approved for § 60.261.
- (10) ASTM A483-64, Standard Specification for Silicomanganese, IBR approved for § 60.261.
- (11) ASTM A483-74 (Reapproved 1988), Standard Specification for Silicomanganese, IBR approved for § 60.261.
- (12) ASTM A495-76, Standard Specification for Calcium-Silicon and Calcium Manganese-Silicon, IBR approved for § 60.261.
- (13) ASTM A495-94, Standard Specification for Calcium-Silicon and Calcium Manganese-Silicon, IBR approved for § 60.261.
- (14) ASTM D86-78, Distillation of Petroleum Products, IBR approved for §§ 60.562-2(d), 60.593(d), 60.593a(d), 60.633(h).
- (15) ASTM D86-82, Distillation of Petroleum Products, IBR approved for §§ 60.562-2(d), 60.593(d), 60.593a(d), 60.633(h).
- (16) ASTM D86-90, Distillation of Petroleum Products, IBR approved for §§ 60.562-2(d), 60.593(d), 60.593a(d), 60.633(h).
- (17) ASTM D86-93, Distillation of Petroleum Products, IBR approved for §§ 60.562-2(d), 60.593(d), 60.593a(d), 60.633(h).
- (18) ASTM D86-95, Distillation of Petroleum Products, IBR approved for §§ 60.562-2(d), 60.593(d), 60.593a(d), 60.633(h).
- (19) ASTM D86-96, Distillation of Petroleum Products, (Approved April 10, 1996), IBR approved for §§ 60.562-2(d), 60.593(d), 60.593a(d), 60.633(h), 60.5401(f), 60.5401a(f).
- (20) ASTM D129-64, Standard Test Method for Sulfur in Petroleum Products (General Bomb Method), IBR approved for §§ 60.106(j) and appendix A-7 to part 60: Method 19, Section 12.5.2.2.3.
- (21) ASTM D129-78, Standard Test Method for Sulfur in Petroleum Products (General Bomb Method), IBR approved for §§ 60.106(j) and appendix A-7 to part 60: Method 19, Section 12.5.2.2.3.
- (22) ASTM D129-95, Standard Test Method for Sulfur in Petroleum Products (General Bomb Method), IBR approved for §§ 60.106(j) and appendix A-7 to part 60: Method 19, Section 12.5.2.2.3.
- (23) ASTM D129-00, Standard Test Method for Sulfur in Petroleum Products (General Bomb Method), IBR approved for § 60.335(b).
- (24) ASTM D129-00 (Reapproved 2005), Standard Test Method for Sulfur in Petroleum Products (General Bomb Method), IBR approved for § 60.4415(a).
- (25) ASTM D240-76, Standard Test Method for Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter, IBR approved for §§ 60.46(c), 60.296(b), and appendix A-7 to part 60: Method 19, Section 12.5.2.2.3.

- (26) ASTM D240-92, Standard Test Method for Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter, IBR approved for §§ 60.46(c), 60.296(b), and appendix A-7: Method 19, Section 12.5.2.2.3.
- (27) ASTM D240-02 (Reapproved 2007), Standard Test Method for Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter, (Approved May 1, 2007), IBR approved for § 60.107a(d).
- (28) ASTM D270-65, Standard Method of Sampling Petroleum and Petroleum Products, IBR approved for appendix A-7 to part 60: Method 19, Section 12.5.2.2.1.
- (29) ASTM D270-75, Standard Method of Sampling Petroleum and Petroleum Products, IBR approved for appendix A-7 to part 60: Method 19, Section 12.5.2.2.1.
- (30) ASTM D323-82, Test Method for Vapor Pressure of Petroleum Products (Reid Method), IBR approved for §§ 60.111(l), 60.111a(g), 60.111b, and 60.116b(f).
- (31) ASTM D323-94, Test Method for Vapor Pressure of Petroleum Products (Reid Method), IBR approved for §§ 60.111(l), 60.111a(g), 60.111b, and 60.116b(f).
- (32) ASTM D388-77, Standard Specification for Classification of Coals by Rank, IBR approved for §§ 60.41, 60.45(f), 60.41Da, 60.41b, 60.41c, and 60.251.
- (33) ASTM D388-90, Standard Specification for Classification of Coals by Rank, IBR approved for §§ 60.41, 60.45(f), 60.41Da, 60.41b, 60.41c, and 60.251.
- (34) ASTM D388-91, Standard Specification for Classification of Coals by Rank, IBR approved for §§ 60.41, 60.45(f), 60.41Da, 60.41b, 60.41c, and 60.251.
- (35) ASTM D388-95, Standard Specification for Classification of Coals by Rank, IBR approved for §§ 60.41, 60.45(f), 60.41Da, 60.41b, 60.41c, and 60.251.
- (36) ASTM D388-98a, Standard Specification for Classification of Coals by Rank, IBR approved for §§ 60.41, 60.45(f), 60.41Da, 60.41b, 60.41c, and 60.251.
- (37) ASTM D388-99 (Reapproved 2004) 1 Standard Classification of Coals by Rank, IBR approved for §§ 60.41, 60.45(f), 60.41Da, 60.41b, 60.41c, 60.251, and 60.5580.
- (38) ASTM D396-78, Standard Specification for Fuel Oils, IBR approved for §§ 60.41b, 60.41c, 60.111(b), and 60.111a(b).
- (39) ASTM D396-89, Standard Specification for Fuel Oils, IBR approved for §§ 60.41b, 60.41c, 60.111(b), and 60.111a(b).
- (40) ASTM D396-90, Standard Specification for Fuel Oils, IBR approved for §§ 60.41b, 60.41c, 60.111(b), and 60.111a(b).
- (41) ASTM D396-92, Standard Specification for Fuel Oils, IBR approved for §§ 60.41b, 60.41c, 60.111(b), and 60.111a(b).
- (42) ASTM D396-98, Standard Specification for Fuel Oils, IBR approved for §§ 60.41b, 60.41c, 60.111(b), 60.111a(b), and 60.5580.
- (43) ASTM D975-78, Standard Specification for Diesel Fuel Oils, IBR approved for §§ 60.111(b) and 60.111a(b).

- (44) ASTM D975-96, Standard Specification for Diesel Fuel Oils, IBR approved for §§ 60.111(b) and 60.111a(b).
- (45) ASTM D975-98a, Standard Specification for Diesel Fuel Oils, IBR approved for §§ 60.111(b) and 60.111a(b).
- (46) ASTM D975-08a, Standard Specification for Diesel Fuel Oils, IBR approved for §§ 60.41b 60.41c, and 60.5580.
- (47) ASTM D1072-80, Standard Test Method for Total Sulfur in Fuel Gases, IBR approved for § 60.335(b).
- (48) ASTM D1072-90 (Reapproved 1994), Standard Test Method for Total Sulfur in Fuel Gases, IBR approved for § 60.335(b).
- (49) ASTM D1072-90 (Reapproved 1999), Standard Test Method for Total Sulfur in Fuel Gases, IBR approved for § 60.4415(a).
- (50) ASTM D1137-53, Standard Method for Analysis of Natural Gases and Related Types of Gaseous Mixtures by the Mass Spectrometer, IBR approved for § 60.45(f).
- (51) ASTM D1137-75, Standard Method for Analysis of Natural Gases and Related Types of Gaseous Mixtures by the Mass Spectrometer, IBR approved for § 60.45(f).
- (52) ASTM D1193-77, Standard Specification for Reagent Water, IBR approved for appendix A-3 to part 60: Method 5, Section 7.1.3; Method 5E, Section 7.2.1; Method 5F, Section 7.2.1; appendix A-4 to part 60: Method 6, Section 7.1.1; Method 7, Section 7.1.1; Method 7C, Section 7.1.1; Method 7D, Section 7.1.1; Method 10A, Section 7.1.1; appendix A-5 to part 60: Method 11, Section 7.1.3; Method 12, Section 7.1.3; Method 13A, Section 7.1.2; appendix A-8 to part 60: Method 26, Section 7.1.2; Method 26A, Section 7.1.2; and Method 29, Section 7.2.2.
- (53) ASTM D1193-91, Standard Specification for Reagent Water, IBR approved for appendix A-3 to part 60: Method 5, Section 7.1.3; Method 5E, Section 7.2.1; Method 5F, Section 7.2.1; appendix A-4 to part 60: Method 6, Section 7.1.1; Method 7, Section 7.1.1; Method 7C, Section 7.1.1; Method 7D, Section 7.1.1; Method 10A, Section 7.1.1; appendix A-5 to part 60: Method 11, Section 7.1.3; Method 12, Section 7.1.3; Method 13A, Section 7.1.2; appendix A-8 to part 60: Method 26, Section 7.1.2; Method 26A, Section 7.1.2; and Method 29, Section 7.2.2.
- (54) ASTM D1266-87, Standard Test Method for Sulfur in Petroleum Products (Lamp Method), IBR approved for §§ 60.106(j) and 60.335(b).
- (55) ASTM D1266-91, Standard Test Method for Sulfur in Petroleum Products (Lamp Method), IBR approved for §§ 60.106(j) and 60.335(b).
- (56) ASTM D1266-98, Standard Test Method for Sulfur in Petroleum Products (Lamp Method), IBR approved for §§ 60.106(j) and 60.335(b).
- (57) ASTM D1266-98 (Reapproved 2003)^{e,1} Standard Test Method for Sulfur in Petroleum Products (Lamp Method), IBR approved for § 60.4415(a).

(58) ASTM D1475-60 (Reapproved 1980), Standard Test Method for Density of Paint, Varnish Lacquer, and Related Products, IBR approved for § 60.435(d), appendix A-7 to part 60: Method 24, Section 6.1; and Method 24A, Sections 6.5 and 7.1.

(59) ASTM D1475-90, Standard Test Method for Density of Paint, Varnish Lacquer, and Related Products, IBR approved for § 60.435(d), appendix A-7 to part 60: Method 24, Section 6.1; and Method 24A, §§ 6.5 and 7.1.

(60) ASTM D1552-83, Standard Test Method for Sulfur in Petroleum Products (High-Temperature Method), IBR approved for §§ 60.106(j), 60.335(b), and appendix A-7 to part 60: Method 19, Section 12.5.2.2.3.

(61) ASTM D1552-95, Standard Test Method for Sulfur in Petroleum Products (High-Temperature Method), IBR approved for §§ 60.106(j), 60.335(b), and appendix A-7 to part 60: Method 19, Section 12.5.2.2.3.

(62) ASTM D1552-01, Standard Test Method for Sulfur in Petroleum Products (High-Temperature Method), IBR approved for §§ 60.106(j), 60.335(b), and appendix A-7 to part 60: Method 19, Section 12.5.2.2.3.

(63) ASTM D1552-03, Standard Test Method for Sulfur in Petroleum Products (High-Temperature Method), IBR approved for § 60.4415(a).

(64) ASTM D1826-77, Standard Test Method for Calorific Value of Gases in Natural Gas Range by Continuous Recording Calorimeter, IBR approved for §§ 60.45(f), 60.46(c), 60.296(b), and appendix A-7 to part 60: Method 19, Section 12.3.2.4.

(65) ASTM D1826-94, Standard Test Method for Calorific Value of Gases in Natural Gas Range by Continuous Recording Calorimeter, IBR approved for §§ 60.45(f), 60.46(c), 60.296(b), and appendix A-7 to part 60: Method 19, Section 12.3.2.4.

(66) ASTM D1826-94 (Reapproved 2003), Standard Test Method for Calorific (Heating) Value of Gases in Natural Gas Range by Continuous Recording Calorimeter, (Approved May 10, 2003), IBR approved for § 60.107a(d).

(67) ASTM D1835-87, Standard Specification for Liquefied Petroleum (LP) Gases, IBR approved for §§ 60.41Da, 60.41b, and 60.41c.

(68) ASTM D1835-91, Standard Specification for Liquefied Petroleum (LP) Gases, IBR approved for §§ 60.41Da, 60.41b, and 60.41c.

(69) ASTM D1835-97, Standard Specification for Liquefied Petroleum (LP) Gases, IBR approved for §§ 60.41Da, 60.41b, and 60.41c.

(70) ASTM D1835-03a, Standard Specification for Liquefied Petroleum (LP) Gases, IBR approved for §§ 60.41Da, 60.41b, and 60.41c.

(71) ASTM D1945-64, Standard Method for Analysis of Natural Gas by Gas Chromatography, IBR approved for § 60.45(f).

(72) ASTM D1945-76, Standard Method for Analysis of Natural Gas by Gas Chromatography, IBR approved for § 60.45(f).

- (73) ASTM D1945-91, Standard Method for Analysis of Natural Gas by Gas Chromatography, IBR approved for § 60.45(f).
- (74) ASTM D1945-96, Standard Method for Analysis of Natural Gas by Gas Chromatography, IBR approved for § 60.45(f).
- (75) ASTM D1945-03 (Reapproved 2010), Standard Method for Analysis of Natural Gas by Gas Chromatography, (Approved January 1, 2010), IBR approved for §§ 60.107a(d), 60.5413(d), 60.5413a(d).
- (76) ASTM D1946-77, Standard Method for Analysis of Reformed Gas by Gas Chromatography, IBR approved for §§ 60.18(f), 60.45(f), 60.564(f), 60.614(e), 60.664(e), and 60.704(d).
- (77) ASTM D1946-90 (Reapproved 1994), Standard Method for Analysis of Reformed Gas by Gas Chromatography, IBR approved for §§ 60.18(f), 60.45(f), 60.564(f), 60.614(e), 60.664(e), and 60.704(d).
- (78) ASTM D1946-90 (Reapproved 2006), Standard Method for Analysis of Reformed Gas by Gas Chromatography, (Approved June 1, 2006), IBR approved for § 60.107a(d).
- (79) ASTM D2013-72, Standard Method of Preparing Coal Samples for Analysis, IBR approved for appendix A-7 to part 60: Method 19, Section 12.5.2.1.3.
- (80) ASTM D2013-86, Standard Method of Preparing Coal Samples for Analysis, IBR approved for appendix A-7 to part 60: Method 19, Section 12.5.2.1.3.
- (81) ASTM D2015-77 (Reapproved 1978), Standard Test Method for Gross Calorific Value of Solid Fuel by the Adiabatic Bomb Calorimeter, IBR approved for §§ 60.45(f), 60.46(c), and appendix A-7 to part 60: Method 19, Section 12.5.2.1.3.
- (82) ASTM D2015-96, Standard Test Method for Gross Calorific Value of Solid Fuel by the Adiabatic Bomb Calorimeter, IBR approved for §§ 60.45(f), 60.46(c), and appendix A-7 to part 60: Method 19, Section 12.5.2.1.3.
- (83) ASTM D2016-74, Standard Test Methods for Moisture Content of Wood, IBR approved for appendix A-8 to part 60: Method 28, Section 16.1.1.
- (84) ASTM D2016-83, Standard Test Methods for Moisture Content of Wood, IBR approved for appendix A-8 to part 60: Method 28, Section 16.1.1.
- (85) ASTM D2234-76, Standard Methods for Collection of a Gross Sample of Coal, IBR approved for appendix A-7 to part 60: Method 19, Section 12.5.2.1.1.
- (86) ASTM D2234-96, Standard Methods for Collection of a Gross Sample of Coal, IBR approved for appendix A-7 to part 60: Method 19, Section 12.5.2.1.1.
- (87) ASTM D2234-97b, Standard Methods for Collection of a Gross Sample of Coal, IBR approved for appendix A-7 to part 60: Method 19, Section 12.5.2.1.1.
- (88) ASTM D2234-98, Standard Methods for Collection of a Gross Sample of Coal, IBR approved for appendix A-7 to part 60: Method 19, Section 12.5.2.1.1.
- (89) ASTM D2369-81, Standard Test Method for Volatile Content of Coatings, IBR approved for appendix A-7 to part 60: Method 24, Section 6.2.

- (90) ASTM D2369-87, Standard Test Method for Volatile Content of Coatings, IBR approved for appendix A-7 to part 60: Method 24, Section 6.2.
- (91) ASTM D2369-90, Standard Test Method for Volatile Content of Coatings, IBR approved for appendix A-7 to part 60: Method 24, Section 6.2.
- (92) ASTM D2369-92, Standard Test Method for Volatile Content of Coatings, IBR approved for appendix A-7 to part 60: Method 24, Section 6.2.
- (93) ASTM D2369-93, Standard Test Method for Volatile Content of Coatings, IBR approved for appendix A-7 to part 60: Method 24, Section 6.2.
- (94) ASTM D2369-95, Standard Test Method for Volatile Content of Coatings, IBR approved for appendix A-7 to part 60: Method 24, Section 6.2.
- (95) ASTM D2369-10 (Reapproved 2015)e1, Standard Test Method for Volatile Content of Coatings, (Approved June 1, 2015); IBR approved for appendix A-7 to part 60: Method 24, Section 6.2.
- (96) ASTM D2382-76, Heat of Combustion of Hydrocarbon Fuels by Bomb Calorimeter (High-Precision Method), IBR approved for §§ 60.18(f), 60.485(g), 60.485a(g), 60.564(f), 60.614(e), 60.664(e), and 60.704(d).
- (97) ASTM D2382-88, Heat of Combustion of Hydrocarbon Fuels by Bomb Calorimeter (High-Precision Method), IBR approved for §§ 60.18(f), 60.485(g), 60.485a(g), 60.564(f), 60.614(e), 60.664(e), and 60.704(d).
- (98) ASTM D2504-67, Noncondensable Gases in C3 and Lighter Hydrocarbon Products by Gas Chromatography, IBR approved for §§ 60.485(g) and 60.485a(g).
- (99) ASTM D2504-77, Noncondensable Gases in C3 and Lighter Hydrocarbon Products by Gas Chromatography, IBR approved for §§ 60.485(g) and 60.485a(g).
- (100) ASTM D2504-88 (Reapproved 1993), Noncondensable Gases in C3 and Lighter Hydrocarbon Products by Gas Chromatography, IBR approved for §§ 60.485(g) and 60.485a(g).
- (101) ASTM D2584-68(Reapproved 1985), Standard Test Method for Ignition Loss of Cured Reinforced Resins, IBR approved for § 60.685(c).
- (102) ASTM D2584-94, Standard Test Method for Ignition Loss of Cured Reinforced Resins, IBR approved for § 60.685(c).
- (103) ASTM D2597-94 (Reapproved 1999), Standard Test Method for Analysis of Demethanized Hydrocarbon Liquid Mixtures Containing Nitrogen and Carbon Dioxide by Gas Chromatography, IBR approved for § 60.335(b).
- (104) ASTM D2622-87, Standard Test Method for Sulfur in Petroleum Products by Wavelength Dispersive X-Ray Fluorescence Spectrometry, IBR approved for §§ 60.106(j) and 60.335(b).
- (105) ASTM D2622-94, Standard Test Method for Sulfur in Petroleum Products by Wavelength Dispersive X-Ray Fluorescence Spectrometry, IBR approved for §§ 60.106(j) and 60.335(b).
- (106) ASTM D2622-98, Standard Test Method for Sulfur in Petroleum Products by Wavelength Dispersive X-Ray Fluorescence Spectrometry, IBR approved for §§ 60.106(j) and 60.335(b).

- (107) ASTM D2622-05, Standard Test Method for Sulfur in Petroleum Products by Wavelength Dispersive X-Ray Fluorescence Spectrometry, IBR approved for § 60.4415(a).
- (108) ASTM D2879-83 Test Method for Vapor Pressure-Temperature Relationship and Initial Decomposition Temperature of Liquids by Isoteniscope, IBR approved for §§ 60.111b(f)(3), 60.116b(e), 60.116b(f), 60.485(e), and 60.485a(e).
- (109) ASTM D2879-96, Test Method for Vapor Pressure-Temperature Relationship and Initial Decomposition Temperature of Liquids by Isoteniscope, IBR approved for §§ 60.111b(f)(3), 60.116b(e), 60.116b(f), 60.485(e), and 60.485a(e).
- (110) ASTM D2879-97, Test Method for Vapor Pressure-Temperature Relationship and Initial Decomposition Temperature of Liquids by Isoteniscope, IBR approved for §§ 60.111b(f)(3), 60.116b(e), 60.116b(f), 60.485(e), and 60.485a(e).
- (111) ASTM D2880-78, Standard Specification for Gas Turbine Fuel Oils, IBR approved for §§ 60.111(b), 60.111a(b), and 60.335(d).
- (112) ASTM D2880-96, Standard Specification for Gas Turbine Fuel Oils, IBR approved for §§ 60.111(b), 60.111a(b), and 60.335(d).
- (113) ASTM D2908-74, Standard Practice for Measuring Volatile Organic Matter in Water by Aqueous-Injection Gas Chromatography, IBR approved for § 60.564(j).
- (114) ASTM D2908-91, Standard Practice for Measuring Volatile Organic Matter in Water by Aqueous-Injection Gas Chromatography, IBR approved for § 60.564(j).
- (115) ASTM D2986-71, Standard Method for Evaluation of Air, Assay Media by the Monodisperse DOP (Diethyl Phthalate) Smoke Test, IBR approved for appendix A-3 to part 60: Method 5, Section 7.1.1; appendix A-5 to part 60: Method 12, Section 7.1.1; and Method 13A, Section 7.1.1.2.
- (116) ASTM D2986-78, Standard Method for Evaluation of Air, Assay Media by the Monodisperse DOP (Diethyl Phthalate) Smoke Test, IBR approved for appendix A-3 to part 60: Method 5, Section 7.1.1; appendix A-5 to part 60: Method 12, Section 7.1.1; and Method 13A, Section 7.1.1.2.
- (117) ASTM D2986-95a, Standard Method for Evaluation of Air, Assay Media by the Monodisperse DOP (Diethyl Phthalate) Smoke Test, IBR approved for appendix A-3 to part 60: Method 5, Section 7.1.1; appendix A-5 to part 60: Method 12, Section 7.1.1; and Method 13A, Section 7.1.1.2.
- (118) ASTM D3173-73, Standard Test Method for Moisture in the Analysis Sample of Coal and Coke, IBR approved for appendix A-7 to part 60: Method 19, Section 12.5.2.1.3.
- (119) ASTM D3173-87, Standard Test Method for Moisture in the Analysis Sample of Coal and Coke, IBR approved for appendix A-7 to part 60: Method 19, Section 12.5.2.1.3.
- (120) ASTM D3176-74, Standard Method for Ultimate Analysis of Coal and Coke, IBR approved for § 60.45(f)(5)(i) and appendix A-7 to part 60: Method 19, Section 12.3.2.3.
- (121) ASTM D3176-89, Standard Method for Ultimate Analysis of Coal and Coke, IBR approved for § 60.45(f)(5)(i) and appendix A-7 to part 60: Method 19, Section 12.3.2.3.
- (122) ASTM D3177-75, Standard Test Method for Total Sulfur in the Analysis Sample of Coal and Coke, IBR approved for appendix A-7 to part 60: Method 19, Section 12.5.2.1.3.

- (123) ASTM D3177-89, Standard Test Method for Total Sulfur in the Analysis Sample of Coal and Coke, IBR approved for appendix A-7 to part 60: Method 19, Section 12.5.2.1.3.
- (124) ASTM D3178-73 (Reapproved 1979), Standard Test Methods for Carbon and Hydrogen in the Analysis Sample of Coal and Coke, IBR approved for § 60.45(f).
- (125) ASTM D3178-89, Standard Test Methods for Carbon and Hydrogen in the Analysis Sample of Coal and Coke, IBR approved for § 60.45(f).
- (126) ASTM D3246-81, Standard Test Method for Sulfur in Petroleum Gas by Oxidative Microcoulometry, IBR approved for § 60.335(b).
- (127) ASTM D3246-92, Standard Test Method for Sulfur in Petroleum Gas by Oxidative Microcoulometry, IBR approved for § 60.335(b).
- (128) ASTM D3246-96, Standard Test Method for Sulfur in Petroleum Gas by Oxidative Microcoulometry, IBR approved for § 60.335(b).
- (129) ASTM D3246-05, Standard Test Method for Sulfur in Petroleum Gas by Oxidative Microcoulometry, IBR approved for § 60.4415(a)(1).
- (130) ASTM D3270-73T, Standard Test Methods for Analysis for Fluoride Content of the Atmosphere and Plant Tissues (Semiautomated Method), IBR approved for appendix A-5 to part 60: Method 13A, Section 16.1.
- (131) ASTM D3270-80, Standard Test Methods for Analysis for Fluoride Content of the Atmosphere and Plant Tissues (Semiautomated Method), IBR approved for appendix A-5 to part 60: Method 13A, Section 16.1.
- (132) ASTM D3270-91, Standard Test Methods for Analysis for Fluoride Content of the Atmosphere and Plant Tissues (Semiautomated Method), IBR approved for appendix A-5 to part 60: Method 13A, Section 16.1.
- (133) ASTM D3270-95, Standard Test Methods for Analysis for Fluoride Content of the Atmosphere and Plant Tissues (Semiautomated Method), IBR approved for appendix A-5 to part 60: Method 13A, Section 16.1.
- (134) ASTM D3286-85, Standard Test Method for Gross Calorific Value of Coal and Coke by the Isoperibol Bomb Calorimeter, IBR approved for appendix A-7 to part 60: Method 19, Section 12.5.2.1.3.
- (135) ASTM D3286-96, Standard Test Method for Gross Calorific Value of Coal and Coke by the Isoperibol Bomb Calorimeter, IBR approved for appendix A-7 to part 60: Method 19, Section 12.5.2.1.3.
- (136) ASTM D3370-76, Standard Practices for Sampling Water, IBR approved for § 60.564(j).
- (137) ASTM D3370-95a, Standard Practices for Sampling Water, IBR approved for § 60.564(j).
- (138) ASTM D3588-98 (Reapproved 2003), Standard Practice for Calculating Heat Value, Compressibility Factor, and Relative Density of Gaseous Fuels, (Approved May 10, 2003), IBR approved for §§ 60.107a(d), 60.5413(d), and 60.5413a(d).
- (139) ASTM D3699-08, Standard Specification for Kerosine, including Appendix X1, (Approved September 1, 2008), IBR approved for §§ 60.41b, 60.41c, and 60.5580.

- (140) ASTM D3792-79, Standard Test Method for Water Content of Water-Reducible Paints by Direct Injection into a Gas Chromatograph, IBR approved for appendix A-7 to part 60: Method 24, Section 6.3.
- (141) ASTM D3792-91, Standard Test Method for Water Content of Water-Reducible Paints by Direct Injection into a Gas Chromatograph, IBR approved for appendix A-7 to part 60: Method 24, Section 6.3.
- (142) ASTM D4017-81, Standard Test Method for Water in Paints and Paint Materials by the Karl Fischer Titration Method, IBR approved for appendix A-7 to part 60: Method 24, Section 6.4.
- (143) ASTM D4017-90, Standard Test Method for Water in Paints and Paint Materials by the Karl Fischer Titration Method, IBR approved for appendix A-7 to part 60: Method 24, Section 6.4.
- (144) ASTM D4017-96a, Standard Test Method for Water in Paints and Paint Materials by the Karl Fischer Titration Method, IBR approved for appendix A-7 to part 60: Method 24, Section 6.4.
- (145) ASTM D4057-81, Standard Practice for Manual Sampling of Petroleum and Petroleum Products, IBR approved for appendix A-7 to part 60: Method 19, Section 12.5.2.2.3.
- (146) ASTM D4057-95, Standard Practice for Manual Sampling of Petroleum and Petroleum Products, IBR approved for appendix A-7 to part 60: Method 19, Section 12.5.2.2.3.
- (147) ASTM D4057-95 (Reapproved 2000), Standard Practice for Manual Sampling of Petroleum and Petroleum Products, IBR approved for § 60.4415(a).
- (148) ASTM D4084-82, Standard Test Method for Analysis of Hydrogen Sulfide in Gaseous Fuels (Lead Acetate Reaction Rate Method), IBR approved for § 60.334(h).
- (149) ASTM D4084-94, Standard Test Method for Analysis of Hydrogen Sulfide in Gaseous Fuels (Lead Acetate Reaction Rate Method), IBR approved for § 60.334(h).
- (150) ASTM D4084-05, Standard Test Method for Analysis of Hydrogen Sulfide in Gaseous Fuels (Lead Acetate Reaction Rate Method), IBR approved for §§ 60.4360 and 60.4415(a).
- (151) ASTM D4177-95, Standard Practice for Automatic Sampling of Petroleum and Petroleum Products, IBR approved for appendix A-7 to part 60: Method 19, Section 12.5.2.2.1.
- (152) ASTM D4177-95 (Reapproved 2000), Standard Practice for Automatic Sampling of Petroleum and Petroleum Products, IBR approved for § 60.4415(a).
- (153) ASTM D4239-85, Standard Test Methods for Sulfur in the Analysis Sample of Coal and Coke Using High Temperature Tube Furnace Combustion Methods, IBR approved for appendix A-7 to part 60: Method 19, Section 12.5.2.1.3.
- (154) ASTM D4239-94, Standard Test Methods for Sulfur in the Analysis Sample of Coal and Coke Using High Temperature Tube Furnace Combustion Methods, IBR approved for appendix A-7 to part 60: Method 19, Section 12.5.2.1.3.
- (155) ASTM D4239-97, Standard Test Methods for Sulfur in the Analysis Sample of Coal and Coke Using High Temperature Tube Furnace Combustion Methods, IBR approved for appendix A-7 to part 60: Method 19, Section 12.5.2.1.3.
- (156) ASTM D4294-02, Standard Test Method for Sulfur in Petroleum and Petroleum Products by Energy-Dispersive X-Ray Fluorescence Spectrometry, IBR approved for § 60.335(b).

- (157) ASTM D4294-03, Standard Test Method for Sulfur in Petroleum and Petroleum Products by Energy-Dispersive X-Ray Fluorescence Spectrometry, IBR approved for § 60.4415(a).
- (158) ASTM D4442-84, Standard Test Methods for Direct Moisture Content Measurement in Wood and Wood-base Materials, IBR approved for appendix A-8 to part 60: Method 28, Section 16.1.1.
- (159) ASTM D4442-92, Standard Test Methods for Direct Moisture Content Measurement in Wood and Wood-base Materials, IBR approved for appendix A-8 to part 60: Method 28, Section 16.1.1.
- (160) ASTM D4444-92, Standard Test Methods for Use and Calibration of Hand-Held Moisture Meters, IBR approved for appendix A-8 to part 60: Method 28, Section 16.1.1.
- (161) ASTM D4457-85 (Reapproved 1991), Test Method for Determination of Dichloromethane and 1,1,1-Trichloroethane in Paints and Coatings by Direct Injection into a Gas Chromatograph, IBR approved for appendix A-7 to part 60: Method 24, Section 6.5.
- (162) ASTM D4468-85 (Reapproved 2000), Standard Test Method for Total Sulfur in Gaseous Fuels by Hydrogenolysis and Rateometric Colorimetry, IBR approved for §§ 60.335(b) and 60.4415(a).
- (163) ASTM D4468-85 (Reapproved 2006), Standard Test Method for Total Sulfur in Gaseous Fuels by Hydrogenolysis and Rateometric Colorimetry, (Approved June 1, 2006), IBR approved for § 60.107a(e).
- (164) ASTM D4629-02, Standard Test Method for Trace Nitrogen in Liquid Petroleum Hydrocarbons by Syringe/Inlet Oxidative Combustion and Chemiluminescence Detection, IBR approved for §§ 60.49b(e) and 60.335(b).
- (165) ASTM D4809-95, Standard Test Method for Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter (Precision Method), IBR approved for §§ 60.18(f), 60.485(g), 60.485a(g), 60.564(f), 60.614(d), 60.664(e), and 60.704(d).
- (166) ASTM D4809-06, Standard Test Method for Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter (Precision Method), (Approved December 1, 2006), IBR approved for § 60.107a(d).
- (167) ASTM D4810-88 (Reapproved 1999), Standard Test Method for Hydrogen Sulfide in Natural Gas Using Length of Stain Detector Tubes, IBR approved for §§ 60.4360 and 60.4415(a).
- (168) ASTM D4891-89 (Reapproved 2006) Standard Test Method for Heating Value of Gases in Natural Gas Range by Stoichiometric Combustion, (Approved June 1, 2006), IBR approved for §§ 60.107a(d), 60.5413(d), and 60.5413a(d).
- (169) ASTM D5287-97 (Reapproved 2002), Standard Practice for Automatic Sampling of Gaseous Fuels, IBR approved for § 60.4415(a).
- (170) ASTM D5403-93, Standard Test Methods for Volatile Content of Radiation Curable Materials, IBR approved for appendix A-7 to part 60: Method 24, Section 6.6.
- (171) ASTM D5453-00, Standard Test Method for Determination of Total Sulfur in Light Hydrocarbons, Motor Fuels and Oils by Ultraviolet Fluorescence, IBR approved for § 60.335(b).
- (172) ASTM D5453-05, Standard Test Method for Determination of Total Sulfur in Light Hydrocarbons, Motor Fuels and Oils by Ultraviolet Fluorescence, IBR approved for § 60.4415(a).

(173) ASTM D5504-01, Standard Test Method for Determination of Sulfur Compounds in Natural Gas and Gaseous Fuels by Gas Chromatography and Chemiluminescence, IBR approved for §§ 60.334(h) and 60.4360.

(174) ASTM D5504-08, Standard Test Method for Determination of Sulfur Compounds in Natural Gas and Gaseous Fuels by Gas Chromatography and Chemiluminescence, (Approved June 15, 2008), IBR approved for §§ 60.107a(e) and 60.5413(d).

(175) ASTM D5623-19, Standard Test Method for Sulfur Compounds in Light Petroleum Liquids by Gas Chromatography and Sulfur Selective Detection, (Approved July 1, 2019); IBR approved for § 60.4415(a).

(176) ASTM D5762-02, Standard Test Method for Nitrogen in Petroleum and Petroleum Products by Boat-Inlet Chemiluminescence, IBR approved for § 60.335(b).

(177) ASTM D5865-98, Standard Test Method for Gross Calorific Value of Coal and Coke, IBR approved for §§ 60.45(f) and 60.46(c), and appendix A-7 to part 60: Method 19, Section 12.5.2.1.3.

(178) ASTM D5865-10, Standard Test Method for Gross Calorific Value of Coal and Coke, (Approved January 1, 2010), IBR approved for §§ 60.45(f), 60.46(c), and appendix A-7 to part 60: Method 19, section 12.5.2.1.3.

(179) ASTM D6216-12, Standard Practice for Opacity Monitor Manufacturers to Certify Conformance with Design and Performance Specifications, approved October 1, 2012; IBR approved for appendix B to part 60.

(180) ASTM D6228-98, Standard Test Method for Determination of Sulfur Compounds in Natural Gas and Gaseous Fuels by Gas Chromatography and Flame Photometric Detection, IBR approved for § 60.334(h).

(181) ASTM D6228-98 (Reapproved 2003), Standard Test Method for Determination of Sulfur Compounds in Natural Gas and Gaseous Fuels by Gas Chromatography and Flame Photometric Detection, IBR approved for §§ 60.4360 and 60.4415.

(182) ASTM D6348-03, Standard Test Method for Determination of Gaseous Compounds by Extractive Direct Interface Fourier Transform Infrared (FTIR) Spectroscopy, (Approved October 1, 2003), IBR approved for § 60.73a(b), table 7 to subpart IIII, table 2 to subpart JJJJ, and § 60.4245(d).

(183) ASTM D6366-99, Standard Test Method for Total Trace Nitrogen and Its Derivatives in Liquid Aromatic Hydrocarbons by Oxidative Combustion and Electrochemical Detection, IBR approved for § 60.335(b)(9).

(184) ASTM D6420-99 (Reapproved 2004), Standard Test Method for Determination of Gaseous Organic Compounds by Direct Interface Gas Chromatography-Mass Spectrometry, (Approved October 1, 2004), IBR approved for § 60.107a(d) and table 2 to subpart JJJJ.

(185) ASTM D6522-00, Standard Test Method for Determination of Nitrogen Oxides, Carbon Monoxide, and Oxygen Concentrations in Emissions from Natural Gas-Fired Reciprocating Engines, Combustion Turbines, Boilers, and Process Heaters Using Portable Analyzers, IBR approved for § 60.335(a).

- (186) ASTM D6522-00 (Reapproved 2005), Standard Test Method for Determination of Nitrogen Oxides, Carbon Monoxide, and Oxygen Concentrations in Emissions from Natural Gas-Fired Reciprocating Engines, Combustion Turbines, Boilers, and Process Heaters Using Portable Analyzers, (Approved October 1, 2005), IBR approved for table 2 to subpart JJJJ, §§ 60.5413(b) and (d), and 60.5413a(b).
- (187) ASTM D6522-11 Standard Test Method for Determination of Nitrogen Oxides, Carbon Monoxide, and Oxygen Concentrations in Emissions from Natural Gas-Fired Reciprocating Engines, Combustion Turbines, Boilers, and Process Heaters Using Portable Analyzers (Approved December 1, 2011), IBR approved for § 60.37f(a), 60.766(a).
- (188) ASTM D6667-01, Standard Test Method for Determination of Total Volatile Sulfur in Gaseous Hydrocarbons and Liquefied Petroleum Gases by Ultraviolet Fluorescence, IBR approved for § 60.335(b).
- (189) ASTM D6667-04, Standard Test Method for Determination of Total Volatile Sulfur in Gaseous Hydrocarbons and Liquefied Petroleum Gases by Ultraviolet Fluorescence, IBR approved for § 60.4415(a).
- (190) ASTM D6751-11b, Standard Specification for Biodiesel Fuel Blend Stock (B100) for Middle Distillate Fuels, including Appendices X1 through X3, (Approved July 15, 2011), IBR approved for §§ 60.41b, 60.41c, and 60.5580.
- (191) ASTM D6784-02, Standard Test Method for Elemental, Oxidized, Particle-Bound and Total Mercury in Flue Gas Generated from Coal-Fired Stationary Sources (Ontario Hydro Method), IBR approved for § 60.56c(b) and appendix B to part 60: Performance Specification 12A, Section 8.6.2.
- (192) ASTM D6784-02 (Reapproved 2008) Standard Test Method for Elemental, Oxidized, Particle-Bound and Total Mercury in Flue Gas Generated from Coal-Fired Stationary Sources (Ontario Hydro Method), (Approved April 1, 2008), IBR approved for §§ 60.2165(j) and 60.2730(j), tables 5, 6 and 8 to subpart CCCC, and tables 2, 6, 7, and 9 to subpart DDDD, §§ 60.4900(b), 60.5220(b), tables 1 and 2 to subpart LLLL, and tables 2 and 3 to subpart MMMM.
- (193) ASTM D6911-15, Standard Guide for Packaging and Shipping Environmental Samples for Laboratory Analysis, approved January 15, 2015, IBR approved for appendix A-8: Method 30B.
- (194) ASTM D7039-15a, Standard Test Method for Sulfur in Gasoline, Diesel Fuel, Jet Fuel, Kerosine, Boideisel, Biodiesel Blends, and Gasoline-Ethanol Blends by Monochromatic Wavelength Dispersive X-ray Fluorescence Spectrometry, (Approved July 1, 2015); IBR approved for § 60.4415(a).
- (195) ASTM D7467-10, Standard Specification for Diesel Fuel Oil, Biodiesel Blend (B6 to B20), including Appendices X1 through X3, (Approved August 1, 2010), IBR approved for §§ 60.41b, 60.41c, and 60.5580.
- (196) ASTM D7520-16, Standard Test Method for Determining the Opacity of a Plume in the Outdoor Ambient Atmosphere, approved April 1, 2016; IBR approved for § 60.374a(d).
- (197) ASTM E168-67, General Techniques of Infrared Quantitative Analysis, IBR approved for §§ 60.485a(d), 60.593(b), 60.593a(b), and 60.632(f).

- (198) ASTM E168-77, General Techniques of Infrared Quantitative Analysis, IBR approved for §§ 60.485a(d), 60.593(b), 60.593a(b), and 60.632(f).
- (199) ASTM E168-92, General Techniques of Infrared Quantitative Analysis, IBR approved for §§ 60.485a(d), 60.593(b), 60.593a(b), 60.632(f), 60.5400, 60.5400a(f).
- (200) ASTM E169-63, General Techniques of Ultraviolet Quantitative Analysis, IBR approved for §§ 60.485a(d), 60.593(b), 60.593a(b), and 60.632(f) .
- (201) ASTM E169-77, General Techniques of Ultraviolet Quantitative Analysis, IBR approved for §§ 60.485a(d), 60.593(b), and 60.593a(b), 60.632(f).
- (202) ASTM E169-93, General Techniques of Ultraviolet Quantitative Analysis, (Approved May 15, 1993), IBR approved for §§ 60.485a(d), 60.593(b), 60.593a(b), 60.632(f), 60.5400(f), and 60.5400a(f).
- (203) ASTM E260-73, General Gas Chromatography Procedures, IBR approved for §§ 60.485a(d), 60.593(b), 60.593a(b), and 60.632(f).
- (204) ASTM E260-91, General Gas Chromatography Procedures, (IBR approved for §§ 60.485a(d), 60.593(b), 60.593a(b), and 60.632(f).
- (205) ASTM E260-96, General Gas Chromatography Procedures, (Approved April 10, 1996), IBR approved for §§ 60.485a(d), 60.593(b), 60.593a(b), 60.632(f), 60.5400(f), 60.5400a(f) 60.5406(b), and 60.5406a(b)(3).
- (206) ASTM E617-13, Standard Specification for Laboratory Weights and Precision Mass Standards, approved May 1, 2013, IBR approved for appendix A-3: Methods 4, 5, 5H, 5I, and appendix A-8: Method 29.
- (207) ASTM E871-82 (Reapproved 2013), Standard Test Method for Moisture Analysis of Particulate Wood Fuels, (Approved August 15, 2013), IBR approved for appendix A-8: method 28R.
- (208) ASTM E1584-11, Standard Test Method for Assay of Nitric Acid, (Approved August 1, 2011), IBR approved for § 60.73a(c).
- (209) ASTM E2515-11, Standard Test Method for Determination of Particulate Matter Emissions Collected by a Dilution Tunnel, (Approved November 1, 2011), IBR approved for § 60.534 and § 60.5476.
- (210) ASTM E2618-13 Standard Test Method for Measurement of Particulate Matter Emissions and Heating Efficiency of Outdoor Solid Fuel-Fired Hydronic Heating Appliances, (Approved September 1, 2013), IBR approved for § 60.5476.
- (211) ASTM E2779-10, Standard Test Method for Determining Particulate Matter Emissions from Pellet Heaters, (Approved October 1, 2010), IBR approved for § 60.534.
- (212) ASTM E2780-10, Standard Test Method for Determining Particulate Matter Emissions from Wood Heaters, (Approved October 1, 2010), IBR approved for appendix A: method 28R.
- (213) ASTM UOP539-97, Refinery Gas Analysis by Gas Chromatography, (Copyright 1997), IBR approved for § 60.107a(d).

(i) Association of Official Analytical Chemists, 1111 North 19th Street, Suite 210, Arlington, VA 22209.

(1) AOAC Method 9, Official Methods of Analysis of the Association of Official Analytical Chemists (AOAC), 11th edition, 1970, pp. 11-12, IBR approved for §§ 60.204(b), 60.214(b), 60.224(b), and 60.234(b).

(2) [Reserved]

(j) U.S. Environmental Protection Agency, 1200 Pennsylvania Avenue NW., Washington, DC 20460, (202) 272-0167, <http://www.epa.gov>.

(1) EPA-454/R-98-015, Office of Air Quality Planning and Standards (OAQPS), Fabric Filter Bag Leak Detection Guidance, September 1997, <https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=2000D5T6.PDF>; IBR approved for §§ 60.373a(b); 60.2145(r); 60.2710(r); 60.4905(b); 60.5225(b).

(2) EPA-600/R-12/531, EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards, May 2012, IBR approved for §§ 60.5413(d) and 60.5413a(d).

(3) SW-846-6010D, Inductively Coupled Plasma-Optical Emission Spectrometry, Revision 5, July 2018, in EPA Publication No. SW-846, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, Third Edition, IBR approved for appendix A-5 to part 60: Method 12.

(4) SW-846-6020B, Inductively Coupled Plasma-Mass Spectrometry, Revision 2, July 2014, in EPA Publication No. SW-846, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, Third Edition, IBR approved for appendix A-5 to part 60: Method 12.

(k) GPA Midstream Association (formerly known as Gas Processors Association), Sixty Sixty American Plaza, Suite 700, Tulsa, OK 74135.

Note 1 to paragraph (k):

Material in this paragraph that is no longer available from GPA may be available through the reseller HIS Markit, 15 Inverness Way East, P.O. Box 1154, Englewood, CO 80150-1154, <https://global.ihs.com/>. For material that is out-of-print, contact EPA's Air and Radiation Docket and Information Center, Room 3334, 1301 Constitution Ave. NW, Washington, DC 20460 or a-and-rdocket@epa.gov.

(1) GPA Midstream Standard 2140-17 (GPA 2140-17), Liquefied Petroleum Gas Specifications and Test Methods, (Revised 2017), IBR approved for § 60.4415(a).

(2) GPA Midstream Standard 2166-17 (GPA 2166-17), Obtaining Natural Gas Samples for Analysis by Gas Chromatography, (Reaffirmed 2017), IBR approved for § 60.4415(a).

(3) Gas Processors Association Standard 2172-09, Calculation of Gross Heating Value, Relative Density, Compressibility and Theoretical Hydrocarbon Liquid Content for Natural Gas Mixtures for Custody Transfer (2009), IBR approved for § 60.107a(d).

(4) GPA Standard 2174-14 (GPA 2174-14), Obtaining Liquid Hydrocarbon Samples for Analysis by Gas Chromatography, (Revised 2014), IBR approved for § 60.4415(a).

(5) GPA Standard 2261-19 (GPA 2261-19), Analysis for Natural Gas and Similar Gaseous Mixtures by Gas Chromatography, (Revised 2019), IBR approved for § 60.4415(a).

(6) Gas Processors Association Standard 2377-86, Test for Hydrogen Sulfide and Carbon Dioxide in Natural Gas Using Length of Stain Tubes, 1986 Revision, IBR approved for §§ 60.105(b), 60.107a(b), 60.334(h), 60.4360, and 60.4415(a).

(l) International Organization for Standardization (ISO) available through IHS Inc., 15 Inverness Way East, Englewood, CO 80112.

(1) ISO 8178-4: 1996(E), Reciprocating Internal Combustion Engines - Exhaust Emission Measurement - part 4: Test Cycles for Different Engine Applications, IBR approved for § 60.4241(b).

(2) ISO 10715:1997(E), Natural gas - Sampling guidelines, (First Edition, June 1, 1997), IBR approved for § 60.4415(a)

(m) International Organization for Standardization (ISO), 1, ch. de la Voie-Creuse, Case postale 56, CH-1211 Geneva 20, Switzerland, + 41 22 749 01 11, <http://www.iso.org/iso/home.htm>.

(1) ISO 2314:2009(E), Gas turbines-Acceptance tests, Third edition (December 15, 2009), IBR approved for § 60.5580.

(2) ISO 8316: Measurement of Liquid Flow in Closed Conduits - Method by Collection of the Liquid in a Volumetric Tank (1987-10-01) - First Edition, IBR approved for § 60.107a(d).

(n) This material is available for purchase from the National Technical Information Services (NTIS), 5285 Port Royal Road, Springfield, Virginia 22161. You may inspect a copy at the EPA's Air and Radiation Docket and Information Center (Docket A-91-61, Item IV-J-125), Room M-1500, 1200 Pennsylvania Ave. NW., Washington, DC 20460.

(1) OMB Bulletin No. 93-17: Revised Statistical Definitions for Metropolitan Areas. Office of Management and Budget, June 30, 1993. NTIS No. PB 93-192-664. IBR approved for § 60.31e.

(2) [Reserved]

(o) North American Electric Reliability Corporation, 1325 G Street NW., Suite 600, Washington, DC 20005-3801, <http://www.nerc.com>.

(1) North American Electric Reliability Corporation Reliability Standard EOP-002-3, Capacity and Energy Emergencies, updated November 19, 2012, IBR approved for §§ 60.4211(f) and 60.4243(d). Also available online: http://www.nerc.com/files/EOP-002-3__1.pdf.

(2) [Reserved]

(p) The following material is available for purchase from the Technical Association of the Pulp and Paper Industry (TAPPI), 15 Technology Parkway South, Suite 115, Peachtree Corners, GA 30092, Telephone (800) 332-8686, and is also available at the following Web site: <http://www.tappi.org>.

(1) TAPPI Method T 624 cm-11, (Copyright 2011), IBR approved, for §§ 60.285(d) and 60.285a(d).

(2) [Reserved]

(q) Underwriter's Laboratories, Inc. (UL), 333 Pfingsten Road, Northbrook, IL 60062.

(1) UL 103, Sixth Edition revised as of September 3, 1986, Standard for Chimneys, Factory-built, Residential Type and Building Heating Appliance, IBR approved for appendix A-8 to part 60.

(2) [Reserved]

(r) Water Pollution Control Federation (WPCF), 2626 Pennsylvania Avenue NW., Washington, DC 20037.

(1) Method 209A, Total Residue Dried at 103-105 °C, in Standard Methods for the Examination of Water and Wastewater, 15th Edition, 1980, IBR approved for § 60.683(b).

(2) [Reserved]

(s) West Coast Lumber Inspection Bureau, 6980 SW. Barnes Road, Portland, OR 97223.

(1) West Coast Lumber Standard Grading Rules No. 16, pages 5-21, 90 and 91, September 3, 1970, revised 1984, IBR approved for appendix A-8 to part 60.

(2) [Reserved]

(t) This material is available for purchase from the Canadian Standards Association (CSA), 5060 Spectrum Way, Suite 100, Mississauga, Ontario, Canada L4W 5N6, Telephone: 800-463-6727.

(1) CSA B415.1-10, Performance Testing of Solid-fuel-burning Heating Appliances, (March 2010), IBR approved for § 60.534 and § 60.5476. (The standard is also available at <http://shop.csa.ca/en/canada/fuel-burning-equipment/b4151-10/invnt/27013322010>)

(2) [Reserved]

(u) This European National (EN) standards material is available for purchase at European Committee for Standardization, Management Centre, Avenue Marnix 17, B-1000 Brussels, Belgium, Telephone: + 32 2 550 08 11.

(1) DIN EN 303-5:2012E (EN 303-5), Heating boilers - Part 5: Heating boilers for solid fuels, manually and automatically stoked, nominal heat output of up to 500 kW - Terminology, requirements, testing and marking, (October 2012), IBR approved for § 60.5476. (The standard is also available at http://www.en-standard.eu/csn-en-303-5-heating-boilers-part-5-heating-boilers-for-solid-fuels-manually-and-automatically-stoked-nominal-heat-output-of-up-to-500-kw-terminology-requirements-testing-and-marking/?gclid=CJXI2P__97MMCFdcccQodan8ATA)

(2) [Reserved]

§ 60.18 General control device and work practice requirements.

(a) **Introduction.**

(1) This section contains requirements for control devices used to comply with applicable subparts of 40 CFR parts 60 and 61. The requirements are placed here for administrative convenience and apply only to facilities covered by subparts referring to this section.

(2) This section also contains requirements for an alternative work practice used to identify leaking equipment. This alternative work practice is placed here for administrative convenience and is available to all subparts in 40 CFR parts 60, 61, 63, and 65 that require monitoring of equipment with a 40 CFR part 60, appendix A-7, Method 21 monitor.

(b) **Flares.** Paragraphs (c) through (f) apply to flares.

(c) (1) Flares shall be designed for and operated with no visible emissions as determined by the methods specified in paragraph (f), except for periods not to exceed a total of 5 minutes during any 2 consecutive hours.

(2) Flares shall be operated with a flame present at all times, as determined by the methods specified in paragraph (f).

(3) An owner/operator has the choice of adhering to either the heat content specifications in paragraph (c)(3)(ii) of this section and the maximum tip velocity specifications in paragraph (c)(4) of this section, or adhering to the requirements in paragraph (c)(3)(i) of this section.

(i) (A) Flares shall be used that have a diameter of 3 inches or greater, are nonassisted, have a hydrogen content of 8.0 percent (by volume), or greater, and are designed for and operated with an exit velocity less than 37.2 m/sec (122 ft/sec) and less than the velocity, $V_{\max}$, as determined by the following equation:

$$V_{\max} = (X_{H_2} - K_1) * K_2$$

Where:

$V_{\max}$ = Maximum permitted velocity, m/sec.

K_1 = Constant, 6.0 volume-percent hydrogen.

K_2 = Constant, 3.9(m/sec)/volume-percent hydrogen.

X_{H_2} = The volume-percent of hydrogen, on a wet basis, as calculated by using the American Society for Testing and Materials (ASTM) Method D1946-77. (Incorporated by reference as specified in § 60.17).

(B) The actual exit velocity of a flare shall be determined by the method specified in paragraph (f)(4) of this section.

(ii) Flares shall be used only with the net heating value of the gas being combusted being 11.2 MJ/scm (300 Btu/scf) or greater if the flare is steam-assisted or air-assisted; or with the net heating value of the gas being combusted being 7.45 MJ/scm (200 Btu/scf) or greater if the flare is nonassisted. The net heating value of the gas being combusted shall be determined by the methods specified in paragraph (f)(3) of this section.

(4) (i) Steam-assisted and nonassisted flares shall be designed for and operated with an exit velocity, as determined by the methods specified in paragraph (f)(4) of this section, less than 18.3 m/sec (60 ft/sec), except as provided in paragraphs (c)(4) (ii) and (iii) of this section.

(ii) Steam-assisted and nonassisted flares designed for and operated with an exit velocity, as determined by the methods specified in paragraph (f)(4), equal to or greater than 18.3 m/sec (60 ft/sec) but less than 122 m/sec (400 ft/sec) are allowed if the net heating value of the gas being combusted is greater than 37.3 MJ/scm (1,000 Btu/scf).

(iii) Steam-assisted and nonassisted flares designed for and operated with an exit velocity, as determined by the methods specified in paragraph (f)(4), less than the velocity, $V_{\max}$, as determined by the method specified in paragraph (f)(5), and less than 122 m/sec (400 ft/sec) are allowed.

(5) Air-assisted flares shall be designed and operated with an exit velocity less than the velocity, $V_{\max}$, as determined by the method specified in paragraph (f)(6).

(6) Flares used to comply with this section shall be steam-assisted, air-assisted, or nonassisted.

(d) Owners or operators of flares used to comply with the provisions of this subpart shall monitor these control devices to ensure that they are operated and maintained in conformance with their designs. Applicable subparts will provide provisions stating how owners or operators of flares shall monitor these control devices.

(e) Flares used to comply with provisions of this subpart shall be operated at all times when emissions may be vented to them.

(f) (1) Method 22 of appendix A to this part shall be used to determine the compliance of flares with the visible emission provisions of this subpart. The observation period is 2 hours and shall be used according to Method 22.

(2) The presence of a flare pilot flame shall be monitored using a thermocouple or any other equivalent device to detect the presence of a flame.

(3) The net heating value of the gas being combusted in a flare shall be calculated using the following equation:

$$H_T = K \sum_{i=1}^n C_i H_i$$

where:

H_T = Net heating value of the sample, MJ/scm; where the net enthalpy per mole of offgas is based on combustion at 25 °C and 760 mm Hg, but the standard temperature for determining the volume corresponding to one mole is 20 °C;

$$K = \text{Constant}, \frac{1}{1.740 \times 10^{-7}} \left(\frac{1}{\text{ppm}} \right) \left(\frac{\text{g mole}}{\text{scm}} \right) \left(\frac{\text{MJ}}{\text{kcal}} \right)$$

where the standard temperature for $\left(\frac{\text{g mole}}{\text{scm}} \right)$ is 20°C;

C_i = Concentration of sample component i in ppm on a wet basis, as measured for organics by Reference Method 18 and measured for hydrogen and carbon monoxide by ASTM D1946-77 or 90 (Reapproved 1994) (Incorporated by reference as specified in § 60.17); and

H_i = Net heat of combustion of sample component i , kcal/g mole at 25 °C and 760 mm Hg. The heats of combustion may be determined using ASTM D2382-76 or 88 or D4809-95 (incorporated by reference as specified in § 60.17) if published values are not available or cannot be calculated.

(4) The actual exit velocity of a flare shall be determined by dividing the volumetric flowrate (in units of standard temperature and pressure), as determined by Reference Methods 2, 2A, 2C, or 2D as appropriate; by the unobstructed (free) cross sectional area of the flare tip.

(5) The maximum permitted velocity, V_{max} , for flares complying with paragraph (c)(4)(iii) shall be determined by the following equation.

$$\text{Log}_{10}(V_{max}) = (H_T + 28.8)/31.7$$

V_{max} = Maximum permitted velocity, M/sec

28.8 = Constant

31.7 = Constant

H_T = The net heating value as determined in paragraph (f)(3).

(6) The maximum permitted velocity, V_{max} , for air-assisted flares shall be determined by the following equation.

$$V_{max} = 8.706 + 0.7084 (H_T)$$

V_{max} = Maximum permitted velocity, m/sec

8.706 = Constant

0.7084 = Constant

H_T = The net heating value as determined in paragraph (f)(3).

(g) **Alternative work practice for monitoring equipment for leaks.** Paragraphs (g), (h), and (i) of this section apply to all equipment for which the applicable subpart requires monitoring with a 40 CFR part 60, appendix A-7, Method 21 monitor, except for closed vent systems, equipment designated as leakless, and equipment identified in the applicable subpart as having no detectable emissions, as indicated by an instrument reading of less than 500 ppm above background. An owner or operator may use an optical gas imaging instrument instead of a 40 CFR part 60, appendix A-7, Method 21 monitor. Requirements in the existing subparts that are specific to the Method 21 instrument do not apply under this section. All other requirements in the applicable subpart that are not addressed in paragraphs (g), (h), and (i) of this section apply to this standard. For example, equipment specification requirements, and non-Method 21 instrument recordkeeping and reporting requirements in the applicable subpart continue to apply. The terms defined in paragraphs (g)(1) through (5) of this section have meanings that are specific to the alternative work practice standard in paragraphs (g), (h), and (i) of this section.

(1) **Applicable subpart** means the subpart in 40 CFR parts 60, 61, 63, or 65 that requires monitoring of equipment with a 40 CFR part 60, appendix A-7, Method 21 monitor.

(2) **Equipment** means pumps, valves, pressure relief valves, compressors, open-ended lines, flanges, connectors, and other equipment covered by the applicable subpart that require monitoring with a 40 CFR part 60, appendix A-7, Method 21 monitor.

(3) **Imaging** means making visible emissions that may otherwise be invisible to the naked eye.

(4) **Optical gas imaging instrument** means an instrument that makes visible emissions that may otherwise be invisible to the naked eye.

(5) **Repair** means that equipment is adjusted, or otherwise altered, in order to eliminate a leak.

(6) **Leak** means:

- (i) Any emissions imaged by the optical gas instrument;
- (ii) Indications of liquids dripping;
- (iii) Indications by a sensor that a seal or barrier fluid system has failed; or
- (iv) Screening results using a 40 CFR part 60, appendix A-7, Method 21 monitor that exceed the leak definition in the applicable subpart to which the equipment is subject.

(h) The alternative work practice standard for monitoring equipment for leaks is available to all subparts in 40 CFR parts 60, 61, 63, and 65 that require monitoring of equipment with a 40 CFR part 60, appendix A-7, Method 21 monitor.

(1) An owner or operator of an affected source subject to CFR parts 60, 61, 63, or 65 can choose to comply with the alternative work practice requirements in paragraph (i) of this section instead of using the 40 CFR part 60, appendix A-7, Method 21 monitor to identify leaking equipment. The owner or operator must document the equipment, process units, and facilities for which the alternative work practice will be used to identify leaks.

(2) Any leak detected when following the leak survey procedure in paragraph (i)(3) of this section must be identified for repair as required in the applicable subpart.

(3) If the alternative work practice is used to identify leaks, re-screening after an attempted repair of leaking equipment must be conducted using either the alternative work practice or the 40 CFR part 60, appendix A-7, Method 21 monitor at the leak definition required in the applicable subpart to which the equipment is subject.

(4) The schedule for repair is as required in the applicable subpart.

(5) When this alternative work practice is used for detecting leaking equipment, choose one of the monitoring frequencies listed in Table 1 to subpart A of this part in lieu of the monitoring frequency specified for regulated equipment in the applicable subpart. Reduced monitoring frequencies for good performance are not applicable when using the alternative work practice.

(6) When this alternative work practice is used for detecting leaking equipment the following are not applicable for the equipment being monitored:

- (i) Skip period leak detection and repair;
- (ii) Quality improvement plans; or
- (iii) Complying with standards for allowable percentage of valves and pumps to leak.

(7) When the alternative work practice is used to detect leaking equipment, the regulated equipment in paragraph (h)(1)(i) of this section must also be monitored annually using a 40 CFR part 60, appendix

A-7, Method 21 monitor at the leak definition required in the applicable subpart. The owner or operator may choose the specific monitoring period (for example, first quarter) to conduct the annual monitoring. Subsequent monitoring must be conducted every 12 months from the initial period. Owners or operators must keep records of the annual Method 21 screening results, as specified in paragraph (i)(4)(vii) of this section.

(i) An owner or operator of an affected source who chooses to use the alternative work practice must comply with the requirements of paragraphs (i)(1) through (i)(5) of this section.

(1) Instrument Specifications. The optical gas imaging instrument must comply with the requirements in (i)(1)(i) and (i)(1)(ii) of this section.

(i) Provide the operator with an image of the potential leak points for each piece of equipment at both the detection sensitivity level and within the distance used in the daily instrument check described in paragraph (i)(2) of this section. The detection sensitivity level depends upon the frequency at which leak monitoring is to be performed.

(ii) Provide a date and time stamp for video records of every monitoring event.

(2) Daily Instrument Check. On a daily basis, and prior to beginning any leak monitoring work, test the optical gas imaging instrument at the mass flow rate determined in paragraph (i)(2)(i) of this section in accordance with the procedure specified in paragraphs (i)(2)(ii) through (i)(2)(iv) of this section for each camera configuration used during monitoring (for example, different lenses used), unless an alternative method to demonstrate daily instrument checks has been approved in accordance with paragraph (i)(2)(v) of this section.

(i) Calculate the mass flow rate to be used in the daily instrument check by following the procedures in paragraphs (i)(2)(i)(A) and (i)(2)(i)(B) of this section.

(A) For a specified population of equipment to be imaged by the instrument, determine the piece of equipment in contact with the lowest mass fraction of chemicals that are detectable, within the distance to be used in paragraph (i)(2)(iv)(B) of this section, at or below the standard detection sensitivity level.

(B) Multiply the standard detection sensitivity level, corresponding to the selected monitoring frequency in Table 1 of subpart A of this part, by the mass fraction of detectable chemicals from the stream identified in paragraph (i)(2)(i)(A) of this section to determine the mass flow rate to be used in the daily instrument check, using the following equation.

$$E_{dic} = (E_{sds}) \sum_{i=1}^k x_i$$

Where:

E_{dic} = Mass flow rate for the daily instrument check, grams per hour

x_i = Mass fraction of detectable chemical(s) i seen by the optical gas imaging instrument, within the distance to be used in paragraph (i)(2)(iv)(B) of this section, at or below the standard detection sensitivity level, E_{sds} .

E_{sds} = Standard detection sensitivity level from Table 1 to subpart A, grams per hour

k = Total number of detectable chemicals emitted from the leaking equipment and seen by the optical gas imaging instrument.

- (ii) Start the optical gas imaging instrument according to the manufacturer's instructions, ensuring that all appropriate settings conform to the manufacturer's instructions.
 - (iii) Use any gas chosen by the user that can be viewed by the optical gas imaging instrument and that has a purity of no less than 98 percent.
 - (iv) Establish a mass flow rate by using the following procedures:
 - (A) Provide a source of gas where it will be in the field of view of the optical gas imaging instrument.
 - (B) Set up the optical gas imaging instrument at a recorded distance from the outlet or leak orifice of the flow meter that will not be exceeded in the actual performance of the leak survey. Do not exceed the operating parameters of the flow meter.
 - (C) Open the valve on the flow meter to set a flow rate that will create a mass emission rate equal to the mass rate specified in paragraph (i)(2)(i) of this section while observing the gas flow through the optical gas imaging instrument viewfinder. When an image of the gas emission is seen through the viewfinder at the required emission rate, make a record of the reading on the flow meter.
 - (v) Repeat the procedures specified in paragraphs (i)(2)(ii) through (i)(2)(iv) of this section for each configuration of the optical gas imaging instrument used during the leak survey.
 - (vi) To use an alternative method to demonstrate daily instrument checks, apply to the Administrator for approval of the alternative under § 60.13(i).
- (3) Leak Survey Procedure. Operate the optical gas imaging instrument to image every regulated piece of equipment selected for this work practice in accordance with the instrument manufacturer's operating parameters. All emissions imaged by the optical gas imaging instrument are considered to be leaks and are subject to repair. All emissions visible to the naked eye are also considered to be leaks and are subject to repair.
- (4) Recordkeeping. You must keep the records described in paragraphs (i)(4)(i) through (i)(4)(vii) of this section:
- (i) The equipment, processes, and facilities for which the owner or operator chooses to use the alternative work practice.
 - (ii) The detection sensitivity level selected from Table 1 to subpart A of this part for the optical gas imaging instrument.
 - (iii) The analysis to determine the piece of equipment in contact with the lowest mass fraction of chemicals that are detectable, as specified in paragraph (i)(2)(i)(A) of this section.
 - (iv) The technical basis for the mass fraction of detectable chemicals used in the equation in paragraph (i)(2)(i)(B) of this section.

(v) The daily instrument check. Record the distance, per paragraph (i)(2)(iv)(B) of this section, and the flow meter reading, per paragraph (i)(2)(iv)(C) of this section, at which the leak was imaged. Keep a video record of the daily instrument check for each configuration of the optical gas imaging instrument used during the leak survey (for example, the daily instrument check must be conducted for each lens used). The video record must include a time and date stamp for each daily instrument check. The video record must be kept for 5 years.

(vi) Recordkeeping requirements in the applicable subpart. A video record must be used to document the leak survey results. The video record must include a time and date stamp for each monitoring event. A video record can be used to meet the recordkeeping requirements of the applicable subparts if each piece of regulated equipment selected for this work practice can be identified in the video record. The video record must be kept for 5 years.

(vii) The results of the annual Method 21 screening required in paragraph (h)(7) of this section. Records must be kept for all regulated equipment specified in paragraph (h)(1) of this section. Records must identify the equipment screened, the screening value measured by Method 21, the time and date of the screening, and calibration information required in the existing applicable subpart.

(5) Reporting. Submit the reports required in the applicable subpart. Submit the records of the annual Method 21 screening required in paragraph (h)(7) of this section to the Administrator via e-mail to *CCG-AWP@EPA.GOV*.

§ 60.19 General notification and reporting requirements.

(a) For the purposes of this part, time periods specified in days shall be measured in calendar days, even if the word “calendar” is absent, unless otherwise specified in an applicable requirement.

(b) For the purposes of this part, if an explicit postmark deadline is not specified in an applicable requirement for the submittal of a notification, application, report, or other written communication to the Administrator, the owner or operator shall postmark the submittal on or before the number of days specified in the applicable requirement. For example, if a notification must be submitted 15 days before a particular event is scheduled to take place, the notification shall be postmarked on or before 15 days preceding the event; likewise, if a notification must be submitted 15 days after a particular event takes place, the notification shall be delivered or postmarked on or before 15 days following the end of the event. The use of reliable non-Government mail carriers that provide indications of verifiable delivery of information required to be submitted to the Administrator, similar to the postmark provided by the U.S. Postal Service, or alternative means of delivery, including the use of electronic media, agreed to by the permitting authority, is acceptable.

(c) Notwithstanding time periods or postmark deadlines specified in this part for the submittal of information to the Administrator by an owner or operator, or the review of such information by the Administrator, such time periods or deadlines may be changed by mutual agreement between the owner or operator and the Administrator. Procedures governing the implementation of this provision are specified in paragraph (f) of this section.

(d) If an owner or operator of an affected facility in a State with delegated authority is required to submit periodic reports under this part to the State, and if the State has an established timeline for the submission of periodic reports that is consistent with the reporting frequency(ies) specified for such

facility under this part, the owner or operator may change the dates by which periodic reports under this part shall be submitted (without changing the frequency of reporting) to be consistent with the State's schedule by mutual agreement between the owner or operator and the State. The allowance in the previous sentence applies in each State beginning 1 year after the affected facility is required to be in compliance with the applicable subpart in this part. Procedures governing the implementation of this provision are specified in paragraph (f) of this section.

(e) If an owner or operator supervises one or more stationary sources affected by standards set under this part and standards set under part 61, part 63, or both such parts of this chapter, he/she may arrange by mutual agreement between the owner or operator and the Administrator (or the State with an approved permit program) a common schedule on which periodic reports required by each applicable standard shall be submitted throughout the year. The allowance in the previous sentence applies in each State beginning 1 year after the stationary source is required to be in compliance with the applicable subpart in this part, or 1 year after the stationary source is required to be in compliance with the applicable 40 CFR part 61 or part 63 of this chapter standard, whichever is latest. Procedures governing the implementation of this provision are specified in paragraph (f) of this section.

(f) (1) (i) Until an adjustment of a time period or postmark deadline has been approved by the Administrator under paragraphs (f)(2) and (f)(3) of this section, the owner or operator of an affected facility remains strictly subject to the requirements of this part.

(ii) An owner or operator shall request the adjustment provided for in paragraphs (f)(2) and (f)(3) of this section each time he or she wishes to change an applicable time period or postmark deadline specified in this part.

(2) Notwithstanding time periods or postmark deadlines specified in this part for the submittal of information to the Administrator by an owner or operator, or the review of such information by the Administrator, such time periods or deadlines may be changed by mutual agreement between the owner or operator and the Administrator. An owner or operator who wishes to request a change in a time period or postmark deadline for a particular requirement shall request the adjustment in writing as soon as practicable before the subject activity is required to take place. The owner or operator shall include in the request whatever information he or she considers useful to convince the Administrator that an adjustment is warranted.

(3) If, in the Administrator's judgment, an owner or operator's request for an adjustment to a particular time period or postmark deadline is warranted, the Administrator will approve the adjustment. The Administrator will notify the owner or operator in writing of approval or disapproval of the request for an adjustment within 15 calendar days of receiving sufficient information to evaluate the request.

(4) If the Administrator is unable to meet a specified deadline, he or she will notify the owner or operator of any significant delay and inform the owner or operator of the amended schedule.

Table 1 to Subpart A of Part 60 - Detection Sensitivity Levels (grams per hour)

Monitoring frequency per subpart ^a	Detection sensitivity level
Bi-Monthly	60

Permit Issued: [month day, year]
Permit Expires: [month day, year]

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Monitoring frequency per subpart ^a	Detection sensitivity level
Semi-Quarterly	85
Monthly	100

^a When this alternative work practice is used to identify leaking equipment, the owner or operator must choose one of the monitoring frequencies listed in this table in lieu of the monitoring frequency specified in the applicable subpart. Bi-monthly means every other month. Semi-quarterly means twice per quarter. Monthly means once per month.

Appendix D. 40 CFR Part 63, Subpart AAAA—National Emissions Standards for Hazardous Air Pollutants: Municipal Solid Waste Landfills

§ 63.1930 What is the purpose of this subpart?

This subpart establishes national emission standards for hazardous air pollutants for existing and new municipal solid waste (MSW) landfills.

(a) Before September 28, 2021, all landfills described in § 63.1935 must meet the requirements of 40 CFR part 60, subpart WWW, or an approved state or federal plan that implements 40 CFR part 60, subpart Cc, and requires timely control of bioreactors and additional reporting requirements. Landfills must also meet the startup, shutdown, and malfunction (SSM) requirements of the general provisions as specified in Table 1 to subpart AAAA of this part and must demonstrate compliance with the operating conditions by parameter monitoring results that are within the specified ranges. Specifically, landfills must meet the following requirements of this subpart that apply before September 28, 2021, as set out in: §§ 63.1955(a), 63.1955(b), 63.1965(a), 63.1965(c), 63.1975, 63.1981(a), 63.1981(b), and 63.1982, and the definitions of “Controlled landfill” and “Deviation” in § 63.1990.

(b) Beginning no later than September 27, 2021, all landfills described in § 63.1935 must meet the requirements of this subpart. A landfill may choose to meet the requirements of this subpart rather than the requirements identified in § 63.1930(a) at any time before September 27, 2021. The requirements of this subpart apply at all times, including during periods of SSM, and the SSM requirements of the General Provisions of this part do not apply.

§ 63.1935 Am I subject to this subpart?

You are subject to this subpart if you meet the criteria in paragraph (a) or (b) of this section.

(a) You are subject to this subpart if you own or operate an MSW landfill that has accepted waste since November 8, 1987, or has additional capacity for waste deposition and meets any one of the three criteria in paragraphs (a)(1) through (3) of this section:

(1) Your MSW landfill is a major source as defined in § 63.2 of subpart A.

(2) Your MSW landfill is collocated with a major source as defined in § 63.2 of subpart A.

(3) Your MSW landfill is an area source landfill that has a design capacity equal to or greater than 2.5 million megagrams (Mg) and 2.5 million cubic meters (m³) and has estimated uncontrolled emissions equal to or greater than 50 megagrams per year (Mg/yr) NMOC as calculated according to § 63.1959.

(b) You are subject to this subpart if you own or operate an MSW landfill that has accepted waste since November 8, 1987, or has additional capacity for waste deposition, that includes a bioreactor, as defined in § 63.1990, and that meets any one of the criteria in paragraphs (b)(1) through (3) of this section:

(1) Your MSW landfill is a major source as defined in § 63.2 of subpart A.

(2) Your MSW landfill is collocated with a major source as defined in § 63.2 of subpart A.

(3) Your MSW landfill is an area source landfill that has a design capacity equal to or greater than 2.5 million Mg and 2.5 million m³ and that is not permanently closed as of January 16, 2003.

§ 63.1940 What is the affected source of this subpart?

(a) An affected source of this subpart is an MSW landfill, as defined in § 63.1990, that meets the criteria in § 63.1935(a) or (b). The affected source includes the entire disposal facility in a contiguous geographic space where household waste is placed in or on land, including any portion of the MSW landfill operated as a bioreactor.

(b) A new affected source of this subpart is an affected source that commenced construction or reconstruction after November 7, 2000. An affected source is reconstructed if it meets the definition of reconstruction in § 63.2 of subpart A.

(c) An affected source of this subpart is existing if it is not new.

§ 63.1945 When do I have to comply with this subpart?

(a) If your landfill is a new affected source, you must comply with this subpart by January 16, 2003, or at the time you begin operating, whichever is later.

(b) If your landfill is an existing affected source, you must comply with this subpart by January 16, 2004.

§ 63.1947 When do I have to comply with this subpart if I own or operate a bioreactor?

You must comply with this subpart by the dates specified in § 63.1945(a) or (b). If you own or operate a bioreactor located at a landfill that is not permanently closed as of January 16, 2003, and has a design capacity equal to or greater than 2.5 million Mg and 2.5 million m³, then you must install and operate a collection and control system that meets the criteria in § 63.1959(b)(2) according to the schedule specified in paragraph (a), (b), or (c) of this section.

(a) If your bioreactor is at a new affected source, then you must meet the requirements in paragraphs (a)(1) and (2) of this section:

- (1) Install the gas collection and control system for the bioreactor before initiating liquids addition.
- (2) Begin operating the gas collection and control system within 180 days after initiating liquids addition or within 180 days after achieving a moisture content of 40 percent by weight, whichever is later. If you choose to begin gas collection and control system operation 180 days after achieving a 40-percent moisture content instead of 180 days after liquids addition, use the procedures in §§ 63.1982(c) and (d) to determine when the bioreactor moisture content reaches 40 percent.

(b) If your bioreactor is at an existing affected source, then you must install and begin operating the gas collection and control system for the bioreactor by January 17, 2006, or by the date your bioreactor is required to install a gas collection and control system under 40 CFR part 60, subpart WWW; a federal plan; or an EPA-approved and effective state plan or tribal plan that applies to your landfill, whichever is earlier.

(c) If your bioreactor is at an existing affected source and you do not initiate liquids addition to your bioreactor until later than January 17, 2006, then you must meet the requirements in paragraphs (c)(1) and (2) of this section:

- (1) Install the gas collection and control system for the bioreactor before initiating liquids addition.
- (2) Begin operating the gas collection and control system within 180 days after initiating liquids addition or within 180 days after achieving a moisture content of 40 percent by weight, whichever is later. If you choose to begin gas collection and control system operation 180 days after achieving a 40-

percent moisture content instead of 180 days after liquids addition, use the procedures in §§ 63.1982(c) and (d) to determine when the bioreactor moisture content reaches 40 percent.

§ 63.1950 When am I no longer required to comply with this subpart?

You are no longer required to comply with the requirements of this subpart when your landfill meets the collection and control system removal criteria in § 63.1957(b).

§ 63.1952 When am I no longer required to comply with the requirements of this subpart if I own or operate a bioreactor?

If you own or operate a landfill that includes a bioreactor, you are no longer required to comply with the requirements of this subpart for the bioreactor provided you meet the conditions of either paragraph (a) or (b) of this section.

- (a) Your affected source meets the control system removal criteria in § 63.1950 or the bioreactor meets the criteria for a nonproductive area of the landfill in § 63.1962(a)(3)(ii).
- (b) The bioreactor portion of the landfill is a closed landfill as defined in § 63.1990, you have permanently ceased adding liquids to the bioreactor, and you have not added liquids to the bioreactor for at least 1 year. A closure report for the bioreactor must be submitted to the Administrator as provided in § 63.1981(g).

Standards

§ 63.1955 What requirements must I meet?

- (a) Before September 28, 2021, if alternatives to the operational standards, test methods, procedures, compliance measures, monitoring, recordkeeping, or reporting provisions have already been approved under 40 CFR part 60, subpart WWW; subpart XXX; a federal plan; or an EPA-approved and effective state or tribal plan, these alternatives can be used to comply with this subpart, except that all affected sources must comply with the SSM requirements in subpart A of this part as specified in Table 1 of this subpart and all affected sources must submit compliance reports every 6 months as specified in § 63.1981(h), including information on all deviations that occurred during the 6-month reporting period. Deviations for continuous emission monitors or numerical continuous parameter monitors must be determined using a 3-hour monitoring block average. Beginning no later than September 28, 2021, the collection and control system design plan may include for approval collection and control systems that include any alternatives to the operational standards, test methods, procedures, compliance measures, monitoring, recordkeeping, or reporting provisions, as provided in § 63.1981(d)(2).
- (b) If you own or operate a bioreactor that is located at an MSW landfill that is not permanently closed and has a design capacity equal to or greater than 2.5 million Mg and 2.5 million m³, then you must meet the requirements of this subpart, including requirements in paragraphs (b)(1) and (2) of this section.
 - (1) You must comply with this subpart starting on the date you are required to install the gas collection and control system.
 - (2) You must extend the collection and control system into each new cell or area of the bioreactor prior to initiating liquids addition in that area.

(c) At all times, beginning no later than September 27, 2021, the owner or operator must operate and maintain any affected source, including associated air pollution control equipment and monitoring equipment, in a manner consistent with safety and good air pollution control practices for minimizing emissions. The general duty to minimize emissions does not require the owner or operator to make any further efforts to reduce emissions if the requirements of this subpart have been achieved. Determination of whether a source is operating in compliance with operation and maintenance requirements will be based on information available to the Administrator which may include, but is not limited to, monitoring results, review of operation and maintenance procedures, review of operation and maintenance records, and inspection of the source.

§ 63.1957 Requirements for gas collection and control system installation and removal.

(a) *Operation.* Operate the collection and control device in accordance with the provisions of §§ 63.1958, 63.1960, and 63.1961.

(b) *Removal criteria.* The collection and control system may be capped, removed, or decommissioned if the following criteria are met:

- (1) The landfill is a closed landfill (as defined in § 63.1990). A closure report must be submitted to the Administrator as provided in § 63.1981(f);
- (2) The gas collection and control system has been in operation a minimum of 15 years or the landfill owner or operator demonstrates that the gas collection and control system will be unable to operate for 15 years due to declining gas flow; and
- (3) Following the procedures specified in § 63.1959(c), the calculated NMOC emission rate at the landfill is less than 50 Mg/yr on three successive test dates. The test dates must be no less than 90 days apart, and no more than 180 days apart.

§ 63.1958 Operational standards for collection and control systems.

Each owner or operator of an MSW landfill with a gas collection and control system used to comply with the provisions of § 63.1957 must:

- (a) Operate the collection system such that gas is collected from each area, cell, or group of cells in the MSW landfill in which solid waste has been in place for:
 - (1) 5 years or more if active; or
 - (2) 2 years or more if closed or at final grade;
- (b) Operate the collection system with negative pressure at each wellhead except under the following conditions:
 - (1) A fire or increased well temperature. The owner or operator must record instances when positive pressure occurs in efforts to avoid a fire. These records must be submitted with the semi-annual reports as provided in § 63.1981(h);
 - (2) Use of a geomembrane or synthetic cover. The owner or operator must develop acceptable pressure limits in the design plan;

(3) A decommissioned well. A well may experience a static positive pressure after shut down to accommodate for declining flows. All design changes must be approved by the Administrator as specified in § 63.1981(d)(2);

(c) Operate each interior wellhead in the collection system as specified in 40 CFR 60.753(c), until the landfill owner or operator elects to meet the operational standard for temperature in paragraph (c)(1) of this section.

(1) Beginning no later than September 27, 2021, operate each interior wellhead in the collection system with a landfill gas temperature less than 62.8 degrees Celsius (145 degrees Fahrenheit).

(2) The owner or operator may establish a higher operating temperature value at a particular well. A higher operating value demonstration must be submitted to the Administrator for approval and must include supporting data demonstrating that the elevated parameter neither causes fires nor significantly inhibits anaerobic decomposition by killing methanogens. The demonstration must satisfy both criteria in order to be approved (*i.e.*, neither causing fires nor killing methanogens is acceptable).

(d) (1) Operate the collection system so that the methane concentration is less than 500 parts per million (ppm) above background at the surface of the landfill. To determine if this level is exceeded, the owner or operator must conduct surface testing around the perimeter of the collection area and along a pattern that traverses the landfill at no more than 30-meter intervals and where visual observations indicate elevated concentrations of landfill gas, such as distressed vegetation and cracks or seeps in the cover. The owner or operator may establish an alternative traversing pattern that ensures equivalent coverage. A surface monitoring design plan must be developed that includes a topographical map with the monitoring route and the rationale for any site-specific deviations from the 30-meter intervals. Areas with steep slopes or other dangerous areas may be excluded from the surface testing.

(2) Beginning no later than September 27, 2021, the owner or operator must:

(i) Conduct surface testing using an organic vapor analyzer, flame ionization detector, or other portable monitor meeting the specifications provided in § 63.1960(d).

(ii) Conduct surface testing at all cover penetrations. Thus, the owner or operator must monitor any cover penetrations that are within an area of the landfill where waste has been placed and a gas collection system is required.

(iii) Determine the latitude and longitude coordinates of each exceedance using an instrument with an accuracy of at least 4 meters. The coordinates must be in decimal degrees with at least five decimal places.

(e) Operate the system as specified in § 60.753(e) of this chapter, except:

(1) Beginning no later than September 27, 2021, operate the system in accordance to § 63.1955(c) such that all collected gases are vented to a control system designed and operated in compliance with § 63.1959(b)(2)(iii). In the event the collection or control system is not operating:

(i) The gas mover system must be shut down and all valves in the collection and control system contributing to venting of the gas to the atmosphere must be closed within 1 hour of the collection or control system not operating; and

(ii) Efforts to repair the collection or control system must be initiated and completed in a manner such that downtime is kept to a minimum, and the collection and control system must be returned to operation.

(2) [Reserved]

(f) Operate the control system at all times when the collected gas is routed to the system.

(g) If monitoring demonstrates that the operational requirements in paragraph (b), (c), or (d) of this section are not met, corrective action must be taken as specified in § 63.1960(a)(3) and (5) or (c). If corrective actions are taken as specified in § 63.1960, the monitored exceedance is not a deviation of the operational requirements in this section.

§ 63.1959 NMOC calculation procedures.

(a) Calculate the NMOC emission rate using the procedures specified in § 60.754(a) of this chapter, except:

(1) *NMOC emission rate*. Beginning no later than September 27, 2021 the landfill owner or operator must calculate the NMOC emission rate using either Equation 1 provided in paragraph (a)(1)(i) of this section or Equation 2 provided in paragraph (a)(1)(ii) of this section. Both Equation 1 and Equation 2 may be used if the actual year-to-year solid waste acceptance rate is known, as specified in paragraph (a)(1)(i) of this section, for part of the life of the landfill and the actual year-to-year solid waste acceptance rate is unknown, as specified in paragraph (a)(1)(ii) of this section, for part of the life of the landfill. The values to be used in both Equation 1 and Equation 2 are 0.05 per year for k , 170 cubic meters per megagram (m^3/Mg) for L_0 , and 4,000 parts per million by volume (ppmv) as hexane for the C_{NMOC} . For landfills located in geographical areas with a 30-year annual average precipitation of less than 25 inches, as measured at the nearest representative official meteorologic site, the k value to be used is 0.02 per year.

(i) (A) Equation 1 must be used if the actual year-to-year solid waste acceptance rate is known.

$$M_{\text{NMOC}} = \sum_{i=1}^n 2 k L_0 M_i (e^{-kt_i}) (C_{\text{NMOC}}) (3.6 \times 10^{-9}) \text{ (Eq. 1)}$$

Where:

M_{NMOC} = Total NMOC emission rate from the landfill, Mg/yr.

k = Methane generation rate constant, year⁻¹.

L_0 = Methane generation potential, m^3/Mg solid waste.

M_i = Mass of solid waste in the i th section, Mg.

t_i = Age of the i th section, years.

C_{NMOC} = Concentration of NMOC, ppmv as hexane.

3.6×10^{-9} = Conversion factor.

(B) The mass of nondegradable solid waste may be subtracted from the total mass of solid waste in a particular section of the landfill when calculating the value for M_i if documentation of the nature and amount of such wastes is maintained.

(ii) (A) Equation 2 must be used if the actual year-to-year solid waste acceptance rate is unknown.

$$M_{\text{NMOC}} = 2L_o R (e^{-kc} - e^{-kt}) C_{\text{NMOC}} (3.6 \times 10^{-9}) \text{ (Eq. 2)}$$

Where:

M_{NMOC} = Mass emission rate of NMOC, Mg/yr.

L_o = Methane generation potential, m^3/Mg solid waste.

R = Average annual acceptance rate, Mg/yr.

k = Methane generation rate constant, year^{-1} .

t = Age of landfill, years.

C_{NMOC} = Concentration of NMOC, ppmv as hexane.

c = Time since closure, years; for active landfill $c=0$ and $e^{-kc} = 1$.

3.6×10^{-9} = Conversion factor.

(B) The mass of nondegradable solid waste may be subtracted from the total mass of solid waste in a particular section of the landfill when calculating the value of R , if documentation of the nature and amount of such wastes is maintained.

(2) *Tier 1.* The owner or operator must compare the calculated NMOC mass emission rate to the standard of 50 Mg/yr.

(i) If the NMOC emission rate calculated in paragraph (a)(1) of this section is less than 50 Mg/yr, then the landfill owner or operator must submit an NMOC emission rate report according to § 63.1981(c) and must recalculate the NMOC mass emission rate annually as required under paragraph (b) of this section.

(ii) If the calculated NMOC emission rate as calculated in paragraph (a)(1) of this section is equal to or greater than 50 Mg/yr, then the landfill owner must either:

(A) Submit a gas collection and control system design plan within 1 year as specified in § 63.1981(d) and install and operate a gas collection and control system within 30 months of the first annual report in which the NMOC emission rate equals or exceeds 50 Mg/yr, according to paragraphs (b)(2)(ii) and (iii) of this section;

(B) Determine a site-specific NMOC concentration and recalculate the NMOC emission rate using the Tier 2 procedures provided in paragraph (a)(3) of this section; or

(C) Determine a site-specific methane generation rate constant and recalculate the NMOC emission rate using the Tier 3 procedures provided in paragraph (a)(4) of this section.

(3) *Tier 2.* The landfill owner or operator must determine the site-specific NMOC concentration using the following sampling procedure. The landfill owner or operator must install at least two sample probes per hectare, evenly distributed over the landfill surface that has retained waste for at least 2 years. If the landfill is larger than 25 hectares in area, only 50 samples are required. The probes should be evenly distributed across the sample area. The sample probes should be located to avoid known areas of nondegradable solid waste. The owner or operator must collect and analyze one sample of landfill gas from each probe to determine the NMOC concentration using EPA Method 25 or 25C of appendix A-7 to part 60. Taking composite samples from different probes into a single cylinder is allowed; however, equal sample volumes must be taken from each probe. For each composite, the sampling rate, collection times, beginning and ending cylinder vacuums, or

alternative volume measurements must be recorded to verify that composite volumes are equal. Composite sample volumes should not be less than one liter unless evidence can be provided to substantiate the accuracy of smaller volumes. Terminate compositing before the cylinder approaches ambient pressure where measurement accuracy diminishes. If more than the required number of samples are taken, all samples must be used in the analysis. The landfill owner or operator must divide the NMOC concentration from EPA Method 25 or 25C of appendix A–7 to part 60 by 6 to convert from C_{NMOC} as carbon to C_{NMOC} as hexane. If the landfill has an active or passive gas removal system in place, EPA Method 25 or 25C samples may be collected from these systems instead of surface probes provided the removal system can be shown to provide sampling as representative as the two sampling probe per hectare requirement. For active collection systems, samples may be collected from the common header pipe. The sample location on the common header pipe must be before any gas moving, condensate removal, or treatment system equipment. For active collection systems, a minimum of three samples must be collected from the header pipe.

- (i) Within 60 days after the date of completing each performance test (as defined in § 63.7 of subpart A), the owner or operator must submit the results according to § 63.1981(l)(1).
- (ii) The landfill owner or operator must recalculate the NMOC mass emission rate using Equation 1 or Equation 2 provided in paragraph (a)(1)(i) or (ii) of this section and use the average site-specific NMOC concentration from the collected samples instead of the default value provided in paragraph (a)(1) of this section.
- (iii) If the resulting NMOC mass emission rate is less than 50 Mg/yr, then the owner or operator must submit a periodic estimate of NMOC emissions in an NMOC emission rate report according to § 63.1981(c) and must recalculate the NMOC mass emission rate annually as required under paragraph (b) of this section. The site-specific NMOC concentration must be retested every 5 years using the methods specified in this section.
- (iv) If the NMOC mass emission rate as calculated using the Tier 2 site-specific NMOC concentration is equal to or greater than 50 Mg/yr, the landfill owner or operator must either:
 - (A) Submit a gas collection and control system design plan within 1 year as specified in § 63.1981(d) and install and operate a gas collection and control system within 30 months according to paragraphs (b)(2)(ii) and (iii) of this section; or
 - (B) Determine a site-specific methane generation rate constant and recalculate the NMOC emission rate using the site-specific methane generation rate using the Tier 3 procedures specified in paragraph (a)(4) of this section.
- (4) *Tier 3.* The site-specific methane generation rate constant must be determined using the procedures provided in EPA Method 2E of appendix A–1 to part 60 of this chapter. The landfill owner or operator must estimate the NMOC mass emission rate using Equation 1 or Equation 2 in paragraph (a)(1)(i) or (ii) of this section and using a site-specific methane generation rate constant, and the site-specific NMOC concentration as determined in paragraph (a)(3) of this section instead of the default values provided in paragraph (a)(1) of this section. The landfill owner or operator must compare the resulting NMOC mass emission rate to the standard of 50 Mg/yr.
- (i) If the NMOC mass emission rate as calculated using the Tier 2 site-specific NMOC concentration and Tier 3 site-specific methane generation rate is equal to or greater than 50 Mg/yr, the owner or operator must:

(A) Submit a gas collection and control system design plan within 1 year as specified in § 63.1981(d) and install and operate a gas collection and control system within 30 months of the first annual report in which the NMOC emission rate equals or exceeds 50 Mg/yr, according to paragraphs (b)(2)(ii) and (iii) of this section.

(B) [Reserved]

(ii) If the NMOC mass emission rate is less than 50 Mg/yr, then the owner or operator must recalculate the NMOC mass emission rate annually using Equation 1 or Equation 2 in paragraph (a)(1) of this section and using the site-specific Tier 2 NMOC concentration and Tier 3 methane generation rate constant and submit a periodic NMOC emission rate report as provided in § 63.1981(c). The calculation of the methane generation rate constant is performed only once, and the value obtained from this test must be used in all subsequent annual NMOC emission rate calculations.

(5) *Other methods.* The owner or operator may use other methods to determine the NMOC concentration or a site-specific methane generation rate constant as an alternative to the methods required in paragraphs (a)(3) and (4) of this section if the method has been approved by the Administrator.

(b) Each owner or operator of an affected source having a design capacity equal to or greater than 2.5 million Mg and 2.5 million m³ must either comply with paragraph (b)(2) of this section or calculate an NMOC emission rate for the landfill using the procedures specified in paragraph (a) of this section. The NMOC emission rate must be recalculated annually, except as provided in § 63.1981(c)(1)(ii)(A).

(1) If the calculated NMOC emission rate is less than 50 Mg/yr, the owner or operator must:

(i) Submit an annual NMOC emission rate emission report to the Administrator, except as provided for in § 63.1981(c)(1)(ii); and

(ii) Recalculate the NMOC emission rate annually using the procedures specified in paragraph (a)(1) of this section until such time as the calculated NMOC emission rate is equal to or greater than 50 Mg/yr, or the landfill is closed.

(A) If the calculated NMOC emission rate, upon initial calculation or annual recalculation required in paragraph (b) of this section, is equal to or greater than 50 Mg/yr, the owner or operator must either: comply with paragraph (b)(2) of this section or calculate NMOC emissions using the next higher tier in paragraph (a) of this section.

(B) If the landfill is permanently closed, a closure report must be submitted to the Administrator as provided for in § 63.1981(f).

(2) If the calculated NMOC emission rate is equal to or greater than 50 Mg/yr using Tier 1, 2, or 3 procedures, the owner or operator must either:

(i) Submit a collection and control system design plan prepared by a professional engineer to the Administrator within 1 year as specified in § 63.1981(d) or calculate NMOC emissions using the next higher tier in paragraph (a) of this section. The collection and control system must meet the requirements in paragraphs (b)(2)(ii) and (iii) of this section.

(ii) Collection system. Install and start up a collection and control system that captures the gas generated within the landfill as required by paragraphs (b)(2)(ii)(B) or (C) and (b)(2)(iii) of this section within 30 months after:

(A) The first annual report in which the NMOC emission rate equals or exceeds 50 Mg/yr, unless Tier 2 or Tier 3 sampling demonstrates that the NMOC emission rate is less than 50 Mg.

(B) An active collection system must:

(1) Be designed to handle the maximum expected gas flow rate from the entire area of the landfill that warrants control over the intended use period of the gas control system equipment;

(2) Collect gas from each area, cell, or group of cells in the landfill in which the initial solid waste has been placed for a period of 5 years or more if active; or 2 years or more if closed or at final grade;

(3) Collect gas at a sufficient extraction rate; and

(4) Be designed to minimize off-site migration of subsurface gas.

(C) A passive collection system must:

(1) Comply with the provisions specified in paragraphs (b)(2)(ii)(B)(1), (2), and (3) of this section; and

(2) Be installed with liners on the bottom and all sides in all areas in which gas is to be collected. The liners must be installed as required under § 258.40 of this chapter.

(iii) Control system. Route all the collected gas to a control system that complies with the requirements in either paragraph (b)(2)(iii)(A), (B), or (C) of this section.

(A) A non-enclosed flare designed and operated in accordance with the parameters established in § 63.11(b) except as noted in paragraph (e) of this section; or

(B) A control system designed and operated to reduce NMOC by 98 weight-percent, or, when an enclosed combustion device is used for control, to either reduce NMOC by 98 weight-percent or reduce the outlet NMOC concentration to less than 20 ppmv, dry basis as hexane at 3-percent oxygen. The reduction efficiency or ppmv must be established by an initial performance test to be completed no later than 180 days after the initial startup of the approved control system using the test methods specified in paragraph (e) of this section. The performance test is not required for boilers and process heaters with design heat input capacities equal to or greater than 44 megawatts that burn landfill gas for compliance with this subpart.

(1) If a boiler or process heater is used as the control device, the landfill gas stream must be introduced into the flame zone.

(2) The control device must be operated within the parameter ranges established during the initial or most recent performance test. The operating parameters to be monitored are specified in §§ 63.1961(b) through (e);

(C) A treatment system that processes the collected gas for subsequent sale or beneficial use such as fuel for combustion, production of vehicle fuel, production of high-British thermal unit (Btu) gas for pipeline injection, or use as a raw material in a chemical manufacturing process. Venting of treated landfill gas to the ambient air is not allowed. If the treated landfill gas cannot be routed for subsequent sale or beneficial use, then the treated landfill gas must be controlled according to either paragraph (b)(2)(iii)(A) or (B) of this section.

(D) All emissions from any atmospheric vent from the gas treatment system are subject to the requirements of paragraph (b)(2)(iii)(A) or (B) of this section. For purposes of this subpart, atmospheric vents located on the condensate storage tank are not part of the treatment system and are exempt from the requirements of paragraph (b)(2)(iii)(A) or (B) of this section.

(c) After the installation and startup of a collection and control system in compliance with this subpart, the owner or operator must calculate the NMOC emission rate for purposes of determining when the system can be capped, removed, or decommissioned as provided in § 63.1957(b)(3), using Equation 3:

$$M_{NMOC} = 1.89 \times 10^{-3} Q_{LFG} C_{NMOC} \text{ (Eq. 3)}$$

Where:

M_{NMOC} = Mass emission rate of NMOC, Mg/yr.

Q_{LFG} = Flow rate of landfill gas, m³ per minute.

C_{NMOC} = Average NMOC concentration, ppmv as hexane.

1.89×10^{-3} = Conversion factor.

(1) The flow rate of landfill gas, Q_{LFG} , must be determined by measuring the total landfill gas flow rate at the common header pipe that leads to the control system using a gas flow measuring device calibrated according to the provisions of section 10 of EPA Method 2E of appendix A–1 of part 60.

(2) The average NMOC concentration, C_{NMOC} , must be determined by collecting and analyzing landfill gas sampled from the common header pipe before the gas moving or condensate removal equipment using the procedures in EPA Method 25 or 25C of appendix A–7 to part 60 of this chapter. The sample location on the common header pipe must be before any condensate removal or other gas refining units. The landfill owner or operator must divide the NMOC concentration from EPA Method 25 or 25C of appendix A–7 to part 60 by 6 to convert from C_{NMOC} as carbon to C_{NMOC} as hexane.

(3) The owner or operator may use another method to determine landfill gas flow rate and NMOC concentration if the method has been approved by the Administrator.

(i) Within 60 days after the date of completing each performance test (as defined in § 63.7), the owner or operator must submit the results of the performance test, including any associated fuel analyses, according to § 63.1981(l)(1).

(ii) [Reserved]

(d) For the performance test required in § 63.1959(b)(2)(iii)(B), EPA Method 25 or 25C (EPA Method 25C of appendix A–7 to part 60 of this chapter may be used at the inlet only) of appendix A of this part must be used to determine compliance with the 98 weight-percent efficiency or the 20- ppmv outlet concentration level, unless another method to demonstrate compliance has been approved by the Administrator as provided by § 63.1981(d)(2). EPA Method 3, 3A, or 3C of appendix A–7 to part 60 must be used to determine oxygen for correcting the NMOC concentration as hexane to 3 percent. In cases where the outlet concentration is less than 50 ppm NMOC as carbon (8 ppm NMOC as hexane), EPA Method 25A should be used in place of EPA Method 25. EPA Method 18 may be used in conjunction with EPA Method 25A on a limited basis (compound specific, *e.g.*, methane) or EPA Method 3C may be used to determine methane. The methane as carbon should be subtracted from the EPA Method 25A total hydrocarbon value as carbon to give NMOC concentration as carbon. The landowner or operator must divide the NMOC concentration as carbon by 6 to convert from the C_{NMOC} as carbon to C_{NMOC} as hexane. Equation 4 must be used to calculate efficiency:

$$\text{Control Efficiency} = (NMOC_{in} - NMOC_{out}) / (NMOC_{in}) \quad \text{(Eq. 4)}$$

Where:

NMOC_{in} = Mass of NMOC entering control device.

NMOC_{out} = Mass of NMOC exiting control device.

(e) For the performance test required in § 63.1959(b)(2)(iii)(A), the net heating value of the combusted landfill gas as determined in § 63.11(b)(6)(ii) is calculated from the concentration of methane in the landfill gas as measured by EPA Method 3C of appendix A to part 60 of this chapter. A minimum of three 30-minute EPA Method 3C samples are determined. The measurement of other organic components, hydrogen, and carbon monoxide is not applicable. EPA Method 3C may be used to determine the landfill gas molecular weight for calculating the flare gas exit velocity under § 63.11(b)(7) of subpart A.

(1) Within 60 days after the date of completing each performance test (as defined in § 63.7), the owner or operator must submit the results of the performance tests, including any associated fuel analyses, required by § 63.1959(c) or (e) according to § 63.1981(l)(1).

(2) [Reserved]

(f) The performance tests required in §§ 63.1959(b)(2)(iii)(A) and (B), must be conducted under such conditions as the Administrator specifies to the owner or operator based on representative performance of the affected source for the period being tested. Representative conditions exclude periods of startup and shutdown unless specified by the Administrator. The owner or operator may not conduct performance tests during periods of malfunction. The owner or operator must record the process information that is necessary to document operating conditions during the test and include in such record an explanation to support that such conditions represent normal operation. Upon request, the owner or operator shall make available to the Administrator such records as may be necessary to determine the conditions of performance tests.

§ 63.1960 Compliance provisions.

(a) Except as provided in § 63.1981(d)(2), the specified methods in paragraphs (a)(1) through (5) of this section must be used to determine whether the gas collection system is in compliance with § 63.1959(b)(2)(ii).

(1) For the purposes of calculating the maximum expected gas generation flow rate from the landfill to determine compliance with § 63.1959(b)(2)(ii)(C)(1), either Equation 5 or Equation 6 must be used. The owner or operator may use another method to determine the maximum gas generation flow rate, if the method has been approved by the Administrator. The methane generation rate constant (k) and methane generation potential (L_0) kinetic factors should be those published in the most recent *Compilation of Air Pollutant Emission Factors* (AP-42) or other site-specific values demonstrated to be appropriate and approved by the Administrator. If k has been determined as specified in § 63.1959(a)(4), the value of k determined from the test must be used. A value of no more than 15 years must be used for the intended use period of the gas mover equipment. The active life of the landfill is the age of the landfill plus the estimated number of years until closure.

(i) For sites with unknown year-to-year solid waste acceptance rate:

$$Q_m = 2L_0R (e^{-kc} - e^{-kt}) \text{ (Eq. 5)}$$

Where:

Q_m = Maximum expected gas generation flow rate, m^3/yr .

L_o = Methane generation potential, m^3/Mg solid waste.

R = Average annual acceptance rate, Mg/yr .

k = Methane generation rate constant, $year^{-1}$.

t = Age of the landfill at equipment installation plus the time the owner or operator intends to use the gas mover equipment or active life of the landfill, whichever is less. If the equipment is installed after closure, t is the age of the landfill at installation, years.

c = Time since closure, years (for an active landfill $c = 0$ and $e^{-kc} = 1$).

2 = Constant.

(ii) For sites with known year-to-year solid waste acceptance rate:

$$Q_M = \sum_{i=1}^n 2kL_oM_i(e^{-kt_i}) \text{ (Eq. 6)}$$

Where:

Q_m = Maximum expected gas generation flow rate, m^3/yr .

k = Methane generation rate constant, $year^{-1}$.

L_o = Methane generation potential, m^3/Mg solid waste.

M_i = Mass of solid waste in the i th section, Mg .

t_i = Age of the i th section, years.

(iii) If a collection and control system has been installed, actual flow data may be used to project the maximum expected gas generation flow rate instead of, or in conjunction with, Equation 5 or Equation 6 in paragraphs (a)(1)(i) and (ii) of this section. If the landfill is still accepting waste, the actual measured flow data will not equal the maximum expected gas generation rate, so calculations using Equation 5 or Equation 6 in paragraph (a)(1)(i) or (ii) of this section or other methods must be used to predict the maximum expected gas generation rate over the intended period of use of the gas control system equipment.

(2) For the purposes of determining sufficient density of gas collectors for compliance with § 63.1959(b)(2)(ii)(B)(2), the owner or operator must design a system of vertical wells, horizontal collectors, or other collection devices, satisfactory to the Administrator, capable of controlling and extracting gas from all portions of the landfill sufficient to meet all operational and performance standards.

(3) For the purpose of demonstrating whether the gas collection system flow rate is sufficient to determine compliance with § 63.1959(b)(2)(ii)(B)(3), the owner or operator must measure gauge pressure in the gas collection header applied to each individual well monthly. Any attempted corrective measure must not cause exceedances of other operational or performance standards. An alternative timeline for correcting the exceedance may be submitted to the Administrator for approval. If a positive pressure exists, follow the procedures as specified in § 60.755(a)(3), except:

(i) Beginning no later than September 27, 2021, if a positive pressure exists, action must be initiated to correct the exceedance within 5 days, except for the three conditions allowed under § 63.1958(b).

(A) If negative pressure cannot be achieved without excess air infiltration within 15 days of the first measurement of positive pressure, the owner or operator must conduct a root cause analysis and correct the exceedance as soon as practicable, but no later than 60 days after positive pressure was first measured. The owner or operator must keep records according to § 63.1983(e)(3).

(B) If corrective actions cannot be fully implemented within 60 days following the positive pressure measurement for which the root cause analysis was required, the owner or operator must also conduct a corrective action analysis and develop an implementation schedule to complete the corrective action(s) as soon as practicable, but no more than 120 days following the positive pressure measurement. The owner or operator must submit the items listed in § 63.1981(h)(7) as part of the next semi-annual report. The owner or operator must keep records according to § 63.1983(e)(4).

(C) If corrective action is expected to take longer than 120 days to complete after the initial exceedance, the owner or operator must submit the root cause analysis, corrective action analysis, and corresponding implementation timeline to the Administrator, according to § 63.1981(j). The owner or operator must keep records according to § 63.1983(e)(5).

(ii) [Reserved]

(4) Where an owner or operator subject to the provisions of this subpart seeks to demonstrate compliance with the temperature and nitrogen or oxygen operational standards in introductory paragraph § 63.1958(c), for the purpose of identifying whether excess air infiltration into the landfill is occurring, the owner or operator must follow the procedures as specified in § 60.755(a)(5) of this chapter, except:

(i) Once an owner or operator subject to the provisions of this subpart seeks to demonstrate compliance with the operational standard for temperature in § 63.1958(c)(1), the owner or operator must monitor each well monthly for temperature for the purpose of identifying whether excess air infiltration exists. If a well exceeds the operating parameter for temperature as provided in § 63.1958(c)(1), action must be initiated to correct the exceedance within 5 days. Any attempted corrective measure must not cause exceedances of other operational or performance standards.

(A) If a landfill gas temperature less than or equal to 62.8 degrees Celsius (145 degrees Fahrenheit) cannot be achieved within 15 days of the first measurement of landfill gas temperature greater than 62.8 degrees Celsius (145 degrees Fahrenheit), the owner or operator must conduct a root cause analysis and correct the exceedance as soon as practicable, but no later than 60 days after a landfill gas temperature greater than 62.8 degrees Celsius (145 degrees Fahrenheit) was first measured. The owner or operator must keep records according to § 63.1983(e)(3).

(B) If corrective actions cannot be fully implemented within 60 days following the temperature measurement for which the root cause analysis was required, the owner or operator must also conduct a corrective action analysis and develop an implementation schedule to complete the corrective action(s) as soon as practicable, but no more than 120 days following the measurement of landfill gas temperature greater than 62.8 degrees Celsius (145 degrees Fahrenheit). The owner or operator must submit the items listed in § 63.1981(h)(7) as part of the next semi-annual report. The owner or operator must keep records according to § 63.1983(e)(4).

(C) If corrective action is expected to take longer than 120 days to complete after the initial exceedance, the owner or operator must submit the root cause analysis, corrective action analysis, and corresponding implementation timeline to the Administrator, according to § 63.1981(h)(7) and (j). The owner or operator must keep records according to § 63.1983(e)(5).

(D) If a landfill gas temperature measured at either the wellhead or at any point in the well is greater than or equal to 76.7 degrees Celsius (170 degrees Fahrenheit) and the carbon monoxide concentration measured, according to the procedures in § 63.1961(a)(5)(vi) is greater than or equal to 1,000 ppmv the corrective action(s) for the wellhead temperature standard (62.8 degrees Celsius or 145 degrees Fahrenheit) must be completed within 15 days.

(5) An owner or operator seeking to demonstrate compliance with § 63.1959(b)(2)(ii)(B)(4) through the use of a collection system not conforming to the specifications provided in § 63.1962 must provide information satisfactory to the Administrator as specified in § 63.1981(d)(3) demonstrating that off-site migration is being controlled.

(b) For purposes of compliance with § 63.1958(a), each owner or operator of a controlled landfill must place each well or design component as specified in the approved design plan as provided in § 63.1981(d). Each well must be installed no later than 60 days after the date on which the initial solid waste has been in place for a period of:

- (1) 5 years or more if active; or
- (2) 2 years or more if closed or at final grade.

(c) The following procedures must be used for compliance with the surface methane operational standard as provided in § 63.1958(d).

(1) After installation and startup of the gas collection system, the owner or operator must monitor surface concentrations of methane along the entire perimeter of the collection area and along a pattern that traverses the landfill at 30 meter intervals (or a site-specific established spacing) for each collection area on a quarterly basis using an organic vapor analyzer, flame ionization detector, or other portable monitor meeting the specifications provided in paragraph (d) of this section.

(2) The background concentration must be determined by moving the probe inlet upwind and downwind outside the boundary of the landfill at a distance of at least 30 meters from the perimeter wells.

(3) Surface emission monitoring must be performed in accordance with section 8.3.1 of EPA Method 21 of appendix A–7 of part 60 of this chapter, except that the probe inlet must be placed within 5 to 10 centimeters of the ground. Monitoring must be performed during typical meteorological conditions.

(4) Any reading of 500 ppm or more above background at any location must be recorded as a monitored exceedance and the actions specified in paragraphs (c)(4)(i) through (v) of this section must be taken. As long as the specified actions are taken, the exceedance is not a violation of the operational requirements of § 63.1958(d).

(i) The location of each monitored exceedance must be marked and the location and concentration recorded. Beginning no later than September 27, 2021, the location must be recorded using an instrument with an accuracy of at least 4 meters. The coordinates must be in decimal degrees with at least five decimal places.

(ii) Cover maintenance or adjustments to the vacuum of the adjacent wells to increase the gas collection in the vicinity of each exceedance must be made and the location must be re-monitored within 10 days of detecting the exceedance.

(iii) If the re-monitoring of the location shows a second exceedance, additional corrective action must be taken and the location must be monitored again within 10 days of the second exceedance. If the re-monitoring shows a third exceedance for the same location, the action specified in paragraph (c)(4)(v) of this section must be taken, and no further monitoring of that location is required until the action specified in paragraph (c)(4)(v) of this section has been taken.

(iv) Any location that initially showed an exceedance but has a methane concentration less than 500 ppm methane above background at the 10-day re-monitoring specified in paragraph (c)(4)(ii) or (iii) of this section must be re-monitored 1 month from the initial exceedance. If the 1-month re-monitoring shows a concentration less than 500 ppm above background, no further monitoring of that location is required until the next quarterly monitoring period. If the 1-month re-monitoring shows an exceedance, the actions specified in paragraph (c)(4)(iii) or (v) of this section must be taken.

(v) For any location where monitored methane concentration equals or exceeds 500 ppm above background three times within a quarterly period, a new well or other collection device must be installed within 120 days of the initial exceedance. An alternative remedy to the exceedance, such as upgrading the blower, header pipes or control device, and a corresponding timeline for installation may be submitted to the Administrator for approval.

(5) The owner or operator must implement a program to monitor for cover integrity and implement cover repairs as necessary on a monthly basis.

(d) Each owner or operator seeking to comply with the provisions in paragraph (c) of this section must comply with the following instrumentation specifications and procedures for surface emission monitoring devices:

(1) The portable analyzer must meet the instrument specifications provided in section 6 of EPA Method 21 of appendix A of part 60 of this chapter, except that “methane” replaces all references to “VOC”.

(2) The calibration gas must be methane, diluted to a nominal concentration of 500 ppm in air.

(3) To meet the performance evaluation requirements in section 8.1 of EPA Method 21 of appendix A of part 60 of this chapter, the instrument evaluation procedures of section 8.1 of EPA Method 21 of appendix A of part 60 must be used.

(4) The calibration procedures provided in sections 8 and 10 of EPA Method 21 of appendix A of part 60 of this chapter must be followed immediately before commencing a surface monitoring survey.

(e) (1) Where an owner or operator subject to the provisions of this subpart seeks to demonstrate compliance with the operational standards in introductory paragraph § 63.1958(e), the provisions of this subpart apply at all times, except during periods of SSM, provided that the duration of SSM does not exceed 5 days for collection systems and does not exceed 1 hour for treatment or control devices. You must comply with the provisions in Table 1 to subpart AAAA that apply before September 28, 2021.

(2) Once an owner or operator subject to the provisions of this subpart seeks to demonstrate compliance with the operational standard in § 63.1958(e)(1), the provisions of this subpart apply at all times, including periods of SSM. During periods of SSM, you must comply with the work practice requirement specified in § 63.1958(e) in lieu of the compliance provisions in § 63.1960.

§ 63.1961 Monitoring of operations.

Except as provided in § 63.1981(d)(2):

(a) Each owner or operator seeking to comply with § 63.1959(b)(2)(ii)(B) for an active gas collection system must install a sampling port and a thermometer, other temperature measuring device, or an access port for temperature measurements at each wellhead and:

(1) Measure the gauge pressure in the gas collection header on a monthly basis as provided in § 63.1960(a)(3); and

(2) Monitor nitrogen or oxygen concentration in the landfill gas on a monthly basis as follows:

(i) The nitrogen level must be determined using EPA Method 3C of appendix A–2 to part 60 of this chapter, unless an alternative test method is established as allowed by § 63.1981(d)(2).

(ii) Unless an alternative test method is established as allowed by § 63.1981(d)(2), the oxygen level must be determined by an oxygen meter using EPA Method 3A or 3C of appendix A–2 to part 60 of this chapter or ASTM D6522–11 (incorporated by reference, see § 63.14). Determine the oxygen level by an oxygen meter using EPA Method 3A or 3C of appendix A–2 to part 60 or ASTM D6522–11 (if sample location is prior to combustion) except that:

(A) The span must be set between 10- and 12-percent oxygen;

(B) A data recorder is not required;

(C) Only two calibration gases are required, a zero and span;

(D) A calibration error check is not required; and

(E) The allowable sample bias, zero drift, and calibration drift are ± 10 percent.

(iii) A portable gas composition analyzer may be used to monitor the oxygen levels provided:

(A) The analyzer is calibrated; and

(B) The analyzer meets all quality assurance and quality control requirements for EPA Method 3A of appendix A–2 to part 60 of this chapter or ASTM D6522–11 (incorporated by reference, see § 63.14).

(3) Where an owner or operator subject to the provisions of this subpart seeks to demonstrate compliance with the temperature and nitrogen or oxygen operational standards in introductory paragraph § 63.1958(c), the owner or operator must follow the procedures as specified in § 60.756(a)(2) and (3) of this chapter. Monitor temperature of the landfill gas on a monthly basis as provided in § 63.1960(a)(4). The temperature measuring device must be calibrated annually using the procedure in Section 10.3 of EPA Method 2 of appendix A–1 to part 60 of this chapter.

(4) Where an owner or operator subject to the provisions of this subpart seeks to demonstrate compliance with the operational standard for temperature in § 63.1958(c)(1), monitor temperature of the landfill gas on a monthly basis as provided in § 63.1960(a)(4). The temperature measuring device must be calibrated annually using the procedure in Section 10.3 of EPA Method 2 of appendix A–1 to part 60 of this chapter. Keep records specified in § 63.1983(e).

(5) Where an owner or operator subject to the provisions of this subpart seeks to demonstrate compliance with the operational standard for temperature in § 63.1958(c)(1), unless a higher operating temperature value has been approved by the Administrator under this subpart or under 40 CFR part 60, subpart WWW; 40 CFR part 60, subpart XXX; or a federal plan or EPA-approved and effective state plan or tribal plan that implements either 40 CFR part 60, subpart Cc or 40 CFR part 60, subpart Cf, you must initiate enhanced monitoring at each well with a measurement of landfill gas temperature greater than 62.8 degrees Celsius (145 degrees Fahrenheit) as follows:

- (i) Visual observations for subsurface oxidation events (smoke, smoldering ash, damage to well) within the radius of influence of the well.
- (ii) Monitor oxygen concentration as provided in paragraph (a)(2) of this section;
- (iii) Monitor temperature of the landfill gas at the wellhead as provided in paragraph (a)(4) of this section.
- (iv) Monitor temperature of the landfill gas every 10 vertical feet of the well as provided in paragraph (a)(6) of this section.
- (v) Monitor the methane concentration with a methane meter using EPA Method 3C of appendix A–6 to part 60, EPA Method 18 of appendix A–6 to part 60 of this chapter, or a portable gas composition analyzer to monitor the methane levels provided that the analyzer is calibrated and the analyzer meets all quality assurance and quality control requirements for EPA Method 3C or EPA Method 18.
- (vi) Monitor and determine carbon monoxide concentrations, as follows:

(A) Collect the sample from the wellhead sampling port in a passivated canister or multi-layer foil gas sampling bag (such as the Cali-5-Bond Bag) and analyze that sample using EPA Method 10 of appendix A–4 to part 60 of this chapter, or an equivalent method with a detection limit of at least 100 ppmv of carbon monoxide in high concentrations of methane; or

(B) Collect and analyze the sample from the wellhead using EPA Method 10 of appendix A-4 to part 60 to measure carbon monoxide concentrations.

(C) When sampling directly from the wellhead, you must sample for 5 minutes plus twice the response time of the analyzer. These values must be recorded. The five 1-minute averages are then averaged to give you the carbon monoxide reading at the wellhead.

(D) When collecting samples in a passivated canister or multi-layer foil sampling bag, you must sample for the period of time needed to assure that enough sample is collected to provide five (5) consecutive, 1-minute samples during the analysis of the canister or bag contents, but no less than 5 minutes plus twice the response time of the analyzer. The five (5) consecutive, 1-minute averages are then averaged together to give you a carbon monoxide value from the wellhead.

(vii) The enhanced monitoring described in this paragraph (a)(5) must begin 7 calendar days after the first measurement of landfill gas temperature greater than 62.8 degrees Celsius (145 degrees Fahrenheit); and

(viii) The enhanced monitoring in this paragraph (a)(5) must be conducted on a weekly basis. If four consecutive weekly carbon monoxide readings are under 100 ppmv, then enhanced monitoring may be decreased to monthly. However, if carbon monoxide readings exceed 100 ppmv again, the landfill must return to weekly monitoring.

(ix) The enhanced monitoring in this paragraph (a)(5) can be stopped once a higher operating value is approved, at which time the monitoring provisions issued with the higher operating value should be followed, or once the measurement of landfill gas temperature at the wellhead is less than or equal to 62.8 degrees Celsius (145 degrees Fahrenheit).

(6) For each wellhead with a measurement of landfill gas temperature greater than or equal to 73.9 degrees Celsius (165 degrees Fahrenheit), annually monitor temperature of the landfill gas every 10 vertical feet of the well. This temperature can be monitored either with a removable thermometer, or using temporary or permanent thermocouples installed in the well.

(b) Each owner or operator seeking to comply with § 63.1959(b)(2)(iii) using an enclosed combustor must calibrate, maintain, and operate according to the manufacturer's specifications, the following equipment:

(1) A temperature monitoring device equipped with a continuous recorder and having a minimum accuracy of ± 1 percent of the temperature being measured expressed in degrees Celsius or ± 0.5 degrees Celsius, whichever is greater. A temperature monitoring device is not required for boilers or process heaters with design heat input capacity equal to or greater than 44 megawatts.

(2) A device that records flow to the control device and bypass of the control device (if applicable). The owner or operator must:

(i) Install, calibrate, and maintain a gas flow rate measuring device that must record the flow to the control device at least every 15 minutes; and

(ii) Secure the bypass line valve in the closed position with a car-seal or a lock-and-key type configuration. A visual inspection of the seal or closure mechanism must be performed at least

once every month to ensure that the valve is maintained in the closed position and that the gas flow is not diverted through the bypass line.

(c) Each owner or operator seeking to comply with § 63.1959(b)(2)(iii) using a non-enclosed flare must install, calibrate, maintain, and operate according to the manufacturer's specifications the following equipment:

- (1) A heat sensing device, such as an ultraviolet beam sensor or thermocouple, at the pilot light or the flame itself to indicate the continuous presence of a flame; and
- (2) A device that records flow to the flare and bypass of the flare (if applicable). The owner or operator must:

- (i) Install, calibrate, and maintain a gas flow rate measuring device that records the flow to the control device at least every 15 minutes; and
- (ii) Secure the bypass line valve in the closed position with a car-seal or a lock-and-key type configuration. A visual inspection of the seal or closure mechanism must be performed at least once every month to ensure that the valve is maintained in the closed position and that the gas flow is not diverted through the bypass line.

(d) Each owner or operator seeking to demonstrate compliance with § 63.1959(b)(2)(iii) using a device other than a non-enclosed flare or an enclosed combustor or a treatment system must provide information satisfactory to the Administrator as provided in § 63.1981(d)(2) describing the operation of the control device, the operating parameters that would indicate proper performance, and appropriate monitoring procedures. The Administrator must review the information and either approve it, or request that additional information be submitted. The Administrator may specify additional appropriate monitoring procedures.

(e) Each owner or operator seeking to install a collection system that does not meet the specifications in § 63.1962 or seeking to monitor alternative parameters to those required by §§ 63.1958 through 63.1961 must provide information satisfactory to the Administrator as provided in § 63.1981(d)(2) and (3) describing the design and operation of the collection system, the operating parameters that would indicate proper performance, and appropriate monitoring procedures. The Administrator may specify additional appropriate monitoring procedures.

(f) Each owner or operator seeking to demonstrate compliance with the 500-ppm surface methane operational standard in § 63.1958(d) must monitor surface concentrations of methane according to the procedures in § 63.1960(c) and the instrument specifications in § 63.1960(d). If you are complying with the 500-ppm surface methane operational standard in § 63.1958(d)(2), for location, you must determine the latitude and longitude coordinates of each exceedance using an instrument with an accuracy of at least 4 meters and the coordinates must be in decimal degrees with at least five decimal places. In the semi-annual report in § 63.1981(h), you must report the location of each exceedance of the 500-ppm methane concentration as provided in § 63.1958(d) and the concentration recorded at each location for which an exceedance was recorded in the previous month. Any closed landfill that has no monitored exceedances of the operational standard in three consecutive quarterly monitoring periods may skip to annual monitoring. Any methane reading of 500 ppm or more above background detected during the annual monitoring returns the frequency for that landfill to quarterly monitoring.

(g) Each owner or operator seeking to demonstrate compliance with § 63.1959(b)(2)(iii)(C) using a landfill gas treatment system must calibrate, maintain, and operate according to the manufacturer's specifications a device that records flow to the treatment system and bypass of the treatment system (if applicable). Beginning no later than September 27, 2021, each owner or operator must maintain and operate all monitoring systems associated with the treatment system in accordance with the site-specific treatment system monitoring plan required in § 63.1983(b)(5)(ii). The owner or operator must:

- (1) Install, calibrate, and maintain a gas flow rate measuring device that records the flow to the treatment system at least every 15 minutes; and
- (2) Secure the bypass line valve in the closed position with a car-seal or a lock-and-key type configuration. A visual inspection of the seal or closure mechanism must be performed at least once every month to ensure that the valve is maintained in the closed position and that the gas flow is not diverted through the bypass line.

(h) The monitoring requirements of paragraphs (a), (b), (c), (d), and (g) of this section apply at all times the affected source is operating, except for periods of monitoring system malfunctions, repairs associated with monitoring system malfunctions, and required monitoring system quality assurance or quality control activities. A monitoring system malfunction is any sudden, infrequent, not reasonably preventable failure of the monitoring system to provide valid data. Monitoring system failures that are caused in part by poor maintenance or careless operation are not malfunctions. You are required to complete monitoring system repairs in response to monitoring system malfunctions and to return the monitoring system to operation as expeditiously as practicable. Where an owner or operator subject to the provisions of this subpart seeks to demonstrate compliance with the temperature and nitrogen or oxygen operational standards in introductory paragraph § 63.1958(c)(1), (d)(2), and (e)(1), the standards apply at all times.

§ 63.1962 Specifications for active collection systems.

(a) Each owner or operator seeking to comply with § 63.1959(b)(2)(i) must site active collection wells, horizontal collectors, surface collectors, or other extraction devices at a sufficient density throughout all gas producing areas using the following procedures unless alternative procedures have been approved by the Administrator as provided in § 63.1981(d)(2) and (3):

- (1) The collection devices within the interior must be certified to achieve comprehensive control of surface gas emissions by a professional engineer. The following issues must be addressed in the design: Depths of refuse, refuse gas generation rates and flow characteristics, cover properties, gas system expandability, leachate and condensate management, accessibility, compatibility with filling operations, integration with closure end use, air intrusion control, corrosion resistance, fill settlement, resistance to the refuse decomposition heat, and ability to isolate individual components or sections for repair or troubleshooting without shutting down entire collection system.
- (2) The sufficient density of gas collection devices determined in paragraph (a)(1) of this section must address landfill gas migration issues and augmentation of the collection system through the use of active or passive systems at the landfill perimeter or exterior.
- (3) The placement of gas collection devices determined in paragraph (a)(1) of this section must control all gas producing areas, except as provided by paragraphs (a)(3)(i) and (ii) of this section.

(i) Any segregated area of asbestos or nondegradable material may be excluded from collection if documented as provided under § 63.1983(d). The documentation must provide the nature, date of deposition, location and amount of asbestos or nondegradable material deposited in the area and must be provided to the Administrator upon request.

(ii) Any nonproductive area of the landfill may be excluded from control, provided that the total of all excluded areas can be shown to contribute less than 1 percent of the total amount of NMOC emissions from the landfill. The amount, location, and age of the material must be documented and provided to the Administrator upon request. A separate NMOC emissions estimate must be made for each section proposed for exclusion, and the sum of all such sections must be compared to the NMOC emissions estimate for the entire landfill.

(A) The NMOC emissions from each section proposed for exclusion must be computed using Equation 7:

$$Q_i = 2 k L_o M_i (e^{-kt_i}) (C_{NMOC}) (3.6 \times 10^{-9}) \text{ (Eq. 7)}$$

Where:

Q_i = NMOC emission rate from the i th section, Mg/yr.

k = Methane generation rate constant, year⁻¹.

L_o = Methane generation potential, m³/Mg solid waste.

M_i = Mass of the degradable solid waste in the i th section, Mg.

t_i = Age of the solid waste in the i th section, years.

C_{NMOC} = Concentration of NMOC, ppmv.

3.6×10^{-9} = Conversion factor.

(B) If the owner/operator is proposing to exclude, or cease gas collection and control from, nonproductive physically separated (*e.g.*, separately lined) closed areas that already have gas collection systems, NMOC emissions from each physically separated closed area must be computed using either Equation 3 in § 63.1959(c) or Equation 7 in paragraph (a)(3)(ii)(A) of this section.

(iii) The values for k and C_{NMOC} determined in field testing must be used if field testing has been performed in determining the NMOC emission rate or the radii of influence (the distance from the well center to a point in the landfill where the pressure gradient applied by the blower or compressor approaches zero). If field testing has not been performed, the default values for k , L_o and C_{NMOC} provided in § 63.1959(a)(1) or the alternative values from § 63.1959(a)(5) must be used. The mass of nondegradable solid waste contained within the given section may be subtracted from the total mass of the section when estimating emissions provided the nature, location, age, and amount of the nondegradable material is documented as provided in paragraph (a)(3)(i) of this section.

(b) Each owner or operator seeking to comply with § 63.1959(b)(2)(ii) must construct the gas collection devices using the following equipment or procedures:

(1) The landfill gas extraction components must be constructed of polyvinyl chloride (PVC), high density polyethylene (HDPE) pipe, fiberglass, stainless steel, or other nonporous corrosion resistant material of suitable dimensions to: Convey projected amounts of gases; withstand installation, static, and settlement forces; and withstand planned overburden or traffic loads. The collection system must extend as necessary to comply with emission and migration standards. Collection devices such as wells and horizontal collectors must be perforated to allow gas entry without head loss sufficient to impair performance across the intended extent of control. Perforations must be situated with regard to the need to prevent excessive air infiltration.

(2) Vertical wells must be placed so as not to endanger underlying liners and must address the occurrence of water within the landfill. Holes and trenches constructed for piped wells and horizontal collectors must be of sufficient cross-section so as to allow for their proper construction and completion including, for example, centering of pipes and placement of gravel backfill. Collection devices must be designed so as not to allow indirect short circuiting of air into the cover or refuse into the collection system or gas into the air. Any gravel used around pipe perforations should be of a dimension so as not to penetrate or block perforations.

(3) Collection devices may be connected to the collection header pipes below or above the landfill surface. The connector assembly must include a positive closing throttle valve, any necessary seals and couplings, access couplings and at least one sampling port. The collection devices must be constructed of PVC, HDPE, fiberglass, stainless steel, or other nonporous material of suitable thickness.

(c) Each owner or operator seeking to comply with § 63.1959(b)(2)(iii) must convey the landfill gas to a control system in compliance with § 63.1959(b)(2)(iii) through the collection header pipe(s). The gas mover equipment must be sized to handle the maximum gas generation flow rate expected over the intended use period of the gas moving equipment using the following procedures:

(1) For existing collection systems, the flow data must be used to project the maximum flow rate. If no flow data exists, the procedures in paragraph (c)(2) of this section must be used.

(2) For new collection systems, the maximum flow rate must be in accordance with § 63.1960(a)(1).

General and Continuing Compliance Requirements

§ 63.1964 How is compliance determined?

Compliance is determined using performance testing, collection system monitoring, continuous parameter monitoring, and other credible evidence. In addition, continuous parameter monitoring data collected under § 63.1961(b)(1), (c)(1), and (d) are used to demonstrate compliance with the operating standards for control systems. If a deviation occurs, you have failed to meet the control device operating standards described in this subpart and have deviated from the requirements of this subpart.

(a) Before September 28, 2021, you must develop a written SSM plan according to the provisions in § 63.6(e)(3) of subpart A. A copy of the SSM plan must be maintained on site. Failure to write or maintain a copy of the SSM plan is a deviation from the requirements of this subpart.

(b) After September 27, 2021, the SSM provisions of § 63.6(e) of subpart A no longer apply to this subpart and the SSM plan developed under paragraph (a) of this section no longer applies. Compliance with the emissions standards and the operating standards of § 63.1958 of this subpart is required at all times.

§ 63.1965 What is a deviation?

A deviation is defined in § 63.1990. For the purposes of the landfill monitoring and SSM plan requirements, deviations include the items in paragraphs (a) through (c) of this section.

- (a) A deviation occurs when the control device operating parameter boundaries described in § 63.1983(c)(1) are exceeded.
- (b) A deviation occurs when 1 hour or more of the hours during the 3-hour block averaging period does not constitute a valid hour of data. A valid hour of data must have measured values for at least three 15-minute monitoring periods within the hour.
- (c) Before September 28, 2021, a deviation occurs when a SSM plan is not developed or maintained on site and when an affected source fails to meet any emission limitation, (including any operating limit), or work practice requirement in this subpart during SSM, regardless of whether or not such failure is permitted by this subpart.

§ 63.1975 How do I calculate the 3-hour block average used to demonstrate compliance?

Before September 28, 2021, averages are calculated in the same way as they are calculated in § 60.758(b)(2)(i) of this subchapter for average combustion temperature and § 60.758(c) for 3-hour average combustion temperature for enclosed combustors, except that the data collected during the events listed in paragraphs (a) through (d) of this section are not to be included in any average computed under this subpart. Beginning no later than September 27, 2021, averages are calculated according to § 63.1983(b)(2)(i) for average combustion temperature and § 63.1983(c)(1)(i) for 3-hour average combustion temperature for enclosed combustors, except that the data collected during the event listed in paragraph (a) of this section are not to be included in any average computed under this subpart.

- (a) Monitoring system breakdowns, repairs, calibration checks, and zero (low-level) and high-level adjustments.
- (b) Startups.
- (c) Shutdowns.
- (d) Malfunctions.

Notifications, Records, and Reports

§ 63.1981 What reports must I submit?

You must submit the reports specified in this section and the reports specified in Table 1 to this subpart. If you have previously submitted a design capacity report, amended design capacity report, initial NMOC emission rate report, initial or revised collection and control system design plan, closure report, equipment removal report, or initial performance test under 40 CFR part 60, subpart WWW; 40 CFR part 60, subpart XXX; or a federal plan or EPA-approved and effective state plan or tribal plan that implements either 40 CFR part 60, subpart Cc or 40 CFR part 60, subpart Cf, then that submission constitutes compliance with the design capacity report in paragraph (a) of this section, the amended design capacity report in paragraph (b) of this section, the initial NMOC emission rate report in paragraph (c) of this section, the initial collection and control system design plan in paragraph (d) of this section, the revised design plan in paragraph (e) of this section, the closure report in paragraph (f) of this section, the equipment removal report in paragraph (g) of this section, and the

initial performance test report in paragraph (i) of this section. You do not need to re-submit the report(s). However, you must include a statement certifying prior submission of the respective report(s) and the date of submittal in the first semi-annual report required in this section.

(a) *Initial design capacity report.* The initial design capacity report must contain the information specified in § 60.757(a)(2) of this chapter, except beginning no later than September 28, 2021, the report must contain:

- (1) A map or plot of the landfill, providing the size and location of the landfill, and identifying all areas where solid waste may be landfilled according to the permit issued by the state, local, or tribal agency responsible for regulating the landfill.
- (2) The maximum design capacity of the landfill. Where the maximum design capacity is specified in the permit issued by the state, local, or tribal agency responsible for regulating the landfill, a copy of the permit specifying the maximum design capacity may be submitted as part of the report. If the maximum design capacity of the landfill is not specified in the permit, the maximum design capacity must be calculated using good engineering practices. The calculations must be provided, along with the relevant parameters as part of the report. The landfill may calculate design capacity in either Mg or m³ for comparison with the exemption values. If the owner or operator chooses to convert the design capacity from volume to mass or from mass to volume to demonstrate its design capacity is less than 2.5 million Mg or 2.5 million m³, the calculation must include a site-specific density, which must be recalculated annually. Any density conversions must be documented and submitted with the design capacity report. The state, tribal, local agency or Administrator may request other reasonable information as may be necessary to verify the maximum design capacity of the landfill.

(b) *Amended design capacity report.* An amended design capacity report must be submitted to the Administrator providing notification of an increase in the design capacity of the landfill, within 90 days of an increase in the maximum design capacity of the landfill to meet or exceed 2.5 million Mg and 2.5 million m³. This increase in design capacity may result from an increase in the permitted volume of the landfill or an increase in the density as documented in the annual recalculation required in § 63.1983(f).

(c) *NMOC emission rate report.* Each owner or operator subject to the requirements of this subpart must submit a copy of the latest NMOC emission rate report that was submitted according to § 60.757(b) of this chapter or submit an NMOC emission rate report to the Administrator initially and annually thereafter, except as provided for in paragraph (c)(1)(ii)(A) of this section. The Administrator may request such additional information as may be necessary to verify the reported NMOC emission rate. If you have submitted an annual report under 40 CFR part 60, subpart WWW; 40 CFR part 60, subpart XXX; or a Federal plan or EPA-approved and effective state plan or tribal plan that implements either 40 CFR part 60, subpart Cc or 40 CFR part 60, subpart Cf, then that submission constitutes compliance with the annual NMOC emission rate report in this paragraph. You do not need to re-submit the annual report for the current year. Beginning no later than September 27, 2021, the report must meet the following requirements:

- (1) The NMOC emission rate report must contain an annual or 5-year estimate of the NMOC emission rate calculated using the formula and procedures provided in § 63.1959(a) or (b), as applicable.

(i) The initial NMOC emission rate report must be submitted no later than 90 days after the date of commenced construction, modification, or reconstruction for landfills that commence construction, modification, or reconstruction on or after March 12, 1996.

(ii) Subsequent NMOC emission rate reports must be submitted annually thereafter, except as provided for in paragraph (c)(1)(ii)(A) of this section.

(A) If the estimated NMOC emission rate as reported in the annual report to the Administrator is less than 50 Mg/yr in each of the next 5 consecutive years, the owner or operator may elect to submit, an estimate of the NMOC emission rate for the next 5-year period in lieu of the annual report. This estimate must include the current amount of solid waste-in-place and the estimated waste acceptance rate for each year of the 5 years for which an NMOC emission rate is estimated. All data and calculations upon which this estimate is based must be provided to the Administrator. This estimate must be revised at least once every 5 years. If the actual waste acceptance rate exceeds the estimated waste acceptance rate in any year reported in the 5-year estimate, a revised 5-year estimate must be submitted to the Administrator. The revised estimate must cover the 5-year period beginning with the year in which the actual waste acceptance rate exceeded the estimated waste acceptance rate.

(B) The report must be submitted following the procedure specified in paragraph (l)(2) of this section.

(2) The NMOC emission rate report must include all the data, calculations, sample reports and measurements used to estimate the annual or 5-year emissions.

(3) Each owner or operator subject to the requirements of this subpart is exempted from the requirements to submit an NMOC emission rate report, after installing a collection and control system that complies with § 63.1959(b)(2), during such time as the collection and control system is in operation and in compliance with §§ 63.1958 and 63.1960.

(d) *Collection and control system design plan.* Each owner or operator subject to the provisions of § 63.1959(b)(2) must submit a collection and control system design plan to the Administrator for approval according to § 60.757(c) of this chapter and the schedule in § 60.757(c)(1) and (2). Beginning no later than September 27, 2021, each owner or operator subject to the provisions of § 63.1959(b)(2) must submit a collection and control system design plan to the Administrator according to paragraphs (d)(1) through (6) of this section. The collection and control system design plan must be prepared and approved by a professional engineer.

(1) The collection and control system as described in the design plan must meet the design requirements in § 63.1959(b)(2).

(2) The collection and control system design plan must include any alternatives to the operational standards, test methods, procedures, compliance measures, monitoring, recordkeeping or reporting provisions of §§ 63.1957 through 63.1983 proposed by the owner or operator.

(3) The collection and control system design plan must either conform with specifications for active collection systems in § 63.1962 or include a demonstration to the Administrator's satisfaction of the sufficiency of the alternative provisions to § 63.1962.

(4) Each owner or operator of an MSW landfill affected by this subpart must submit a collection and control system design plan to the Administrator for approval within 1 year of becoming subject to this subpart.

(5) The landfill owner or operator must notify the Administrator that the design plan is completed and submit a copy of the plan's signature page. The Administrator has 90 days to decide whether the design plan should be submitted for review. If the Administrator chooses to review the plan, the approval process continues as described in paragraph (d)(6) of this section. In the event that the design plan is required to be modified to obtain approval, the owner or operator must take any steps necessary to conform any prior actions to the approved design plan and any failure to do so could result in an enforcement action.

(6) Upon receipt of an initial or revised design plan, the Administrator must review the information submitted under paragraphs (d)(1) through (3) of this section and either approve it, disapprove it, or request that additional information be submitted. Because of the many site-specific factors involved with landfill gas system design, alternative systems may be necessary. A wide variety of system designs are possible, such as vertical wells, combination horizontal and vertical collection systems, or horizontal trenches only, leachate collection components, and passive systems.

(e) *Revised design plan.* Beginning no later than September 27, 2021, the owner or operator who has already been required to submit a design plan under paragraph (d) of this section must submit a revised design plan to the Administrator for approval as follows:

(1) At least 90 days before expanding operations to an area not covered by the previously approved design plan.

(2) Prior to installing or expanding the gas collection system in a way that is not consistent with the design plan that was submitted to the Administrator according to paragraph (d) of this section.

(f) *Closure report.* Each owner or operator of a controlled landfill must submit a closure report to the Administrator within 30 days of waste acceptance cessation. The Administrator may request additional information as may be necessary to verify that permanent closure has taken place in accordance with the requirements of § 258.60 of this chapter. If a closure report has been submitted to the Administrator, no additional wastes may be placed into the landfill without filing a notification of modification as described under § 63.9(b) of subpart A.

(g) *Equipment removal report.* Each owner or operator of a controlled landfill must submit an equipment removal report as provided in § 60.757(e) of this chapter. Each owner or operator of a controlled landfill must submit an equipment removal report to the Administrator 30 days prior to removal or cessation of operation of the control equipment.

(1) Beginning no later than September 27, 2021, the equipment removal report must contain all of the following items:

- (i) A copy of the closure report submitted in accordance with paragraph (f) of this section;
- (ii) A copy of the initial performance test report demonstrating that the 15-year minimum control period has expired, or information that demonstrates that the gas collection and control system will be unable to operate for 15 years due to declining gas flows. In the equipment removal report, the process unit(s) tested, the pollutant(s) tested, and the date that

such performance test was conducted may be submitted in lieu of the performance test report if the report has been previously submitted to the EPA's Central Data Exchange (CDX); and

(iii) Dated copies of three successive NMOC emission rate reports demonstrating that the landfill is no longer producing 50 Mg or greater of NMOC per year. If the NMOC emission rate reports have been previously submitted to the EPA's CDX, a statement that the NMOC emission rate reports have been submitted electronically and the dates that the reports were submitted to the EPA's CDX may be submitted in the equipment removal report in lieu of the NMOC emission rate reports.

(2) The Administrator may request such additional information as may be necessary to verify that all of the conditions for removal in § 63.1957(b) have been met.

(h) *Semi-annual report.* The owner or operator of a landfill seeking to comply with § 63.1959(b)(2) using an active collection system designed in accordance with § 63.1959(b)(2)(ii) must submit to the Administrator semi-annual reports. Beginning no later than September 27, 2021, you must submit the report, following the procedure specified in paragraph (l) of this section. The initial report must be submitted within 180 days of installation and startup of the collection and control system and must include the initial performance test report required under § 63.7 of subpart A, as applicable. In the initial report, the process unit(s) tested, the pollutant(s) tested, and the date that such performance test was conducted may be submitted in lieu of the performance test report if the report has been previously submitted to the EPA's CDX. For enclosed combustion devices and flares, reportable exceedances are defined under § 63.1983(c). The semi-annual reports must contain the information in paragraphs (h)(1) through (8) of this section.

(1) Number of times that applicable parameters monitored under § 63.1958(b), (c), and (d) were exceeded and when the gas collection and control system was not operating under § 63.1958(e), including periods of SSM. For each instance, report the date, time, and duration of each exceedance.

(i) Where an owner or operator subject to the provisions of this subpart seeks to demonstrate compliance with the temperature and nitrogen or oxygen operational standards in introductory paragraph § 63.1958(c), provide a statement of the wellhead operational standard for temperature and oxygen you are complying with for the period covered by the report. Indicate the number of times each of those parameters monitored under § 63.1961(a)(3) were exceeded. For each instance, report the date, time, and duration of each exceedance.

(ii) Where an owner or operator subject to the provisions of this subpart seeks to demonstrate compliance with the operational standard for temperature in § 63.1958(c)(1), provide a statement of the wellhead operational standard for temperature and oxygen you are complying with for the period covered by the report. Indicate the number of times each of those parameters monitored under § 63.1961(a)(4) were exceeded. For each instance, report the date, time, and duration of each exceedance.

(iii) Beginning no later than September 27, 2021, number of times the parameters for the site-specific treatment system in § 63.1961(g) were exceeded.

(2) Description and duration of all periods when the gas stream was diverted from the control device or treatment system through a bypass line or the indication of bypass flow as specified under § 63.1961.

(3) Description and duration of all periods when the control device or treatment system was not operating and length of time the control device or treatment system was not operating.

(4) All periods when the collection system was not operating.

(5) The location of each exceedance of the 500-ppm methane concentration as provided in § 63.1958(d) and the concentration recorded at each location for which an exceedance was recorded in the previous month. Beginning no later than September 27, 2021, for location, you record the latitude and longitude coordinates of each exceedance using an instrument with an accuracy of at least 4 meters. The coordinates must be in decimal degrees with at least five decimal places.

(6) The date of installation and the location of each well or collection system expansion added pursuant to § 63.1960(a)(3) and (4), (b), and (c)(4).

(7) For any corrective action analysis for which corrective actions are required in § 63.1960(a)(3)(i) or (a)(5) and that take more than 60 days to correct the exceedance, the root cause analysis conducted, including a description of the recommended corrective action(s), the date for corrective action(s) already completed following the positive pressure or high temperature reading, and, for action(s) not already completed, a schedule for implementation, including proposed commencement and completion dates.

(8) Each owner or operator required to conduct enhanced monitoring in §§ 63.1961(a)(5) and (6) must include the results of all monitoring activities conducted during the period.

(i) For each monitoring point, report the date, time, and well identifier along with the value and units of measure for oxygen, temperature (wellhead and downwell), methane, and carbon monoxide.

(ii) Include a summary trend analysis for each well subject to the enhanced monitoring requirements to chart the weekly readings over time for oxygen, wellhead temperature, methane, and weekly or monthly readings over time, as applicable for carbon monoxide.

(iii) Include the date, time, staff person name, and description of findings for each visual observation for subsurface oxidation event.

(i) *Initial performance test report.* Each owner or operator seeking to comply with § 63.1959(b)(2)(iii) must include the following information with the initial performance test report required under § 63.7 of subpart A:

(1) A diagram of the collection system showing collection system positioning including all wells, horizontal collectors, surface collectors, or other gas extraction devices, including the locations of any areas excluded from collection and the proposed sites for the future collection system expansion;

(2) The data upon which the sufficient density of wells, horizontal collectors, surface collectors, or other gas extraction devices and the gas mover equipment sizing are based;

(3) The documentation of the presence of asbestos or nondegradable material for each area from which collection wells have been excluded based on the presence of asbestos or nondegradable material;

(4) The sum of the gas generation flow rates for all areas from which collection wells have been excluded based on nonproductivity and the calculations of gas generation flow rate for each excluded area;

(5) The provisions for increasing gas mover equipment capacity with increased gas generation flow rate, if the present gas mover equipment is inadequate to move the maximum flow rate expected over the life of the landfill; and

(6) The provisions for the control of off-site migration.

(j) *Corrective action and the corresponding timeline.* The owner or operator must submit information regarding corrective actions according to paragraphs (j)(1) and (2) of this section.

(1) For corrective action that is required according to § 63.1960(a)(3) or (4) and is not completed within 60 days after the initial exceedance, you must submit a notification to the Administrator as soon as practicable but no later than 75 days after the first measurement of positive pressure or temperature exceedance.

(2) For corrective action that is required according to § 63.1960(a)(3) or (4) and is expected to take longer than 120 days after the initial exceedance to complete, you must submit the root cause analysis, corrective action analysis, and corresponding implementation timeline to the Administrator as soon as practicable but no later than 75 days after the first measurement of positive pressure or temperature monitoring value of 62.8 degrees Celsius (145 degrees Fahrenheit) or above unless a higher operating temperature value has been approved by the Administrator for the well under this subpart or under 40 CFR part 60, subpart WWW; 40 CFR part 60, subpart XXX; or a Federal plan or EPA approved and effective state plan or tribal plan that implements either 40 CFR part 60, subpart Cc or 40 CFR part 60, subpart Cf. The Administrator must approve the plan for corrective action and the corresponding timeline.

(k) *24-hour high temperature report.* Where an owner or operator subject to the provisions of this subpart seeks to demonstrate compliance with the operational standard for temperature in § 63.1958(c)(1) and a landfill gas temperature measured at either the wellhead or at any point in the well is greater than or equal to 76.7 degrees Celsius (170 degrees Fahrenheit) and the carbon monoxide concentration measured is greater than or equal to 1,000 ppmv, then you must report the date, time, well identifier, temperature and carbon monoxide reading via email to the Administrator within 24 hours of the measurement unless a higher operating temperature value has been approved by the Administrator for the well under this subpart or under 40 CFR part 60, subpart WWW; 40 CFR part 60, subpart XXX; or a Federal plan or EPA approved and effective state plan or tribal plan that implements either 40 CFR part 60, subpart Cc or 40 CFR part 60, subpart Cf.

(l) *Electronic reporting.* Beginning no later than September 27, 2021, the owner or operator must submit reports electronically according to paragraphs (l)(1) and (2) of this section.

(1) Within 60 days after the date of completing each performance test required by this subpart, you must submit the results of the performance test following the procedures specified in paragraphs (l)(1)(i) through (iii) of this section.

(i) Data collected using test methods supported by the EPA's Electronic Reporting Tool (ERT) as listed on the EPA's ERT website (<https://www.epa.gov/electronic-reporting-air->

emissions/electronic-reporting-tool-ert) at the time of the test. Submit the results of the performance test to the EPA via the Compliance and Emissions Data Reporting Interface (CEDRI), which can be accessed through the EPA's CDX (<https://cdx.epa.gov/>). The data must be submitted in a file format generated through the use of the EPA's ERT. Alternatively, you may submit an electronic file consistent with the extensible markup language (XML) schema listed on the EPA's ERT website.

(ii) Data collected using test methods that are not supported by the EPA's ERT as listed on the EPA's ERT website at the time of the test. The results of the performance test must be included as an attachment in the ERT or an alternate electronic file consistent with the XML schema listed on the EPA's ERT website. Submit the ERT generated package or alternative file to the EPA via CEDRI.

(iii) Confidential business information (CBI). If you claim some of the information submitted under paragraph (a) of this section is CBI, you must submit a complete file, including information claimed to be CBI, to the EPA. The file must be generated through the use of the EPA's ERT or an alternate electronic file consistent with the XML schema listed on the EPA's ERT website. Submit the file on a compact disc, flash drive, or other commonly used electronic storage medium and clearly mark the medium as CBI. Mail the electronic medium to U.S. EPA/OAQPS/CORE CBI Office, Attention: Group Leader, Measurement Policy Group, MD C404-02, 4930 Old Page Rd., Durham, NC 27703. The same file with the CBI omitted must be submitted to the EPA via the EPA's CDX as described in paragraph (l)(1)(i) of this section.

(2) Each owner or operator required to submit reports following the procedure specified in this paragraph must submit reports to the EPA via CEDRI. CEDRI can be accessed through the EPA's CDX. The owner or operator must use the appropriate electronic report in CEDRI for this subpart or an alternate electronic file format consistent with the XML schema listed on the CEDRI website (<https://www.epa.gov/electronic-reporting-air-emissions/compliance-and-emissions-data-reporting-interface-cedri>). Once the spreadsheet template upload/forms for the reports have been available in CEDRI for 90 days, the owner or operator must begin submitting all subsequent reports via CEDRI. The reports must be submitted by the deadlines specified in this subpart, regardless of the method in which the reports are submitted. The NMOC emission rate reports, semi-annual reports, and bioreactor 40-percent moisture reports should be electronically reported as a spreadsheet template upload/form to CEDRI. If the reporting forms specific to this subpart are not available in CEDRI at the time that the reports are due, the owner or operator must submit the reports to the Administrator at the appropriate address listed in § 63.13 of subpart A.

(m) *Claims of EPA system outage.* Beginning no later than September 27, 2021, if you are required to electronically submit a report through CEDRI in the EPA's CDX, you may assert a claim of EPA system outage for failure to comply timely with the reporting requirement. To assert a claim of EPA system outage, you must meet the following requirements:

- (1) You must have been or will be precluded from accessing CEDRI and submitting a required report within the time prescribed due to an outage of either the EPA's CEDRI or CDX systems.
- (2) The outage must have occurred within the period of time beginning 5 business days prior to the date that the submission is due.

(3) The outage may be planned or unplanned.

(4) You must submit notification to the Administrator in writing as soon as possible following the date you first knew, or through due diligence should have known, that the event may cause or has caused a delay in reporting.

(5) You must provide to the Administrator a written description identifying:

- (i) The date(s) and time(s) when CDX or CEDRI was accessed and the system was unavailable;
- (ii) A rationale for attributing the delay in reporting beyond the regulatory deadline to EPA system outage;
- (iii) Measures taken or to be taken to minimize the delay in reporting; and
- (iv) The date by which you propose to report, or if you have already met the reporting requirement at the time of the notification, the date you reported.

(6) The decision to accept the claim of EPA system outage and allow an extension to the reporting deadline is solely within the discretion of the Administrator.

(7) In any circumstance, the report must be submitted electronically as soon as possible after the outage is resolved.

(n) *Claims of force majeure.* Beginning no later than September 27, 2021, if you are required to electronically submit a report through CEDRI in the EPA's CDX, you may assert a claim of force majeure for failure to comply timely with the reporting requirement. To assert a claim of force majeure, you must meet the following requirements:

(1) You may submit a claim if a force majeure event is about to occur, occurs, or has occurred or there are lingering effects from such an event within the period of time beginning 5 business days prior to the date the submission is due. For the purposes of this section, a force majeure event is defined as an event that will be or has been caused by circumstances beyond the control of the affected facility, its contractors, or any entity controlled by the affected facility that prevents you from complying with the requirement to submit a report electronically within the time period prescribed. Examples of such events are acts of nature (*e.g.*, hurricanes, earthquakes, or floods), acts of war or terrorism, or equipment failure or safety hazard beyond the control of the affected facility (*e.g.*, large scale power outage).

(2) You must submit notification to the Administrator in writing as soon as possible following the date you first knew, or through due diligence should have known, that the event may cause or has caused a delay in reporting.

(3) You must provide to the Administrator:

- (i) A written description of the force majeure event;
- (ii) A rationale for attributing the delay in reporting beyond the regulatory deadline to the force majeure event;
- (iii) Measures taken or to be taken to minimize the delay in reporting; and

(iv) The date by which you propose to report, or if you have already met the reporting requirement at the time of the notification, the date you reported.

(4) The decision to accept the claim of force majeure and allow an extension to the reporting deadline is solely within the discretion of the Administrator.

(5) In any circumstance, the reporting must occur as soon as possible after the force majeure event occurs.

§ 63.1982 What records and reports must I submit and keep for bioreactors or liquids addition other than leachate?

Submit reports as specified in this section and § 63.1981. Keep records as specified in this section and § 63.1983.

(a) For bioreactors at new affected sources you must submit the initial semi-annual compliance report and performance test results described in § 63.1981(h) within 180 days after the date you are required to begin operating the gas collection and control system by § 63.1947(a)(2).

(b) If you must submit a semi-annual compliance report for a bioreactor as well as a semi-annual compliance report for a conventional portion of the same landfill, you may delay submittal of a subsequent semi-annual compliance report for the bioreactor according to paragraphs (b)(1) through (3) of this section so that the reports may be submitted on the same schedule.

(1) After submittal of your initial semi-annual compliance report and performance test results for the bioreactor, you may delay submittal of the subsequent semi-annual compliance report for the bioreactor until the date the initial or subsequent semi-annual compliance report is due for the conventional portion of your landfill.

(2) You may delay submittal of your subsequent semi-annual compliance report by no more than 12 months after the due date for submitting the initial semi-annual compliance report and performance test results described in § 63.1981(h) for the bioreactor. The report must cover the time period since the previous semi-annual report for the bioreactor, which would be a period of at least 6 months and no more than 12 months.

(3) After the delayed semi-annual report, all subsequent semi-annual reports for the bioreactor must be submitted every 6 months on the same date the semi-annual report for the conventional portion of the landfill is due.

(c) If you add any liquids other than leachate in a controlled fashion to the waste mass and do not comply with the bioreactor requirements in §§ 63.1947, 63.1955(b), and paragraphs (a) and (b) of this section, you must keep a record of calculations showing that the percent moisture by weight expected in the waste mass to which liquid is added is less than 40 percent. The calculation must consider the waste mass, moisture content of the incoming waste, mass of water added to the waste including leachate recirculation and other liquids addition and precipitation, and the mass of water removed through leachate or other water losses. Moisture level sampling or mass balances calculations can be used. You must document the calculations and the basis of any assumptions. Keep the record of the calculations until you cease liquids addition.

(d) If you calculate moisture content to establish the date your bioreactor is required to begin operating the collection and control system under § 63.1947(a)(2) or (c)(2), keep a record of the calculations including the information specified in paragraph (e) of this section for 5 years. Within 90 days after the bioreactor achieves 40-percent moisture content, report the results of the calculation, the date the bioreactor achieved 40-percent moisture content by weight, and the date you plan to begin collection and control system operation to the Administrator. Beginning no later than September 27, 2021, the reports should be submitted following the procedure specified in § 63.1981(l)(2).

§ 63.1983 What records must I keep?

You must keep records as specified in this subpart. You must also keep records as specified in the general provisions of 40 CFR part 63 as shown in Table 1 to this subpart.

(a) Except as provided in § 63.1981(d)(2), each owner or operator of an MSW landfill subject to the provisions of § 63.1959(b)(2)(ii) and (iii) of this chapter must keep for at least 5 years up-to-date, readily accessible, on-site records of the design capacity report that triggered § 63.1959(b), the current amount of solid waste in-place, and the year-by-year waste acceptance rate. Off-site records may be maintained if they are retrievable within 4 hours. Either paper copy or electronic formats are acceptable.

(b) Except as provided in § 63.1981(d)(2), each owner or operator of a controlled landfill must keep up-to-date, readily accessible records for the life of the control system equipment of the data listed in paragraphs (b)(1) through (5) of this section as measured during the initial performance test or compliance determination. Records of subsequent tests or monitoring must be maintained for a minimum of 5 years. Records of the control device vendor specifications must be maintained until removal.

(1) Where an owner or operator subject to the provisions of this subpart seeks to demonstrate compliance with § 63.1959(b)(2)(ii):

(i) The maximum expected gas generation flow rate as calculated in § 63.1960(a)(1).

(ii) The density of wells, horizontal collectors, surface collectors, or other gas extraction devices determined using the procedures specified in § 63.1962(a)(1) and (2).

(2) Where an owner or operator subject to the provisions of this subpart seeks to demonstrate compliance with § 63.1959(b)(2)(iii) through use of an enclosed combustion device other than a boiler or process heater with a design heat input capacity equal to or greater than 44 megawatts:

(i) The average temperature measured at least every 15 minutes and averaged over the same time period of the performance test.

(ii) The percent reduction of NMOC determined as specified in § 63.1959(b)(2)(iii)(B) achieved by the control device.

(3) Where an owner or operator subject to the provisions of this subpart seeks to demonstrate compliance with § 63.1959(b)(2)(iii)(B)(1) through use of a boiler or process heater of any size: A description of the location at which the collected gas vent stream is introduced into the boiler or process heater over the same time period of the performance testing.

(4) Where an owner or operator subject to the provisions of this subpart seeks to demonstrate compliance with § 63.1959(b)(2)(iii)(A) through use of a non-enclosed flare, the flare type (*i.e.*, steam-assisted, air-assisted, or nonassisted), all visible emission readings, heat content determination, flow

rate or bypass flow rate measurements, and exit velocity determinations made during the performance test as specified in § 63.11; continuous records of the flare pilot flame or flare flame monitoring and records of all periods of operations during which the pilot flame or the flare flame is absent.

(5) Where an owner or operator subject to the provisions of this subpart seeks to demonstrate compliance with § 63.1959(b)(2)(iii)(C) through use of a landfill gas treatment system:

(i) *Bypass records.* Records of the flow of landfill gas to, and bypass of, the treatment system.

(ii) *Site-specific treatment monitoring plan.* Beginning no later than September 27, 2021, the owner or operator must prepare a site-specific treatment monitoring plan to include:

(A) Monitoring records of parameters that are identified in the treatment system monitoring plan and that ensure the treatment system is operating properly for each intended end use of the treated landfill gas. At a minimum, records should include records of filtration, de-watering, and compression parameters that ensure the treatment system is operating properly for each intended end use of the treated landfill gas.

(B) Monitoring methods, frequencies, and operating ranges for each monitored operating parameter based on manufacturer's recommendations or engineering analysis for each intended end use of the treated landfill gas.

(C) Documentation of the monitoring methods and ranges, along with justification for their use.

(D) List of responsible staff (by job title) for data collection.

(E) Processes and methods used to collect the necessary data.

(F) Description of the procedures and methods that are used for quality assurance, maintenance, and repair of all continuous monitoring systems (CMS).

(c) Except as provided in § 63.1981(d)(2), each owner or operator of a controlled landfill subject to the provisions of this subpart must keep for 5 years up-to-date, readily accessible continuous records of the equipment operating parameters specified to be monitored in § 63.1961 as well as up-to-date, readily accessible records for periods of operation during which the parameter boundaries established during the most recent performance test are exceeded.

(1) The following constitute exceedances that must be recorded and reported under § 63.1981(h):

(i) For enclosed combustors except for boilers and process heaters with design heat input capacity of 44 megawatts (150 million Btu per hour) or greater, all 3-hour periods of operation during which the average temperature was more than 28 degrees Celsius (82 degrees Fahrenheit) below the average combustion temperature during the most recent performance test at which compliance with § 63.1959(b)(2)(iii) was determined.

(ii) For boilers or process heaters, whenever there is a change in the location at which the vent stream is introduced into the flame zone as required under paragraph (b)(3) of this section.

(2) Each owner or operator subject to the provisions of this subpart must keep up-to-date, readily accessible continuous records of the indication of flow to the control system and the indication of

bypass flow or records of monthly inspections of car-seals or lock-and-key configurations used to seal bypass lines, specified under § 63.1961(b)(2)(ii), (c)(2)(ii), and (g)(2).

(3) Each owner or operator subject to the provisions of this subpart who uses a boiler or process heater with a design heat input capacity of 44 megawatts or greater to comply with § 63.1959(b)(2)(iii) must keep an up-to-date, readily accessible record of all periods of operation of the boiler or process heater. Examples of such records could include records of steam use, fuel use, or monitoring data collected pursuant to other state, local, tribal, or federal regulatory requirements.

(4) Each owner or operator seeking to comply with the provisions of this subpart by use of a non-enclosed flare must keep up-to-date, readily accessible continuous records of the flame or flare pilot flame monitoring specified under § 63.1961(c), and up-to-date, readily accessible records of all periods of operation in which the flame or flare pilot flame is absent.

(5) Each owner or operator of a landfill seeking to comply with § 63.1959(b)(2) using an active collection system designed in accordance with § 63.1959(b)(2)(ii) must keep records of periods when the collection system or control device is not operating.

(6) Where an owner or operator subject to the provisions of this subpart seeks to demonstrate compliance with the operational standard in § 63.1958(e)(1), the date, time, and duration of each startup and/or shutdown period, recording the periods when the affected source was subject to the standard applicable to startup and shutdown.

(7) Where an owner or operator subject to the provisions of this subpart seeks to demonstrate compliance with the operational standard in § 63.1958(e)(1), in the event that an affected unit fails to meet an applicable standard, record the information below in this paragraph:

(i) For each failure record the date, time and duration of each failure and the cause of such events (including unknown cause, if applicable).

(ii) For each failure to meet an applicable standard; record and retain a list of the affected sources or equipment.

(iii) Record actions taken to minimize emissions in accordance with the general duty of § 63.1955(c) and any corrective actions taken to return the affected unit to its normal or usual manner of operation.

(8) Beginning no later than September 27, 2021, in lieu of the requirements specified in § 63.8(d)(3) of subpart A you must keep the written procedures required by § 63.8(d)(2) on record for the life of the affected source or until the affected source is no longer subject to the provisions of this part, to be made available for inspection, upon request, by the Administrator. If the performance evaluation plan is revised, you must keep previous (*i.e.*, superseded) versions of the performance evaluation plan on record to be made available for inspection, upon request, by the Administrator, for a period of 5 years after each revision to the plan. The program of corrective action should be included in the plan required under § 63.8(d)(2).

(d) Except as provided in § 63.1981(d)(2), each owner or operator subject to the provisions of this subpart must keep for the life of the collection system an up-to-date, readily accessible plot map showing each existing and planned collector in the system and providing a unique identification location label for each collector.

- (1) Each owner or operator subject to the provisions of this subpart must keep up-to-date, readily accessible records of the installation date and location of all newly installed collectors as specified under § 63.1960(b).
- (2) Each owner or operator subject to the provisions of this subpart must keep readily accessible documentation of the nature, date of deposition, amount, and location of asbestos-containing or nondegradable waste excluded from collection as provided in § 63.1962(a)(3)(i) as well as any nonproductive areas excluded from collection as provided in § 63.1962(a)(3)(ii).
- (e) Except as provided in § 63.1981(d)(2), each owner or operator subject to the provisions of this subpart must keep for at least 5 years up-to-date, readily accessible records of the following:
 - (1) All collection and control system exceedances of the operational standards in § 63.1958, the reading in the subsequent month whether or not the second reading is an exceedance, and the location of each exceedance.
 - (2) Each owner or operator subject to the control provisions of this subpart must keep records of each wellhead temperature monitoring value of greater than 55 degrees Celsius (131 degrees Fahrenheit), each wellhead nitrogen level at or above 20 percent, and each wellhead oxygen level at or above 5 percent, except:
 - (i) When an owner or operator subject to the provisions of this subpart seeks to demonstrate compliance with the compliance provisions for wellhead temperature in § 63.1958(c)(1), but no later than September 27, 2021, the records of each wellhead temperature monitoring value of 62.8 degrees Celsius (145 degrees Fahrenheit) or above instead of values greater than 55 degrees Celsius (131 degrees Fahrenheit).
 - (ii) Each owner or operator required to conduct the enhanced monitoring provisions in § 63.1961(a)(5), must also keep records of all enhanced monitoring activities.
 - (iii) Each owner or operator required to submit the *24-hour high temperature report* in § 63.1981(k), must also keep a record of the email transmission.
 - (3) For any root cause analysis for which corrective actions are required in § 63.1960(a)(3)(i)(A) or (a)(4)(i)(A), keep a record of the root cause analysis conducted, including a description of the recommended corrective action(s) taken, and the date(s) the corrective action(s) were completed.
 - (4) For any root cause analysis for which corrective actions are required in § 63.1960(a)(3)(i)(B) or (a)(4)(i)(B), keep a record of the root cause analysis conducted, the corrective action analysis, the date for corrective action(s) already completed following the positive pressure reading or high temperature reading, and, for action(s) not already completed, a schedule for implementation, including proposed commencement and completion dates.
 - (5) For any root cause analysis for which corrective actions are required in § 63.1960(a)(3)(i)(C) or (a)(4)(i)(C), keep a record of the root cause analysis conducted, the corrective action analysis, the date for corrective action(s) already completed following the positive pressure reading or high temperature reading, for action(s) not already completed, a schedule for implementation, including proposed commencement and completion dates, and a copy of any comments or final approval on the corrective action analysis or schedule from the Administrator.

(f) Landfill owners or operators who convert design capacity from volume to mass or mass to volume to demonstrate that landfill design capacity is less than 2.5 million Mg or 2.5 million m³, as provided in the definition of “design capacity,” must keep readily accessible, on-site records of the annual recalculation of site-specific density, design capacity, and the supporting documentation. Off-site records may be maintained if they are retrievable within 4 hours. Either paper copy or electronic formats are acceptable.

(g) Except as provided in § 63.1981(d)(2), each owner or operator subject to the provisions of this subpart must keep for at least 5 years up-to-date, readily accessible records of all collection and control system monitoring data for parameters measured in § 63.1961(a)(1) through (6).

(h) Where an owner or operator subject to the provisions of this subpart seeks to demonstrate compliance with the operational standard for temperature in § 63.1958(c)(1), you must keep the following records.

(1) Records of the landfill gas temperature on a monthly basis as monitored in § 63.1960(a)(4).

(2) Records of enhanced monitoring data at each well with a measurement of landfill gas temperature greater than 62.8 degrees Celsius (145 degrees Fahrenheit) as gathered in § 63.1961(a)(5) and (6).

(i) Any records required to be maintained by this subpart that are submitted electronically via the EPA's CEDRI may be maintained in electronic format. This ability to maintain electronic copies does not affect the requirement for facilities to make records, data, and reports available upon request to a delegated air agency or the EPA as part of an on-site compliance evaluation.

(ii) [Reserved]

Other Requirements and Information

§ 63.1985 Who enforces this subpart?

(a) This subpart can be implemented and enforced by the EPA, or a delegated authority such as the applicable state, local, or tribal agency. If the EPA Administrator has delegated authority to a state, local, or tribal agency, then that agency as well as the EPA has the authority to implement and enforce this subpart. Contact the applicable EPA Regional office to find out if this subpart is delegated to a state, local, or tribal agency.

(b) In delegating implementation and enforcement authority of this subpart to a state, local, or tribal agency under subpart E of this part, the authorities contained in paragraph (c) of this section are retained by the EPA Administrator and are not transferred to the state, local, or tribal agency.

(c) The authorities that will not be delegated to state, local, or tribal agencies are as follows. Approval of alternatives to the emission standards in §§ 63.1955 through 63.1962. Where this subpart references part 60, subpart WWW of this subchapter, the cited provisions will be delegated according to the delegation provisions of part 60, subpart WWW of this subchapter. For this subpart, the EPA also retains the authority to approve methods for determining the NMOC concentration in § 63.1959(a)(3) and the method for determining the site-specific methane generation rate constant k in § 63.1959(a)(4).

§ 63.1990 What definitions apply to this subpart?

Terms used in this subpart are defined in the Clean Air Act, 40 CFR part 60, subparts A, Cc, Cf, WWW, and XXX; 40 CFR part 62, subpart GGG, and subpart A of this part, and this section that follows:

Active collection system means a gas collection system that uses gas mover equipment.

Active landfill means a landfill in which solid waste is being placed or a landfill that is planned to accept waste in the future.

Bioreactor means an MSW landfill or portion of an MSW landfill where any liquid other than leachate (leachate includes landfill gas condensate) is added in a controlled fashion into the waste mass (often in combination with recirculating leachate) to reach a minimum average moisture content of at least 40 percent by weight to accelerate or enhance the anaerobic (without oxygen) biodegradation of the waste.

Closed area means a separately lined area of an MSW landfill in which solid waste is no longer being placed. If additional solid waste is placed in that area of the landfill, that landfill area is no longer closed. The area must be separately lined to ensure that the landfill gas does not migrate between open and closed areas.

Closed landfill means a landfill in which solid waste is no longer being placed, and in which no additional solid wastes will be placed without first filing a notification of modification as prescribed under § 63.9(b). Once a notification of modification has been filed, and additional solid waste is placed in the landfill, the landfill is no longer closed.

Closure means that point in time when a landfill becomes a closed landfill.

Commercial solid waste means all types of solid waste generated by stores, offices, restaurants, warehouses, and other nonmanufacturing activities, excluding residential and industrial wastes.

Controlled landfill means any landfill at which collection and control systems are required under this subpart as a result of the nonmethane organic compounds emission rate. The landfill is considered controlled at the time a collection and control system design plan is submitted in compliance with § 60.752(b)(2)(i) of this chapter or in compliance with § 63.1959(b)(2)(i).

Corrective action analysis means a description of all reasonable interim and long-term measures, if any, that are available, and an explanation of why the selected corrective action(s) is/are the best alternative(s), including, but not limited to, considerations of cost effectiveness, technical feasibility, safety, and secondary impacts.

Cover penetration means a wellhead, a part of a landfill gas collection or operations system, and/or any other object that completely passes through the landfill cover. The landfill cover includes that portion which covers the waste, as well as the portion which borders the waste extended to the point where it is sealed with the landfill liner or the surrounding land mass. Examples of what is not a penetration for purposes of this subpart include but are not limited to: Survey stakes, fencing including litter fences, flags, signs, utility posts, and trees so long as these items do not pass through the landfill cover.

Design capacity means the maximum amount of solid waste a landfill can accept, as indicated in terms of volume or mass in the most recent permit issued by the state, local, or tribal agency responsible for regulating the landfill, plus any in-place waste not accounted for in the most recent permit. If the owner or operator chooses to convert the design capacity from volume to mass or from mass to volume to demonstrate its design capacity is less than 2.5 million Mg or 2.5 million m³, the calculation must include a site-specific density, which must be recalculated annually.

Deviation before September 28, 2021, means any instance in which an affected source subject to this subpart, or an owner or operator of such a source:

- (1) Fails to meet any requirement or obligation established by this subpart, including, but not limited to, any emissions limitation (including any operating limit) or work practice requirement;
- (2) Fails to meet any term or condition that is adopted to implement an applicable requirement in this subpart and that is included in the operating permit for any affected source required to obtain such a permit; or
- (3) Fails to meet any emission limitation, (including any operating limit), or work practice requirement in this subpart during SSM, regardless of whether or not such failure is permitted by this subpart.

Deviation beginning no later than September 27, 2021, means any instance in which an affected source subject to this subpart or an owner or operator of such a source:

- (1) Fails to meet any requirement or obligation established by this subpart including but not limited to any emission limit, or operating limit, or work practice requirement; or
- (2) Fails to meet any term or condition that is adopted to implement an applicable requirement in this subpart and that is included in the operating permit for any affected source required to obtain such a permit.

Disposal facility means all contiguous land and structures, other appurtenances, and improvements on the land used for the disposal of solid waste.

Emissions limitation means any emission limit, opacity limit, operating limit, or visible emissions limit.

Enclosed combustor means an enclosed firebox which maintains a relatively constant limited peak temperature generally using a limited supply of combustion air. An enclosed flare is considered an enclosed combustor.

EPA approved State plan means a State plan that EPA has approved based on the requirements in 40 CFR part 60, subpart B to implement and enforce 40 CFR part 60, subparts Cc or Cf. An approved state plan becomes effective on the date specified in the document published in the Federal Register announcing EPA's approval.

EPA approved Tribal plan means a plan submitted by a tribal authority pursuant to 40 CFR parts 9, 35, 49, 50, and 81 to implement and enforce 40 CFR part 60, subpart Cc or subpart Cf.

Federal plan means the EPA plan to implement 40 CFR part 60, subparts Cc or Cf for existing MSW landfills located in states and Indian country where state plans or tribal plans are not currently in effect. On the effective date of an EPA approved state or tribal plan, the Federal Plan no longer applies. The Federal Plan implementing 40 CFR part 60, subpart Cc is found at 40 CFR part 62, subpart GGG.

Flare means an open combustor without enclosure or shroud.

Gas mover equipment means the equipment (*i.e.*, fan, blower, compressor) used to transport landfill gas through the header system.

Household waste means any solid waste (including garbage, trash, and sanitary waste in septic tanks) derived from households (including, but not limited to, single and multiple residences, hotels and motels, bunkhouses, ranger stations, crew quarters, campgrounds, picnic grounds, and day-use recreation areas). Household waste does not include fully segregated yard waste. Segregated yard waste means vegetative matter resulting exclusively from the cutting of grass, the pruning and/or removal of bushes, shrubs, and

trees, the weeding of gardens, and other landscaping maintenance activities. Household waste does not include construction, renovation, or demolition wastes, even if originating from a household.

Industrial solid waste means solid waste generated by manufacturing or industrial processes that is not a hazardous waste regulated under Subtitle C of the Resource Conservation and Recovery Act, 40 CFR parts 264 and 265. Such waste may include, but is not limited to, waste resulting from the following manufacturing processes: Electric power generation; fertilizer/agricultural chemicals; food and related products/by-products; inorganic chemicals; iron and steel manufacturing; leather and leather products; nonferrous metals manufacturing/foundries; organic chemicals; plastics and resins manufacturing; pulp and paper industry; rubber and miscellaneous plastic products; stone, glass, clay, and concrete products; textile manufacturing; transportation equipment; and water treatment. This term does not include mining waste or oil and gas waste.

Interior well means any well or similar collection component located inside the perimeter of the landfill waste. A perimeter well located outside the landfilled waste is not an interior well.

Landfill means an area of land or an excavation in which wastes are placed for permanent disposal, and that is not a land application unit, surface impoundment, injection well, or waste pile as those terms are defined under § 257.2 of this chapter.

Lateral expansion means a horizontal expansion of the waste boundaries of an existing MSW landfill. A lateral expansion is not a modification unless it results in an increase in the design capacity of the landfill.

Leachate recirculation means the practice of taking the leachate collected from the landfill and reapplying it to the landfill by any of one of a variety of methods, including pre-wetting of the waste, direct discharge into the working face, spraying, infiltration ponds, vertical injection wells, horizontal gravity distribution systems, and pressure distribution systems.

Modification means an increase in the permitted volume design capacity of the landfill by either lateral or vertical expansion based on its permitted design capacity after November 7, 2000. Modification does not occur until the owner or operator commences construction on the lateral or vertical expansion.

Municipal solid waste landfill or *MSW landfill* means an entire disposal facility in a contiguous geographical space where household waste is placed in or on land. An MSW landfill may also receive other types of RCRA Subtitle D wastes (§ 257.2 of this chapter) such as commercial solid waste, nonhazardous sludge, conditionally exempt small quantity generator waste, and industrial solid waste. Portions of an MSW landfill may be separated by access roads. An MSW landfill may be publicly or privately owned. An MSW landfill may be a new MSW landfill, an existing MSW landfill, or a lateral expansion.

Municipal solid waste landfill emissions or *MSW landfill emissions* means gas generated by the decomposition of organic waste deposited in an MSW landfill or derived from the evolution of organic compounds in the waste.

NMOC means nonmethane organic compounds, as measured according to the provisions of § 63.1959.

Nondegradable waste means any waste that does not decompose through chemical breakdown or microbiological activity. Examples are, but are not limited to, concrete, municipal waste combustor ash, and metals.

Passive collection system means a gas collection system that solely uses positive pressure within the landfill to move the gas rather than using gas mover equipment.

Root cause analysis means an assessment conducted through a process of investigation to determine the primary cause, and any other contributing causes, of an exceedance of a standard operating parameter at a wellhead.

Segregated yard waste means vegetative matter resulting exclusively from the cutting of grass, the pruning and/or removal of bushes, shrubs, and trees, the weeding of gardens, and other landscaping maintenance activities.

Sludge means the term sludge as defined in § 258.2 of this chapter.

Solid waste means the term solid waste as defined in § 258.2 of this chapter.

Sufficient density means any number, spacing, and combination of collection system components, including vertical wells, horizontal collectors, and surface collectors, necessary to maintain emission and migration control as determined by measures of performance set forth in this subpart.

Sufficient extraction rate means a rate sufficient to maintain a negative pressure at all wellheads in the collection system without causing air infiltration, including any wellheads connected to the system as a result of expansion or excess surface emissions, for the life of the blower.

Treated landfill gas means landfill gas processed in a treatment system as defined in this subpart.

Treatment system means a system that filters, de-waters, and compresses landfill gas for sale or beneficial use.

Untreated landfill gas means any landfill gas that is not treated landfill gas.

Work practice requirement means any design, equipment, work practice, or operational standard, or combination thereof, that is promulgated pursuant to section 112(h) of the Clean Air Act.

Table 1 to Subpart AAAA of Part 63 - Applicability of NESHAP General Provisions to Subpart AAAA

As specified in this subpart, you must meet each requirement in the following table that applies to you. The owner or operator may begin complying with the provisions that apply no later than September 27, 2021, any time before that date.

Table 1 to Subpart AAAA of Part 63—Applicability of NESHAP General Provisions to Subpart AAAA

Part 63 citation	Description	Applicable to subpart AAAA before September 28, 2021	Applicable to subpart AAAA no later than September 27, 2021	Explanation
§ 63.1(a)	Applicability: General applicability of NESHAP in this part	Yes	Yes	
§ 63.1(b)	Applicability determination for stationary sources	Yes	Yes	
§ 63.1(c)	Applicability after a standard has been	No ¹	Yes	

Part 63 citation	Description	Applicable to subpart AAAAA before September 28, 2021	Applicable to subpart AAAAA no later than September 27, 2021	Explanation
	set			
§ 63.1(e)	Applicability of permit program before relevant standard is set	Yes	Yes	
§ 63.2	Definitions	Yes	Yes	
§ 63.3	Units and abbreviations	No ¹	Yes	
§ 63.4	Prohibited activities and circumvention	Yes	Yes	
§ 63.5(a)	Construction/reconstruction	No ¹	Yes	
§ 63.5(b)	Requirements for existing, newly constructed, and reconstructed sources	Yes	Yes	
§ 63.5(d)	Application for approval of construction or reconstruction	No ¹	Yes	
§ 63.5(e) and (f)	Approval of construction and reconstruction	No ¹	Yes	
§ 63.6(a)	Compliance with standards and maintenance requirements—applicability	No ¹	Yes	
§ 63.6(b) and (c)	Compliance dates for new, reconstructed, and existing sources	No ¹	Yes	
§ 63.6(e)(1)(i)–(ii)	Operation and maintenance requirements	Yes	No	See § 63.1955(c) for general duty requirements.
§ 63.6(e)(3)(i)–(ix)	SSM plan	Yes	No	
§ 63.6(f)(1)	Exemption of nonopacity emission standards during SSM	No	No	
§ 63.6(f)(2) and (3)	Compliance with nonopacity emission standards	Yes	Yes	
§ 63.6(g)	Use of an alternative nonopacity standard	No ¹	Yes	
§ 63.6(h)	Compliance with opacity and visible emission standards	No ¹	No	Subpart AAAAA does not prescribe opacity or visible emission standards.
§ 63.6(i)	Extension of compliance with emission standards	No ¹	Yes	

Part 63 citation	Description	Applicable to subpart AAAAA before September 28, 2021	Applicable to subpart AAAAA no later than September 27, 2021	Explanation
§ 63.6(j)	Exemption from compliance with emission standards	No ¹	Yes	
§ 63.7	Performance testing	No ¹	Yes	
§ 63.7(e)(1)	Conditions for performing performance tests	No ¹	No	40 CFR 63.1959(f) specifies the conditions for performing performance tests.
§ 63.8(a) and (b)	Monitoring requirements— Applicability and conduct of monitoring	No ¹	Yes	
§ 63.8(c)(1)	Operation and Maintenance of continuous emissions monitoring system	No ¹	Yes	
§ 63.8(c)(1)(i)	Operation and Maintenance Requirements	No ¹	No	Unnecessary due to the requirements of § 63.8(c)(1) and the requirements for a quality control plan for monitoring equipment in § 63.8(d)(2).
§ 63.8(c)(1)(ii)	Operation and Maintenance Requirements	No ¹	No	
§ 63.8(c)(1)(iii)	SSM plan for monitors	No ¹	No	
§ 63.8(c)(2)–(8)	Monitoring requirements	No ¹	Yes	
§ 63.8(d)(1)	Quality control for monitors	No ¹	Yes	
§ 63.8(d)(2)	Quality control for monitors	No ¹	Yes	
§ 63.8(d)(3)	Quality control records	No ¹	No	See § 63.1983(c)(8).
§ 63.9(a), (c), and (d)	Notifications	No ¹	Yes	
§ 63.9(b)	Initial notifications	No ¹	Yes ²	
§ 63.9(e)	Notification of performance test	No ¹	Yes ²	
§ 63.9(f)	Notification of visible emissions/opacity test	No ¹	No	Subpart AAAAA does not prescribe opacity or visible emission standards.
§ 63.9(g)	Notification when using CMS	No ¹	Yes ²	
§ 63.9(h)	Notification of compliance status	No ¹	Yes ²	
§ 63.9(i)	Adjustment of submittal deadlines	No ¹	Yes	
§ 63.9(j)	Change in information already	No ¹	Yes	

Part 63 citation	Description	Applicable to subpart AAAAA before September 28, 2021	Applicable to subpart AAAAA no later than September 27, 2021	Explanation
	provided			
§ 63.10(a)	Recordkeeping and reporting—general	No ¹	Yes	
§ 63.10(b)(1)	General recordkeeping	No ¹	Yes	
§ 63.10(b)(2)(i)	Startup and shutdown records	Yes	No	See § 63.1983(c)(6) for recordkeeping for periods of startup and shutdown.
§ 63.10(b)(2)(ii)	Recordkeeping of failures to meet a standard	Yes	No	See § 63.1983(c)(6)–(7) for recordkeeping for any exceedance of a standard.
§ 63.10(b)(2)(iii)	Recordkeeping of maintenance on air pollution control equipment	Yes	Yes	
§ 63.10(b)(2)(iv)–(v)	Actions taken to minimize emissions during SSM	Yes	No	See § 63.1983(c)(7) for recordkeeping of corrective actions to restore compliance.
§ 63.10(b)(2)(vi)	Recordkeeping for CMS malfunctions	No ¹	Yes	
§ 63.10(b)(2)(vii)–(xiv)	Other Recordkeeping of compliance measurements	No ¹	Yes	
§ 63.10(c)	Additional recordkeeping for sources with CMS	No ¹	No	See § 63.1983 for required CMS recordkeeping.
§ 63.10(d)(1)	General reporting	No ¹	Yes	
§ 63.10(d)(2)	Reporting of performance test results	No ¹	Yes	
§ 63.10(d)(3)	Reporting of visible emission observations	No ¹	No	
§ 63.10(d)(4)	Progress reports for compliance date extensions	No ¹	Yes	
§ 63.10(d)(5)	SSM reporting	Yes	No	All exceedances must be reported in the semi-annual report required by § 63.1981(h).
§ 63.10(e)	Additional reporting for CMS systems	No ¹	Yes	
§ 63.10(f)	Recordkeeping/reporting waiver	No ¹	Yes	
§ 63.11	Control device requirements/flares	No ¹	Yes	§ 60.18 is required before September 27, 2021. However, § 60.18 and 63.11 are equivalent.
§ 63.12(a)	State authority	Yes	Yes	

Part 63 citation	Description	Applicable to subpart AAAAA before September 28, 2021	Applicable to subpart AAAAA no later than September 27, 2021	Explanation
§ 63.12(b)–(c)	State delegations	No ¹	Yes	
§ 63.13	Addresses	No ¹	Yes	
§ 63.14	Incorporation by reference	No ¹	Yes	
§ 63.15	Availability of information and confidentiality	Yes	Yes	

¹ Before September 28, 2021, this subpart requires affected facilities to follow 40 CFR part 60, subpart WWW, which incorporates the General Provisions of 40 CFR part 60.

² If an owner or operator has complied with requirements that are parallel to the requirements of the part 63 citation of this table under 40 CFR part 60, subpart WWW or subpart XXX, or a state or federal plan that implements 40 CFR part 60, subpart Cc or Cf, then additional notification for that requirement is not required.

[85 FR 17261, Mar. 26, 2020, as amended at 85 FR 64401, Oct. 13, 2020; 87 FR 8204, Feb. 14, 2022]

Appendix E. 40 CFR Part 63, Subpart A—General Provisions

§ 63.1 Applicability.

(a) *General.*

(1) Terms used throughout this part are defined in § 63.2 or in the Clean Air Act (Act) as amended in 1990, except that individual subparts of this part may include specific definitions in addition to or that supersede definitions in § 63.2.

(2) This part contains national emission standards for hazardous air pollutants (NESHAP) established pursuant to section 112 of the Act as amended November 15, 1990. These standards regulate specific categories of stationary sources that emit (or have the potential to emit) one or more hazardous air pollutants listed in this part pursuant to section 112(b) of the Act. This section explains the applicability of such standards to sources affected by them. The standards in this part are independent of NESHAP contained in 40 CFR part 61. The NESHAP in part 61 promulgated by signature of the Administrator before November 15, 1990 (i.e., the date of enactment of the Clean Air Act Amendments of 1990) remain in effect until they are amended, if appropriate, and added to this part.

(3) No emission standard or other requirement established under this part shall be interpreted, construed, or applied to diminish or replace the requirements of a more stringent emission limitation or other applicable requirement established by the Administrator pursuant to other authority of the Act (section 111, part C or D or any other authority of this Act), or a standard issued under State authority. The Administrator may specify in a specific standard under this part that facilities subject to other provisions under the Act need only comply with the provisions of that standard.

(4) (i) Each relevant standard in this part 63 must identify explicitly whether each provision in this subpart A is or is not included in such relevant standard.

(ii) If a relevant part 63 standard incorporates the requirements of 40 CFR part 60, part 61 or other part 63 standards, the relevant part 63 standard must identify explicitly the applicability of each corresponding part 60, part 61, or other part 63 subpart A (General) provision.

(iii) The General Provisions in this subpart A do not apply to regulations developed pursuant to section 112(r) of the amended Act, unless otherwise specified in those regulations.

(5) [Reserved]

(6) To obtain the most current list of categories of sources to be regulated under section 112 of the Act, or to obtain the most recent regulation promulgation schedule established pursuant to section 112(e) of the Act, contact the Office of the Director, Emission Standards Division, Office of Air Quality Planning and Standards, U.S. EPA (MD-13), Research Triangle Park, North Carolina 27711.

(7)-(9) [Reserved]

(10) For the purposes of this part, time periods specified in days shall be measured in calendar days, even if the word “calendar” is absent, unless otherwise specified in an applicable requirement.

(11) For the purposes of this part, if an explicit postmark deadline is not specified in an applicable requirement for the submittal of a notification, application, test plan, report, or other written communication to the Administrator, the owner or operator shall postmark the submittal on or before the number of days specified in the applicable requirement. For example, if a notification must be

submitted 15 days before a particular event is scheduled to take place, the notification shall be postmarked on or before 15 days preceding the event; likewise, if a notification must be submitted 15 days after a particular event takes place, the notification shall be postmarked on or before 15 days following the end of the event. The use of reliable non-Government mail carriers that provide indications of verifiable delivery of information required to be submitted to the Administrator, similar to the postmark provided by the U.S. Postal Service, or alternative means of delivery agreed to by the permitting authority, is acceptable.

(12) Notwithstanding time periods or postmark deadlines specified in this part for the submittal of information to the Administrator by an owner or operator, or the review of such information by the Administrator, such time periods or deadlines may be changed by mutual agreement between the owner or operator and the Administrator. Procedures governing the implementation of this provision are specified in § 63.9(i).

(b) Initial applicability determination for this part.

(1) The provisions of this part apply to the owner or operator of any stationary source that -

- (i) Emits or has the potential to emit any hazardous air pollutant listed in or pursuant to section 112(b) of the Act; and
- (ii) Is subject to any standard, limitation, prohibition, or other federally enforceable requirement established pursuant to this part.

(2) [Reserved]

(3) An owner or operator of a stationary source who is in the relevant source category and who determines that the source is not subject to a relevant standard or other requirement established under this part must keep a record as specified in § 63.10(b)(3).

(c) Applicability of this part after a relevant standard has been set under this part.

(1) If a relevant standard has been established under this part, the owner or operator of an affected source must comply with the provisions of that standard and of this subpart as provided in paragraph (a)(4) of this section.

(2) Except as provided in § 63.10(b)(3), if a relevant standard has been established under this part, the owner or operator of an affected source may be required to obtain a title V permit from a permitting authority in the State in which the source is located. Emission standards promulgated in this part for area sources pursuant to section 112(c)(3) of the Act will specify whether -

- (i) States will have the option to exclude area sources affected by that standard from the requirement to obtain a title V permit (i.e., the standard will exempt the category of area sources altogether from the permitting requirement);
- (ii) States will have the option to defer permitting of area sources in that category until the Administrator takes rulemaking action to determine applicability of the permitting requirements; or

(iii) If a standard fails to specify what the permitting requirements will be for area sources affected by such a standard, then area sources that are subject to the standard will be subject to the requirement to obtain a title V permit without any deferral.

(3)-(4) [Reserved]

(5) If an area source that otherwise would be subject to an emission standard or other requirement established under this part if it were a major source subsequently increases its emissions of hazardous air pollutants (or its potential to emit hazardous air pollutants) such that the source is a major source that is subject to the emission standard or other requirement, such source also shall be subject to the notification requirements of this subpart.

(6) A major source may become an area source at any time upon reducing its emissions of and potential to emit hazardous air pollutants, as defined in this subpart, to below the major source thresholds established in § 63.2, subject to the provisions in paragraphs (c)(6)(i) and (ii) of this section.

(i) A major source reclassifying to area source status is subject to the applicability of standards, compliance dates and notification requirements specified in (c)(6)(i)(A) of this section. An area source that previously was a major source and becomes a major source again is subject to the applicability of standards, compliance dates, and notification requirements specified in (c)(6)(i)(B) of this section:

(A) A major source reclassifying to area source status under this part remains subject to any applicable major source requirements established under this part until the reclassification becomes effective. After the reclassification becomes effective, the source is subject to any applicable area source requirements established under this part immediately, provided the compliance date for the area source requirements has passed. The owner or operator of a major source that becomes an area source subject to newly applicable area source requirements under this part must comply with the initial notification requirements pursuant to § 63.9(b). The owner or operator of a major source that becomes an area source must also provide to the Administrator any change in the information already provided under § 63.9(b) per § 63.9(j).

(B) An area source that previously was a major source under this part and that becomes a major source again is subject to the applicable major source requirements established under this part immediately upon becoming a major source again, provided the compliance date for the major source requirements has passed, notwithstanding any provision within the applicable subparts. The owner or operator of an area source that becomes a major source again must comply with the initial notification pursuant to § 63.9(b). The owner or operator must also provide to the Administrator any change in the information already provided under § 63.9(b) per § 63.9(j).

(ii) Becoming an area source does not absolve a source subject to an enforcement action or investigation for major source violations or infractions from the consequences of any actions occurring when the source was major. Becoming a major source does not absolve a source subject to an enforcement action or investigation for area source violations or infractions from the consequences of any actions occurring when the source was an area source.

(d) [Reserved]

(e) If the Administrator promulgates an emission standard under section 112(d) or (h) of the Act that is applicable to a source subject to an emission limitation by permit established under section 112(j) of the Act, and the requirements under the section 112(j) emission limitation are substantially as effective as the promulgated emission standard, the owner or operator may request the permitting authority to revise the source's title V permit to reflect that the emission limitation in the permit satisfies the requirements of the promulgated emission standard. The process by which the permitting authority determines whether the section 112(j) emission limitation is substantially as effective as the promulgated emission standard must include, consistent with part 70 or 71 of this chapter, the opportunity for full public, EPA, and affected State review (including the opportunity for EPA's objection) prior to the permit revision being finalized. A negative determination by the permitting authority constitutes final action for purposes of review and appeal under the applicable title V operating permit program.

§ 63.2 Definitions.

The terms used in this part are defined in the Act or in this section as follows:

Act means the Clean Air Act (42 U.S.C. 7401 *et seq.*, as amended by Pub. L. 101-549, 104 Stat. 2399).

Actual emissions is defined in subpart D of this part for the purpose of granting a compliance extension for an early reduction of hazardous air pollutants.

Administrator means the Administrator of the United States Environmental Protection Agency or his or her authorized representative (e.g., a State that has been delegated the authority to implement the provisions of this part).

Affected source, for the purposes of this part, means the collection of equipment, activities, or both within a single contiguous area and under common control that is included in a section 112(c) source category or subcategory for which a section 112(d) standard or other relevant standard is established pursuant to section 112 of the Act. Each relevant standard will define the "affected source," as defined in this paragraph unless a different definition is warranted based on a published justification as to why this definition would result in significant administrative, practical, or implementation problems and why the different definition would resolve those problems. The term "affected source," as used in this part, is separate and distinct from any other use of that term in EPA regulations such as those implementing title IV of the Act. Affected source may be defined differently for part 63 than affected facility and stationary source in parts 60 and 61, respectively. This definition of "affected source," and the procedures for adopting an alternative definition of "affected source," shall apply to each section 112(d) standard for which the initial proposed rule is signed by the Administrator after June 30, 2002.

Alternative emission limitation means conditions established pursuant to sections 112(i)(5) or 112(i)(6) of the Act by the Administrator or by a State with an approved permit program.

Alternative emission standard means an alternative means of emission limitation that, after notice and opportunity for public comment, has been demonstrated by an owner or operator to the Administrator's satisfaction to achieve a reduction in emissions of any air pollutant at least equivalent to the reduction in emissions of such pollutant achieved under a relevant design, equipment, work practice, or operational emission standard, or combination thereof, established under this part pursuant to section 112(h) of the Act.

Alternative test method means any method of sampling and analyzing for an air pollutant that has been demonstrated to the Administrator's satisfaction, using Method 301 in appendix A of this part, to produce

results adequate for the Administrator's determination that it may be used in place of a test method specified in this part.

Approved permit program means a State permit program approved by the Administrator as meeting the requirements of part 70 of this chapter or a Federal permit program established in this chapter pursuant to title V of the Act (42 U.S.C. 7661).

Area source means any stationary source of hazardous air pollutants that is not a major source as defined in this part.

Commenced means, with respect to construction or reconstruction of an affected source, that an owner or operator has undertaken a continuous program of construction or reconstruction or that an owner or operator has entered into a contractual obligation to undertake and complete, within a reasonable time, a continuous program of construction or reconstruction.

Compliance date means the date by which an affected source is required to be in compliance with a relevant standard, limitation, prohibition, or any federally enforceable requirement established by the Administrator (or a State with an approved permit program) pursuant to section 112 of the Act.

Compliance schedule means:

- (1) In the case of an affected source that is in compliance with all applicable requirements established under this part, a statement that the source will continue to comply with such requirements; or
- (2) In the case of an affected source that is required to comply with applicable requirements by a future date, a statement that the source will meet such requirements on a timely basis and, if required by an applicable requirement, a detailed schedule of the dates by which each step toward compliance will be reached; or
- (3) In the case of an affected source not in compliance with all applicable requirements established under this part, a schedule of remedial measures, including an enforceable sequence of actions or operations with milestones and a schedule for the submission of certified progress reports, where applicable, leading to compliance with a relevant standard, limitation, prohibition, or any federally enforceable requirement established pursuant to section 112 of the Act for which the affected source is not in compliance. This compliance schedule shall resemble and be at least as stringent as that contained in any judicial consent decree or administrative order to which the source is subject. Any such schedule of compliance shall be supplemental to, and shall not sanction noncompliance with, the applicable requirements on which it is based.

Construction means the on-site fabrication, erection, or installation of an affected source. Construction does not include the removal of all equipment comprising an affected source from an existing location and reinstallation of such equipment at a new location. The owner or operator of an existing affected source that is relocated may elect not to reinstall minor ancillary equipment including, but not limited to, piping, ductwork, and valves. However, removal and reinstallation of an affected source will be construed as reconstruction if it satisfies the criteria for reconstruction as defined in this section. The costs of replacing minor ancillary equipment must be considered in determining whether the existing affected source is reconstructed.

Continuous emission monitoring system (CEMS) means the total equipment that may be required to meet the data acquisition and availability requirements of this part, used to sample, condition (if applicable), analyze, and provide a record of emissions.

Continuous monitoring system (CMS) is a comprehensive term that may include, but is not limited to, continuous emission monitoring systems, continuous opacity monitoring systems, continuous parameter monitoring systems, or other manual or automatic monitoring that is used for demonstrating compliance with an applicable regulation on a continuous basis as defined by the regulation.

Continuous opacity monitoring system (COMS) means a continuous monitoring system that measures the opacity of emissions.

Continuous parameter monitoring system means the total equipment that may be required to meet the data acquisition and availability requirements of this part, used to sample, condition (if applicable), analyze, and provide a record of process or control system parameters.

Effective date means:

- (1) With regard to an emission standard established under this part, the date of promulgation in the Federal Register of such standard; or
- (2) With regard to an alternative emission limitation or equivalent emission limitation determined by the Administrator (or a State with an approved permit program), the date that the alternative emission limitation or equivalent emission limitation becomes effective according to the provisions of this part.

Emission standard means a national standard, limitation, prohibition, or other regulation promulgated in a subpart of this part pursuant to sections 112(d), 112(h), or 112(f) of the Act.

Emissions averaging is a way to comply with the emission limitations specified in a relevant standard, whereby an affected source, if allowed under a subpart of this part, may create emission credits by reducing emissions from specific points to a level below that required by the relevant standard, and those credits are used to offset emissions from points that are not controlled to the level required by the relevant standard.

EPA means the United States Environmental Protection Agency.

Equivalent emission limitation means any maximum achievable control technology emission limitation or requirements which are applicable to a major source of hazardous air pollutants and are adopted by the Administrator (or a State with an approved permit program) on a case-by-case basis, pursuant to section 112(g) or (j) of the Act.

Excess emissions and continuous monitoring system performance report is a report that must be submitted periodically by an affected source in order to provide data on its compliance with relevant emission limits, operating parameters, and the performance of its continuous parameter monitoring systems.

Existing source means any affected source that is not a new source.

Federally enforceable means all limitations and conditions that are enforceable by the Administrator and citizens under the Act or that are enforceable under other statutes administered by the Administrator. Examples of federally enforceable limitations and conditions include, but are not limited to:

- (1) Emission standards, alternative emission standards, alternative emission limitations, and equivalent emission limitations established pursuant to section 112 of the Act as amended in 1990;
- (2) New source performance standards established pursuant to section 111 of the Act, and emission standards established pursuant to section 112 of the Act before it was amended in 1990;

- (3) All terms and conditions in a title V permit, including any provisions that limit a source's potential to emit, unless expressly designated as not federally enforceable;
- (4) Limitations and conditions that are part of an approved State Implementation Plan (SIP) or a Federal Implementation Plan (FIP);
- (5) Limitations and conditions that are part of a Federal construction permit issued under 40 CFR 52.21 or any construction permit issued under regulations approved by the EPA in accordance with 40 CFR part 51;
- (6) Limitations and conditions that are part of an operating permit where the permit and the permitting program pursuant to which it was issued meet all of the following criteria:
 - (i) The operating permit program has been submitted to and approved by EPA into a State implementation plan (SIP) under section 110 of the CAA;
 - (ii) The SIP imposes a legal obligation that operating permit holders adhere to the terms and limitations of such permits and provides that permits which do not conform to the operating permit program requirements and the requirements of EPA's underlying regulations may be deemed not "federally enforceable" by EPA;
 - (iii) The operating permit program requires that all emission limitations, controls, and other requirements imposed by such permits will be at least as stringent as any other applicable limitations and requirements contained in the SIP or enforceable under the SIP, and that the program may not issue permits that waive, or make less stringent, any limitations or requirements contained in or issued pursuant to the SIP, or that are otherwise "federally enforceable";
 - (iv) The limitations, controls, and requirements in the permit in question are permanent, quantifiable, and otherwise enforceable as a practical matter; and
 - (v) The permit in question was issued only after adequate and timely notice and opportunity for comment for EPA and the public.
- (7) Limitations and conditions in a State rule or program that has been approved by the EPA under subpart E of this part for the purposes of implementing and enforcing section 112; and
- (8) Individual consent agreements that the EPA has legal authority to create.

Fixed capital cost means the capital needed to provide all the depreciable components of an existing source.

Force majeure means, for purposes of § 63.7, an event that will be or has been caused by circumstances beyond the control of the affected facility, its contractors, or any entity controlled by the affected facility that prevents the owner or operator from complying with the regulatory requirement to conduct performance tests within the specified timeframe despite the affected facility's best efforts to fulfill the obligation. Examples of such events are acts of nature, acts of war or terrorism, or equipment failure or safety hazard beyond the control of the affected facility.

Fugitive emissions means those emissions from a stationary source that could not reasonably pass through a stack, chimney, vent, or other functionally equivalent opening. Under section 112 of the Act, all fugitive emissions are to be considered in determining whether a stationary source is a major source.

Hazardous air pollutant means any air pollutant listed in or pursuant to section 112(b) of the Act.

Issuance of a part 70 permit will occur, if the State is the permitting authority, in accordance with the requirements of part 70 of this chapter and the applicable, approved State permit program. When the EPA is

the permitting authority, issuance of a title V permit occurs immediately after the EPA takes final action on the final permit.

Major source means any stationary source or group of stationary sources located within a contiguous area and under common control that emits or has the potential to emit considering controls, in the aggregate, 10 tons per year or more of any hazardous air pollutant or 25 tons per year or more of any combination of hazardous air pollutants, unless the Administrator establishes a lesser quantity, or in the case of radionuclides, different criteria from those specified in this sentence.

Malfunction means any sudden, infrequent, and not reasonably preventable failure of air pollution control and monitoring equipment, process equipment, or a process to operate in a normal or usual manner which causes, or has the potential to cause, the emission limitations in an applicable standard to be exceeded. Failures that are caused in part by poor maintenance or careless operation are not malfunctions.

Monitoring means the collection and use of measurement data or other information to control the operation of a process or pollution control device or to verify a work practice standard relative to assuring compliance with applicable requirements. Monitoring is composed of four elements:

- (1) Indicator(s) of performance - the parameter or parameters you measure or observe for demonstrating proper operation of the pollution control measures or compliance with the applicable emissions limitation or standard. Indicators of performance may include direct or predicted emissions measurements (including opacity), operational parametric values that correspond to process or control device (and capture system) efficiencies or emissions rates, and recorded findings of inspection of work practice activities, materials tracking, or design characteristics. Indicators may be expressed as a single maximum or minimum value, a function of process variables (for example, within a range of pressure drops), a particular operational or work practice status (for example, a damper position, completion of a waste recovery task, materials tracking), or an interdependency between two or among more than two variables.
- (2) Measurement techniques - the means by which you gather and record information of or about the indicators of performance. The components of the measurement technique include the detector type, location and installation specifications, inspection procedures, and quality assurance and quality control measures. Examples of measurement techniques include continuous emission monitoring systems, continuous opacity monitoring systems, continuous parametric monitoring systems, and manual inspections that include making records of process conditions or work practices.
- (3) Monitoring frequency - the number of times you obtain and record monitoring data over a specified time interval. Examples of monitoring frequencies include at least four points equally spaced for each hour for continuous emissions or parametric monitoring systems, at least every 10 seconds for continuous opacity monitoring systems, and at least once per operating day (or week, month, etc.) for work practice or design inspections.
- (4) Averaging time - the period over which you average and use data to verify proper operation of the pollution control approach or compliance with the emissions limitation or standard. Examples of averaging time include a 3-hour average in units of the emissions limitation, a 30-day rolling average emissions value, a daily average of a control device operational parametric range, and an instantaneous alarm.

New affected source means the collection of equipment, activities, or both within a single contiguous area and under common control that is included in a section 112(c) source category or subcategory that is subject to a section 112(d) or other relevant standard for new sources. This definition of “new affected source,” and the

criteria to be utilized in implementing it, shall apply to each section 112(d) standard for which the initial proposed rule is signed by the Administrator after June 30, 2002. Each relevant standard will define the term “new affected source,” which will be the same as the “affected source” unless a different collection is warranted based on consideration of factors including:

- (1) Emission reduction impacts of controlling individual sources versus groups of sources;
- (2) Cost effectiveness of controlling individual equipment;
- (3) Flexibility to accommodate common control strategies;
- (4) Cost/benefits of emissions averaging;
- (5) Incentives for pollution prevention;
- (6) Feasibility and cost of controlling processes that share common equipment (e.g., product recovery devices);
- (7) Feasibility and cost of monitoring; and
- (8) Other relevant factors.

New source means any affected source the construction or reconstruction of which is commenced after the Administrator first proposes a relevant emission standard under this part establishing an emission standard applicable to such source.

One-hour period, unless otherwise defined in an applicable subpart, means any 60-minute period commencing on the hour.

Opacity means the degree to which emissions reduce the transmission of light and obscure the view of an object in the background. For continuous opacity monitoring systems, opacity means the fraction of incident light that is attenuated by an optical medium.

Owner or operator means any person who owns, leases, operates, controls, or supervises a stationary source.

Performance audit means a procedure to analyze blind samples, the content of which is known by the Administrator, simultaneously with the analysis of performance test samples in order to provide a measure of test data quality.

Performance evaluation means the conduct of relative accuracy testing, calibration error testing, and other measurements used in validating the continuous monitoring system data.

Performance test means the collection of data resulting from the execution of a test method (usually three emission test runs) used to demonstrate compliance with a relevant emission standard as specified in the performance test section of the relevant standard.

Permit modification means a change to a title V permit as defined in regulations codified in this chapter to implement title V of the Act (42 U.S.C. 7661).

Permit program means a comprehensive State operating permit system established pursuant to title V of the Act (42 U.S.C. 7661) and regulations codified in part 70 of this chapter and applicable State regulations, or a comprehensive Federal operating permit system established pursuant to title V of the Act and regulations codified in this chapter.

Permit revision means any permit modification or administrative permit amendment to a title V permit as defined in regulations codified in this chapter to implement title V of the Act (42 U.S.C. 7661).

Permitting authority means:

- (1) The State air pollution control agency, local agency, other State agency, or other agency authorized by the Administrator to carry out a permit program under part 70 of this chapter; or
- (2) The Administrator, in the case of EPA-implemented permit programs under title V of the Act (42 U.S.C. 7661).

Pollution Prevention means *source reduction* as defined under the Pollution Prevention Act (42 U.S.C. 13101-13109). The definition is as follows:

- (1) *Source reduction* is any practice that:
 - (i) Reduces the amount of any hazardous substance, pollutant, or contaminant entering any waste stream or otherwise released into the environment (including fugitive emissions) prior to recycling, treatment, or disposal; and
 - (ii) Reduces the hazards to public health and the environment associated with the release of such substances, pollutants, or contaminants.
- (2) The term *source reduction* includes equipment or technology modifications, process or procedure modifications, reformulation or redesign of products, substitution of raw materials, and improvements in housekeeping, maintenance, training, or inventory control.
- (3) The term *source reduction* does not include any practice that alters the physical, chemical, or biological characteristics or the volume of a hazardous substance, pollutant, or contaminant through a process or activity which itself is not integral to and necessary for the production of a product or the providing of a service.

Potential to emit means the maximum capacity of a stationary source to emit a pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the stationary source to emit a pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored, or processed, shall be treated as part of its design if the limitation or the effect it would have on emissions is enforceable.

Reconstruction, unless otherwise defined in a relevant standard, means the replacement of components of an affected or a previously nonaffected source to such an extent that:

- (1) The fixed capital cost of the new components exceeds 50 percent of the fixed capital cost that would be required to construct a comparable new source; and
- (2) It is technologically and economically feasible for the reconstructed source to meet the relevant standard(s) established by the Administrator (or a State) pursuant to section 112 of the Act. Upon reconstruction, an affected source, or a stationary source that becomes an affected source, is subject to relevant standards for new sources, including compliance dates, irrespective of any change in emissions of hazardous air pollutants from that source.

Regulation promulgation schedule means the schedule for the promulgation of emission standards under this part, established by the Administrator pursuant to section 112(e) of the Act and published in the Federal Register.

Relevant standard means:

- (1) An emission standard;
- (2) An alternative emission standard;
- (3) An alternative emission limitation; or
- (4) An equivalent emission limitation established pursuant to section 112 of the Act that applies to the collection of equipment, activities, or both regulated by such standard or limitation. A relevant standard may include or consist of a design, equipment, work practice, or operational requirement, or other measure, process, method, system, or technique (including prohibition of emissions) that the Administrator (or a State) establishes for new or existing sources to which such standard or limitation applies. Every relevant standard established pursuant to section 112 of the Act includes subpart A of this part, as provided by § 63.1(a)(4), and all applicable appendices of this part or of other parts of this chapter that are referenced in that standard.

Responsible official means one of the following:

- (1) For a corporation: A president, secretary, treasurer, or vice president of the corporation in charge of a principal business function, or any other person who performs similar policy or decision-making functions for the corporation, or a duly authorized representative of such person if the representative is responsible for the overall operation of one or more manufacturing, production, or operating facilities and either:
 - (i) The facilities employ more than 250 persons or have gross annual sales or expenditures exceeding \$25 million (in second quarter 1980 dollars); or
 - (ii) The delegation of authority to such representative is approved in advance by the Administrator.
- (2) For a partnership or sole proprietorship: a general partner or the proprietor, respectively.
- (3) For a municipality, State, Federal, or other public agency: either a principal executive officer or ranking elected official. For the purposes of this part, a principal executive officer of a Federal agency includes the chief executive officer having responsibility for the overall operations of a principal geographic unit of the agency (e.g., a Regional Administrator of the EPA).
- (4) For affected sources (as defined in this part) applying for or subject to a title V permit: "responsible official" shall have the same meaning as defined in part 70 or Federal title V regulations in this chapter (42 U.S.C. 7661), whichever is applicable.

Run means one of a series of emission or other measurements needed to determine emissions for a representative operating period or cycle as specified in this part.

Shutdown means the cessation of operation of an affected source or portion of an affected source for any purpose.

Six-minute period means, with respect to opacity determinations, any one of the 10 equal parts of a 1-hour period.

Source at a Performance Track member facility means a major or area source located at a facility which has been accepted by EPA for membership in the Performance Track Program (as described at www.epa.gov/PerformanceTrack) and is still a member of the Program. The Performance Track Program is a voluntary program that encourages continuous environmental improvement through the use of environmental management systems, local community outreach, and measurable results.

Standard conditions means a temperature of 293 K (68 °F) and a pressure of 101.3 kilopascals (29.92 in. Hg).

Startup means the setting in operation of an affected source or portion of an affected source for any purpose.

State means all non-Federal authorities, including local agencies, interstate associations, and State-wide programs, that have delegated authority to implement:

- (1) The provisions of this part and/or
- (2) the permit program established under part 70 of this chapter. The term State shall have its conventional meaning where clear from the context.

Stationary source means any building, structure, facility, or installation which emits or may emit any air pollutant.

Test method means the validated procedure for sampling, preparing, and analyzing for an air pollutant specified in a relevant standard as the performance test procedure. The test method may include methods described in an appendix of this chapter, test methods incorporated by reference in this part, or methods validated for an application through procedures in Method 301 of appendix A of this part.

Title V permit means any permit issued, renewed, or revised pursuant to Federal or State regulations established to implement title V of the Act (42 U.S.C. 7661). A title V permit issued by a State permitting authority is called a part 70 permit in this part.

Visible emission means the observation of an emission of opacity or optical density above the threshold of vision.

Working day means any day on which Federal Government offices (or State government offices for a State that has obtained delegation under section 112(l)) are open for normal business. Saturdays, Sundays, and official Federal (or where delegated, State) holidays are not working days.

§ 63.3 Units and abbreviations.

Used in this part are abbreviations and symbols of units of measure. These are defined as follows:

(a) *System International (SI) units of measure:*

A = ampere

g = gram

Hz = hertz

J = joule

°K = degree Kelvin

kg = kilogram

l = liter

m = meter

m³ = cubic meter

mg = milligram = 10⁻³ gram

ml = milliliter = 10^{-3} liter

mm = millimeter = 10^{-3} meter

Mg = megagram = 10^6 gram = metric ton

MJ = megajoule

mol = mole

N = newton

ng = nanogram = 10^{-9} gram

nm = nanometer = 10^{-9} meter

Pa = pascal

s = second

V = volt

W = watt

Ω = ohm

μg = microgram = 10^{-6} gram

μl = microliter = 10^{-6} liter

(b) *Other units of measure:*

Btu = British thermal unit

$^{\circ}\text{C}$ = degree Celsius (centigrade)

cal = calorie

cfm = cubic feet per minute

cc = cubic centimeter

cu ft = cubic feet

d = day

dcf = dry cubic feet

dcm = dry cubic meter

dscf = dry cubic feet at standard conditions

dscm = dry cubic meter at standard conditions

eq = equivalent

$^{\circ}\text{F}$ degree Fahrenheit

ft = feet

ft^2 = square feet

ft³ = cubic feet

gal = gallon

gr = grain

g-eq = gram equivalent

g-mole = gram mole

hr = hour

in. = inch

in. H₂ O = inches of water

K = 1,000

kcal = kilocalorie

lb = pound

lpm = liter per minute

meq = milliequivalent

min = minute

MW = molecular weight

oz = ounces

ppb = parts per billion

ppbw = parts per billion by weight

ppbv = parts per billion by volume

ppm = parts per million

ppmw = parts per million by weight

ppmv = parts per million by volume

psia = pounds per square inch absolute

psig = pounds per square inch gage

°R = degree Rankine

scf = cubic feet at standard conditions

scfh = cubic feet at standard conditions per hour

scm = cubic meter at standard conditions

scmm = cubic meter at standard conditions per minute

sec = second

sq ft = square feet

std = at standard conditions

v/v = volume per volume

yd² = square yards

yr = year

(c) *Miscellaneous:*

act = actual

avg = average

I.D. = inside diameter

M = molar

N = normal

O.D. = outside diameter

% = percent

§ 63.4 Prohibited activities and circumvention.

(a) Prohibited activities.

(1) No owner or operator subject to the provisions of this part must operate any affected source in violation of the requirements of this part. Affected sources subject to and in compliance with either an extension of compliance or an exemption from compliance are not in violation of the requirements of this part. An extension of compliance can be granted by the Administrator under this part; by a State with an approved permit program; or by the President under section 112(i)(4) of the Act.

(2) No owner or operator subject to the provisions of this part shall fail to keep records, notify, report, or revise reports as required under this part.

(3)-(5) [Reserved]

(b) *Circumvention.* No owner or operator subject to the provisions of this part shall build, erect, install, or use any article, machine, equipment, or process to conceal an emission that would otherwise constitute noncompliance with a relevant standard. Such concealment includes, but is not limited to -

(1) The use of diluents to achieve compliance with a relevant standard based on the concentration of a pollutant in the effluent discharged to the atmosphere;

(2) The use of gaseous diluents to achieve compliance with a relevant standard for visible emissions;
and

(c) *Fragmentation.* Fragmentation after November 15, 1990 which divides ownership of an operation, within the same facility among various owners where there is no real change in control, will not affect applicability. The owner and operator must not use fragmentation or phasing of reconstruction activities (i.e., intentionally dividing reconstruction into multiple parts for purposes of avoiding new source requirements) to avoid becoming subject to new source requirements.

§ 63.5 Preconstruction review and notification requirements.

(a) Applicability.

(1) This section implements the preconstruction review requirements of section 112(i)(1). After the effective date of a relevant standard, promulgated pursuant to section 112(d), (f), or (h) of the Act, under this part, the preconstruction review requirements in this section apply to the owner or operator of new affected sources and reconstructed affected sources that are major-emitting as specified in this section. New and reconstructed affected sources that commence construction or reconstruction before the effective date of a relevant standard are not subject to the preconstruction review requirements specified in paragraphs (b)(3), (d), and (e) of this section.

(2) This section includes notification requirements for new affected sources and reconstructed affected sources that are not major-emitting affected sources and that are or become subject to a relevant promulgated emission standard after the effective date of a relevant standard promulgated under this part.

(b) Requirements for existing, newly constructed, and reconstructed sources.

(1) A new affected source for which construction commences after proposal of a relevant standard is subject to relevant standards for new affected sources, including compliance dates. An affected source for which reconstruction commences after proposal of a relevant standard is subject to relevant standards for new sources, including compliance dates, irrespective of any change in emissions of hazardous air pollutants from that source.

(2) [Reserved]

(3) After the effective date of any relevant standard promulgated by the Administrator under this part, no person may, without obtaining written approval in advance from the Administrator in accordance with the procedures specified in paragraphs (d) and (e) of this section, do any of the following:

- (i) Construct a new affected source that is major-emitting and subject to such standard;
- (ii) Reconstruct an affected source that is major-emitting and subject to such standard; or
- (iii) Reconstruct a major source such that the source becomes an affected source that is major-emitting and subject to the standard.

(4) After the effective date of any relevant standard promulgated by the Administrator under this part, an owner or operator who constructs a new affected source that is not major-emitting or reconstructs an affected source that is not major-emitting that is subject to such standard, or reconstructs a source such that the source becomes an affected source subject to the standard, must notify the Administrator of the intended construction or reconstruction. The notification must be submitted in accordance with the procedures in § 63.9(b).

(5) [Reserved]

(6) After the effective date of any relevant standard promulgated by the Administrator under this part, equipment added (or a process change) to an affected source that is within the scope of the definition of affected source under the relevant standard must be considered part of the affected source and subject to all provisions of the relevant standard established for that affected source.

(c) [Reserved]

(d) *Application for approval of construction or reconstruction.* The provisions of this paragraph implement section 112(i)(1) of the Act.

(1) *General application requirements.*

(i) An owner or operator who is subject to the requirements of paragraph (b)(3) of this section must submit to the Administrator an application for approval of the construction or reconstruction. The application must be submitted as soon as practicable before actual construction or reconstruction begins. The application for approval of construction or reconstruction may be used to fulfill the initial notification requirements of § 63.9(b)(5). The owner or operator may submit the application for approval well in advance of the date actual construction or reconstruction begins in order to ensure a timely review by the Administrator and that the planned date to begin will not be delayed.

(ii) A separate application shall be submitted for each construction or reconstruction. Each application for approval of construction or reconstruction shall include at a minimum:

(A) The applicant's name and address;

(B) A notification of intention to construct a new major affected source or make any physical or operational change to a major affected source that may meet or has been determined to meet the criteria for a reconstruction, as defined in § 63.2 or in the relevant standard;

(C) The address (i.e., physical location) or proposed address of the source;

(D) An identification of the relevant standard that is the basis of the application;

(E) The expected date of the beginning of actual construction or reconstruction;

(F) The expected completion date of the construction or reconstruction;

(G) [Reserved]

(H) The type and quantity of hazardous air pollutants emitted by the source, reported in units and averaging times and in accordance with the test methods specified in the relevant standard, or if actual emissions data are not yet available, an estimate of the type and quantity of hazardous air pollutants expected to be emitted by the source reported in units and averaging times specified in the relevant standard. The owner or operator may submit percent reduction information if a relevant standard is established in terms of percent reduction. However, operating parameters, such as flow rate, shall be included in the submission to the extent that they demonstrate performance and compliance; and

(I) [Reserved]

(J) Other information as specified in paragraphs (d)(2) and (d)(3) of this section.

(iii) An owner or operator who submits estimates or preliminary information in place of the actual emissions data and analysis required in paragraphs (d)(1)(ii)(H) and (d)(2) of this section shall submit the actual, measured emissions data and other correct information as soon as

available but no later than with the notification of compliance status required in § 63.9(h) (see § 63.9(h)(5)).

(2) *Application for approval of construction.* Each application for approval of construction must include, in addition to the information required in paragraph (d)(1)(ii) of this section, technical information describing the proposed nature, size, design, operating design capacity, and method of operation of the source, including an identification of each type of emission point for each type of hazardous air pollutant that is emitted (or could reasonably be anticipated to be emitted) and a description of the planned air pollution control system (equipment or method) for each emission point. The description of the equipment to be used for the control of emissions must include each control device for each hazardous air pollutant and the estimated control efficiency (percent) for each control device. The description of the method to be used for the control of emissions must include an estimated control efficiency (percent) for that method. Such technical information must include calculations of emission estimates in sufficient detail to permit assessment of the validity of the calculations.

(3) *Application for approval of reconstruction.* Each application for approval of reconstruction shall include, in addition to the information required in paragraph (d)(1)(ii) of this section -

- (i) A brief description of the affected source and the components that are to be replaced;
- (ii) A description of present and proposed emission control systems (i.e., equipment or methods). The description of the equipment to be used for the control of emissions shall include each control device for each hazardous air pollutant and the estimated control efficiency (percent) for each control device. The description of the method to be used for the control of emissions shall include an estimated control efficiency (percent) for that method. Such technical information shall include calculations of emission estimates in sufficient detail to permit assessment of the validity of the calculations;
- (iii) An estimate of the fixed capital cost of the replacements and of constructing a comparable entirely new source;
- (iv) The estimated life of the affected source after the replacements; and
- (v) A discussion of any economic or technical limitations the source may have in complying with relevant standards or other requirements after the proposed replacements. The discussion shall be sufficiently detailed to demonstrate to the Administrator's satisfaction that the technical or economic limitations affect the source's ability to comply with the relevant standard and how they do so.
- (vi) If in the application for approval of reconstruction the owner or operator designates the affected source as a reconstructed source and declares that there are no economic or technical limitations to prevent the source from complying with all relevant standards or other requirements, the owner or operator need not submit the information required in paragraphs (d)(3)(iii) through (d)(3)(v) of this section.

(4) *Additional information.* The Administrator may request additional relevant information after the submittal of an application for approval of construction or reconstruction.

(e) *Approval of construction or reconstruction.*

(1) (i) If the Administrator determines that, if properly constructed, or reconstructed, and operated, a new or existing source for which an application under paragraph (d) of this section was submitted will not cause emissions in violation of the relevant standard(s) and any other federally enforceable requirements, the Administrator will approve the construction or reconstruction.

(ii) In addition, in the case of reconstruction, the Administrator's determination under this paragraph will be based on:

(A) The fixed capital cost of the replacements in comparison to the fixed capital cost that would be required to construct a comparable entirely new source;

(B) The estimated life of the source after the replacements compared to the life of a comparable entirely new source;

(C) The extent to which the components being replaced cause or contribute to the emissions from the source; and

(D) Any economic or technical limitations on compliance with relevant standards that are inherent in the proposed replacements.

(2) (i) The Administrator will notify the owner or operator in writing of approval or intention to deny approval of construction or reconstruction within 60 calendar days after receipt of sufficient information to evaluate an application submitted under paragraph (d) of this section. The 60-day approval or denial period will begin after the owner or operator has been notified in writing that his/her application is complete. The Administrator will notify the owner or operator in writing of the status of his/her application, that is, whether the application contains sufficient information to make a determination, within 30 calendar days after receipt of the original application and within 30 calendar days after receipt of any supplementary information that is submitted.

(ii) When notifying the owner or operator that his/her application is not complete, the Administrator will specify the information needed to complete the application and provide notice of opportunity for the applicant to present, in writing, within 30 calendar days after he/she is notified of the incomplete application, additional information or arguments to the Administrator to enable further action on the application.

(3) Before denying any application for approval of construction or reconstruction, the Administrator will notify the applicant of the Administrator's intention to issue the denial together with -

(i) Notice of the information and findings on which the intended denial is based; and

(ii) Notice of opportunity for the applicant to present, in writing, within 30 calendar days after he/she is notified of the intended denial, additional information or arguments to the Administrator to enable further action on the application.

(4) A final determination to deny any application for approval will be in writing and will specify the grounds on which the denial is based. The final determination will be made within 60 calendar days of presentation of additional information or arguments (if the application is complete), or within 60 calendar days after the final date specified for presentation if no presentation is made.

(5) Neither the submission of an application for approval nor the Administrator's approval of construction or reconstruction shall -

- (i) Relieve an owner or operator of legal responsibility for compliance with any applicable provisions of this part or with any other applicable Federal, State, or local requirement; or
- (ii) Prevent the Administrator from implementing or enforcing this part or taking any other action under the Act.

(f) Approval of construction or reconstruction based on prior State preconstruction review.

(1) Preconstruction review procedures that a State utilizes for other purposes may also be utilized for purposes of this section if the procedures are substantially equivalent to those specified in this section. The Administrator will approve an application for construction or reconstruction specified in paragraphs (b)(3) and (d) of this section if the owner or operator of a new affected source or reconstructed affected source, who is subject to such requirement meets the following conditions:

- (i) The owner or operator of the new affected source or reconstructed affected source has undergone a preconstruction review and approval process in the State in which the source is (or would be) located and has received a federally enforceable construction permit that contains a finding that the source will meet the relevant promulgated emission standard, if the source is properly built and operated.
- (ii) Provide a statement from the State or other evidence (such as State regulations) that it considered the factors specified in paragraph (e)(1) of this section.

(2) The owner or operator must submit to the Administrator the request for approval of construction or reconstruction under this paragraph (f)(2) no later than the application deadline specified in paragraph (d)(1) of this section (see also § 63.9(b)(2)). The owner or operator must include in the request information sufficient for the Administrator's determination. The Administrator will evaluate the owner or operator's request in accordance with the procedures specified in paragraph (e) of this section. The Administrator may request additional relevant information after the submittal of a request for approval of construction or reconstruction under this paragraph (f)(2).

§ 63.6 Compliance with standards and maintenance requirements.

(a) Applicability.

(1) The requirements in this section apply to the owner or operator of affected sources for which any relevant standard has been established pursuant to section 112 of the Act and the applicability of such requirements is set out in accordance with § 63.1(a)(4) unless -

- (i) The Administrator (or a State with an approved permit program) has granted an extension of compliance consistent with paragraph (i) of this section; or
- (ii) The President has granted an exemption from compliance with any relevant standard in accordance with section 112(i)(4) of the Act.

(2) If an area source that otherwise would be subject to an emission standard or other requirement established under this part if it were a major source subsequently increases its emissions of hazardous air pollutants (or its potential to emit hazardous air pollutants) such that the source is a major source, such source shall be subject to the relevant emission standard or other requirement.

(b) Compliance dates for new and reconstructed sources.

(1) Except as specified in paragraphs (b)(3) and (4) of this section, the owner or operator of a new or reconstructed affected source for which construction or reconstruction commences after proposal of a relevant standard that has an initial startup before the effective date of a relevant standard established under this part pursuant to section 112(d), (f), or (h) of the Act must comply with such standard not later than the standard's effective date.

(2) Except as specified in paragraphs (b)(3) and (4) of this section, the owner or operator of a new or reconstructed affected source that has an initial startup after the effective date of a relevant standard established under this part pursuant to section 112(d), (f), or (h) of the Act must comply with such standard upon startup of the source.

(3) The owner or operator of an affected source for which construction or reconstruction is commenced after the proposal date of a relevant standard established under this part pursuant to section 112(d), 112(f), or 112(h) of the Act but before the effective date (that is, promulgation) of such standard shall comply with the relevant emission standard not later than the date 3 years after the effective date if:

(i) The promulgated standard (that is, the relevant standard) is more stringent than the proposed standard; for purposes of this paragraph, a finding that controls or compliance methods are "more stringent" must include control technologies or performance criteria and compliance or compliance assurance methods that are different but are substantially equivalent to those required by the promulgated rule, as determined by the Administrator (or his or her authorized representative); and

(ii) The owner or operator complies with the standard as proposed during the 3-year period immediately after the effective date.

(4) The owner or operator of an affected source for which construction or reconstruction is commenced after the proposal date of a relevant standard established pursuant to section 112(d) of the Act but before the proposal date of a relevant standard established pursuant to section 112(f) shall not be required to comply with the section 112(f) emission standard until the date 10 years after the date construction or reconstruction is commenced, except that, if the section 112(f) standard is promulgated more than 10 years after construction or reconstruction is commenced, the owner or operator must comply with the standard as provided in paragraphs (b)(1) and (2) of this section.

(5) The owner or operator of a new source that is subject to the compliance requirements of paragraph (b)(3) or (4) of this section must notify the Administrator in accordance with § 63.9(d)

(6) [Reserved]

(7) When an area source increases its emissions of (or its potential to emit) hazardous air pollutants such that the source becomes a major source, the portion of the facility that meets the definition of a new affected source must comply with all requirements of that standard applicable to new sources. The source owner or operator must comply with the relevant standard upon startup.

(c) Compliance dates for existing sources.

(1) After the effective date of a relevant standard established under this part pursuant to section 112(d) or 112(h) of the Act, the owner or operator of an existing source shall comply with such standard by the compliance date established by the Administrator in the applicable subpart(s) of this

part, except as provided in § 63.1(c)(6)(i). Except as otherwise provided for in section 112 of the Act, in no case will the compliance date established for an existing source in an applicable subpart of this part exceed 3 years after the effective date of such standard.

(2) If an existing source is subject to a standard established under this part pursuant to section 112(f) of the Act, the owner or operator must comply with the standard by the date 90 days after the standard's effective date, or by the date specified in an extension granted to the source by the Administrator under paragraph (i)(4)(ii) of this section, whichever is later.

(3)-(4) [Reserved]

(5) Except as provided in paragraph (b)(7) of this section, the owner or operator of an area source that increases its emissions of (or its potential to emit) hazardous air pollutants such that the source becomes a major source and meets the definition of an existing source in the applicable major source standard shall be subject to relevant standards for existing sources. Except as provided in paragraph § 63.1(c)(6)(i)(B), such sources must comply by the date specified in the standards for existing area sources that become major sources. If no such compliance date is specified in the standards, the source shall have a period of time to comply with the relevant emission standard that is equivalent to the compliance period specified in the relevant standard for existing sources in existence at the time the standard becomes effective.

(d) [Reserved]

(e) *Operation and maintenance requirements.*

(1) (i) At all times, including periods of startup, shutdown, and malfunction, the owner or operator must operate and maintain any affected source, including associated air pollution control equipment and monitoring equipment, in a manner consistent with safety and good air pollution control practices for minimizing emissions. During a period of startup, shutdown, or malfunction, this general duty to minimize emissions requires that the owner or operator reduce emissions from the affected source to the greatest extent which is consistent with safety and good air pollution control practices. The general duty to minimize emissions during a period of startup, shutdown, or malfunction does not require the owner or operator to achieve emission levels that would be required by the applicable standard at other times if this is not consistent with safety and good air pollution control practices, nor does it require the owner or operator to make any further efforts to reduce emissions if levels required by the applicable standard have been achieved. Determination of whether such operation and maintenance procedures are being used will be based on information available to the Administrator which may include, but is not limited to, monitoring results, review of operation and maintenance procedures (including the startup, shutdown, and malfunction plan required in paragraph (e)(3) of this section), review of operation and maintenance records, and inspection of the source.

(ii) Malfunctions must be corrected as soon as practicable after their occurrence. To the extent that an unexpected event arises during a startup, shutdown, or malfunction, an owner or operator must comply by minimizing emissions during such a startup, shutdown, and malfunction event consistent with safety and good air pollution control practices.

(iii) Operation and maintenance requirements established pursuant to section 112 of the Act are enforceable independent of emissions limitations or other requirements in relevant standards.

(2) [Reserved]

(3) *Startup, shutdown, and malfunction plan.*

(i) The owner or operator of an affected source must develop a written startup, shutdown, and malfunction plan that describes, in detail, procedures for operating and maintaining the source during periods of startup, shutdown, and malfunction; and a program of corrective action for malfunctioning process, air pollution control, and monitoring equipment used to comply with the relevant standard. The startup, shutdown, and malfunction plan does not need to address any scenario that would not cause the source to exceed an applicable emission limitation in the relevant standard. This plan must be developed by the owner or operator by the source's compliance date for that relevant standard. The purpose of the startup, shutdown, and malfunction plan is to -

- (A) Ensure that, at all times, the owner or operator operates and maintains each affected source, including associated air pollution control and monitoring equipment, in a manner which satisfies the general duty to minimize emissions established by paragraph (e)(1)(i) of this section;
- (B) Ensure that owners or operators are prepared to correct malfunctions as soon as practicable after their occurrence in order to minimize excess emissions of hazardous air pollutants; and
- (C) Reduce the reporting burden associated with periods of startup, shutdown, and malfunction (including corrective action taken to restore malfunctioning process and air pollution control equipment to its normal or usual manner of operation).

(ii) [Reserved]

(iii) When actions taken by the owner or operator during a startup or shutdown (and the startup or shutdown causes the source to exceed any applicable emission limitation in the relevant emission standards), or malfunction (including actions taken to correct a malfunction) are consistent with the procedures specified in the affected source's startup, shutdown, and malfunction plan, the owner or operator must keep records for that event which demonstrate that the procedures specified in the plan were followed. These records may take the form of a "checklist," or other effective form of recordkeeping that confirms conformance with the startup, shutdown, and malfunction plan and describes the actions taken for that event. In addition, the owner or operator must keep records of these events as specified in paragraph 63.10(b), including records of the occurrence and duration of each startup or shutdown (if the startup or shutdown causes the source to exceed any applicable emission limitation in the relevant emission standards), or malfunction of operation and each malfunction of the air pollution control and monitoring equipment. Furthermore, the owner or operator shall confirm that actions taken during the relevant reporting period during periods of startup, shutdown, and malfunction were consistent with the affected source's startup, shutdown and malfunction plan in the semiannual (or more frequent) startup, shutdown, and malfunction report required in § 63.10(d)(5).

(iv) If an action taken by the owner or operator during a startup, shutdown, or malfunction (including an action taken to correct a malfunction) is not consistent with the procedures

specified in the affected source's startup, shutdown, and malfunction plan, and the source exceeds any applicable emission limitation in the relevant emission standard, then the owner or operator must record the actions taken for that event and must report such actions within 2 working days after commencing actions inconsistent with the plan, followed by a letter within 7 working days after the end of the event, in accordance with § 63.10(d)(5) (unless the owner or operator makes alternative reporting arrangements, in advance, with the Administrator).

(v) The owner or operator must maintain at the affected source a current startup, shutdown, and malfunction plan and must make the plan available upon request for inspection and copying by the Administrator. In addition, if the startup, shutdown, and malfunction plan is subsequently revised as provided in paragraph (e)(3)(viii) of this section, the owner or operator must maintain at the affected source each previous (i.e., superseded) version of the startup, shutdown, and malfunction plan, and must make each such previous version available for inspection and copying by the Administrator for a period of 5 years after revision of the plan. If at any time after adoption of a startup, shutdown, and malfunction plan the affected source ceases operation or is otherwise no longer subject to the provisions of this part, the owner or operator must retain a copy of the most recent plan for 5 years from the date the source ceases operation or is no longer subject to this part and must make the plan available upon request for inspection and copying by the Administrator. The Administrator may at any time request in writing that the owner or operator submit a copy of any startup, shutdown, and malfunction plan (or a portion thereof) which is maintained at the affected source or in the possession of the owner or operator. Upon receipt of such a request, the owner or operator must promptly submit a copy of the requested plan (or a portion thereof) to the Administrator. The owner or operator may elect to submit the required copy of any startup, shutdown, and malfunction plan to the Administrator in an electronic format. If the owner or operator claims that any portion of such a startup, shutdown, and malfunction plan is confidential business information entitled to protection from disclosure under section 114(c) of the Act or 40 CFR 2.301, the material which is claimed as confidential must be clearly designated in the submission.

(vi) To satisfy the requirements of this section to develop a startup, shutdown, and malfunction plan, the owner or operator may use the affected source's standard operating procedures (SOP) manual, or an Occupational Safety and Health Administration (OSHA) or other plan, provided the alternative plans meet all the requirements of this section and are made available for inspection or submitted when requested by the Administrator.

(vii) Based on the results of a determination made under paragraph (e)(1)(i) of this section, the Administrator may require that an owner or operator of an affected source make changes to the startup, shutdown, and malfunction plan for that source. The Administrator must require appropriate revisions to a startup, shutdown, and malfunction plan, if the Administrator finds that the plan:

- (A) Does not address a startup, shutdown, or malfunction event that has occurred;
- (B) Fails to provide for the operation of the source (including associated air pollution control and monitoring equipment) during a startup, shutdown, or malfunction event in a manner consistent with the general duty to minimize emissions established by paragraph (e)(1)(i) of this section;

(C) Does not provide adequate procedures for correcting malfunctioning process and/or air pollution control and monitoring equipment as quickly as practicable; or

(D) Includes an event that does not meet the definition of startup, shutdown, or malfunction listed in § 63.2.

(viii) The owner or operator may periodically revise the startup, shutdown, and malfunction plan for the affected source as necessary to satisfy the requirements of this part or to reflect changes in equipment or procedures at the affected source. Unless the permitting authority provides otherwise, the owner or operator may make such revisions to the startup, shutdown, and malfunction plan without prior approval by the Administrator or the permitting authority. However, each such revision to a startup, shutdown, and malfunction plan must be reported in the semiannual report required by § 63.10(d)(5). If the startup, shutdown, and malfunction plan fails to address or inadequately addresses an event that meets the characteristics of a malfunction but was not included in the startup, shutdown, and malfunction plan at the time the owner or operator developed the plan, the owner or operator must revise the startup, shutdown, and malfunction plan within 45 days after the event to include detailed procedures for operating and maintaining the source during similar malfunction events and a program of corrective action for similar malfunctions of process or air pollution control and monitoring equipment. In the event that the owner or operator makes any revision to the startup, shutdown, and malfunction plan which alters the scope of the activities at the source which are deemed to be a startup, shutdown, or malfunction, or otherwise modifies the applicability of any emission limit, work practice requirement, or other requirement in a standard established under this part, the revised plan shall not take effect until after the owner or operator has provided a written notice describing the revision to the permitting authority.

(ix) The title V permit for an affected source must require that the owner or operator develop a startup, shutdown, and malfunction plan which conforms to the provisions of this part, but may do so by citing to the relevant subpart or subparagraphs of paragraph (e) of this section. However, any revisions made to the startup, shutdown, and malfunction plan in accordance with the procedures established by this part shall not be deemed to constitute permit revisions under part 70 or part 71 of this chapter and the elements of the startup, shutdown, and malfunction plan shall not be considered an applicable requirement as defined in § 70.2 and § 71.2 of this chapter. Moreover, none of the procedures specified by the startup, shutdown, and malfunction plan for an affected source shall be deemed to fall within the permit shield provision in section 504(f) of the Act.

(f) Compliance with nonopacity emission standards -

(1) *Applicability.* The non-opacity emission standards set forth in this part shall apply at all times except as otherwise specified in an applicable subpart. If a startup, shutdown, or malfunction of one portion of an affected source does not affect the ability of particular emission points within other portions of the affected source to comply with the non-opacity emission standards set forth in this part, then that emission point must still be required to comply with the non-opacity emission standards and other applicable requirements.

(2) *Methods for determining compliance.*

(i) The Administrator will determine compliance with nonopacity emission standards in this part based on the results of performance tests conducted according to the procedures in § 63.7, unless otherwise specified in an applicable subpart of this part.

(ii) The Administrator will determine compliance with nonopacity emission standards in this part by evaluation of an owner or operator's conformance with operation and maintenance requirements, including the evaluation of monitoring data, as specified in § 63.6(e) and applicable subparts of this part.

(iii) If an affected source conducts performance testing at startup to obtain an operating permit in the State in which the source is located, the results of such testing may be used to demonstrate compliance with a relevant standard if -

(A) The performance test was conducted within a reasonable amount of time before an initial performance test is required to be conducted under the relevant standard;

(B) The performance test was conducted under representative operating conditions for the source;

(C) The performance test was conducted and the resulting data were reduced using EPA-approved test methods and procedures, as specified in § 63.7(e) of this subpart; and

(D) The performance test was appropriately quality-assured, as specified in § 63.7(c).

(iv) The Administrator will determine compliance with design, equipment, work practice, or operational emission standards in this part by review of records, inspection of the source, and other procedures specified in applicable subparts of this part.

(v) The Administrator will determine compliance with design, equipment, work practice, or operational emission standards in this part by evaluation of an owner or operator's conformance with operation and maintenance requirements, as specified in paragraph (e) of this section and applicable subparts of this part.

(3) *Finding of compliance.* The Administrator will make a finding concerning an affected source's compliance with a non-opacity emission standard, as specified in paragraphs (f)(1) and (2) of this section, upon obtaining all the compliance information required by the relevant standard (including the written reports of performance test results, monitoring results, and other information, if applicable), and information available to the Administrator pursuant to paragraph (e)(1)(i) of this section.

(g) *Use of an alternative nonopacity emission standard.*

(1) If, in the Administrator's judgment, an owner or operator of an affected source has established that an alternative means of emission limitation will achieve a reduction in emissions of a hazardous air pollutant from an affected source at least equivalent to the reduction in emissions of that pollutant from that source achieved under any design, equipment, work practice, or operational emission standard, or combination thereof, established under this part pursuant to section 112(h) of the Act, the Administrator will publish in the Federal Register a notice permitting the use of the alternative emission standard for purposes of compliance with the promulgated standard. Any Federal Register

notice under this paragraph shall be published only after the public is notified and given the opportunity to comment. Such notice will restrict the permission to the stationary source(s) or category(ies) of sources from which the alternative emission standard will achieve equivalent emission reductions. The Administrator will condition permission in such notice on requirements to assure the proper operation and maintenance of equipment and practices required for compliance with the alternative emission standard and other requirements, including appropriate quality assurance and quality control requirements, that are deemed necessary.

(2) An owner or operator requesting permission under this paragraph shall, unless otherwise specified in an applicable subpart, submit a proposed test plan or the results of testing and monitoring in accordance with § 63.7 and § 63.8, a description of the procedures followed in testing or monitoring, and a description of pertinent conditions during testing or monitoring. Any testing or monitoring conducted to request permission to use an alternative nonopacity emission standard shall be appropriately quality assured and quality controlled, as specified in § 63.7 and § 63.8.

(3) The Administrator may establish general procedures in an applicable subpart that accomplish the requirements of paragraphs (g)(1) and (g)(2) of this section.

(h) Compliance with opacity and visible emission standards -

(1) *Applicability.* The opacity and visible emission standards set forth in this part must apply at all times except as otherwise specified in an applicable subpart. If a startup, shutdown, or malfunction of one portion of an affected source does not affect the ability of particular emission points within other portions of the affected source to comply with the opacity and visible emission standards set forth in this part, then that emission point shall still be required to comply with the opacity and visible emission standards and other applicable requirements.

(2) Methods for determining compliance.

(i) The Administrator will determine compliance with opacity and visible emission standards in this part based on the results of the test method specified in an applicable subpart. Whenever a continuous opacity monitoring system (COMS) is required to be installed to determine compliance with numerical opacity emission standards in this part, compliance with opacity emission standards in this part shall be determined by using the results from the COMS. Whenever an opacity emission test method is not specified, compliance with opacity emission standards in this part shall be determined by conducting observations in accordance with Test Method 9 in appendix A of part 60 of this chapter or the method specified in paragraph (h)(7)(ii) of this section. Whenever a visible emission test method is not specified, compliance with visible emission standards in this part shall be determined by conducting observations in accordance with Test Method 22 in appendix A of part 60 of this chapter.

(ii) [Reserved]

(iii) If an affected source undergoes opacity or visible emission testing at startup to obtain an operating permit in the State in which the source is located, the results of such testing may be used to demonstrate compliance with a relevant standard if -

- (A) The opacity or visible emission test was conducted within a reasonable amount of time before a performance test is required to be conducted under the relevant standard;
- (B) The opacity or visible emission test was conducted under representative operating conditions for the source;
- (C) The opacity or visible emission test was conducted and the resulting data were reduced using EPA-approved test methods and procedures, as specified in § 63.7(e); and
- (D) The opacity or visible emission test was appropriately quality-assured, as specified in § 63.7(c) of this section.

(3) [Reserved]

(4) *Notification of opacity or visible emission observations.* The owner or operator of an affected source shall notify the Administrator in writing of the anticipated date for conducting opacity or visible emission observations in accordance with § 63.9(f), if such observations are required for the source by a relevant standard.

(5) *Conduct of opacity or visible emission observations.* When a relevant standard under this part includes an opacity or visible emission standard, the owner or operator of an affected source shall comply with the following:

(i) For the purpose of demonstrating initial compliance, opacity or visible emission observations shall be conducted concurrently with the initial performance test required in § 63.7 unless one of the following conditions applies:

(A) If no performance test under § 63.7 is required, opacity or visible emission observations shall be conducted within 60 days after achieving the maximum production rate at which a new or reconstructed source will be operated, but not later than 120 days after initial startup of the source, or within 120 days after the effective date of the relevant standard in the case of new sources that start up before the standard's effective date. If no performance test under § 63.7 is required, opacity or visible emission observations shall be conducted within 120 days after the compliance date for an existing or modified source; or

(B) If visibility or other conditions prevent the opacity or visible emission observations from being conducted concurrently with the initial performance test required under § 63.7, or within the time period specified in paragraph (h)(5)(i)(A) of this section, the source's owner or operator shall reschedule the opacity or visible emission observations as soon after the initial performance test, or time period, as possible, but not later than 30 days thereafter, and shall advise the Administrator of the rescheduled date. The rescheduled opacity or visible emission observations shall be conducted (to the extent possible) under the same operating conditions that existed during the initial performance test conducted under § 63.7. The visible emissions observer shall determine whether visibility or other conditions prevent the opacity or visible emission observations from being made concurrently with the initial performance test in

accordance with procedures contained in Test Method 9 or Test Method 22 in appendix A of part 60 of this chapter.

(ii) For the purpose of demonstrating initial compliance, the minimum total time of opacity observations shall be 3 hours (30 6-minute averages) for the performance test or other required set of observations (e.g., for fugitive-type emission sources subject only to an opacity emission standard).

(iii) The owner or operator of an affected source to which an opacity or visible emission standard in this part applies shall conduct opacity or visible emission observations in accordance with the provisions of this section, record the results of the evaluation of emissions, and report to the Administrator the opacity or visible emission results in accordance with the provisions of § 63.10(d).

(iv) [Reserved]

(v) Opacity readings of portions of plumes that contain condensed, uncombined water vapor shall not be used for purposes of determining compliance with opacity emission standards.

(6) *Availability of records.* The owner or operator of an affected source shall make available, upon request by the Administrator, such records that the Administrator deems necessary to determine the conditions under which the visual observations were made and shall provide evidence indicating proof of current visible observer emission certification.

(7) *Use of a continuous opacity monitoring system.*

(i) The owner or operator of an affected source required to use a continuous opacity monitoring system (COMS) shall record the monitoring data produced during a performance test required under § 63.7 and shall furnish the Administrator a written report of the monitoring results in accordance with the provisions of § 63.10(e)(4).

(ii) Whenever an opacity emission test method has not been specified in an applicable subpart, or an owner or operator of an affected source is required to conduct Test Method 9 observations (see appendix A of part 60 of this chapter), the owner or operator may submit, for compliance purposes, COMS data results produced during any performance test required under § 63.7 in lieu of Method 9 data. If the owner or operator elects to submit COMS data for compliance with the opacity emission standard, he or she shall notify the Administrator of that decision, in writing, simultaneously with the notification under § 63.7(b) of the date the performance test is scheduled to begin. Once the owner or operator of an affected source has notified the Administrator to that effect, the COMS data results will be used to determine opacity compliance during subsequent performance tests required under § 63.7, unless the owner or operator notifies the Administrator in writing to the contrary not later than with the notification under § 63.7(b) of the date the subsequent performance test is scheduled to begin.

(iii) For the purposes of determining compliance with the opacity emission standard during a performance test required under § 63.7 using COMS data, the COMS data shall be reduced to 6-minute averages over the duration of the mass emission performance test.

(iv) The owner or operator of an affected source using a COMS for compliance purposes is responsible for demonstrating that he/she has complied with the performance evaluation

requirements of § 63.8(e), that the COMS has been properly maintained, operated, and data quality-assured, as specified in § 63.8(c) and § 63.8(d), and that the resulting data have not been altered in any way.

(v) Except as provided in paragraph (h)(7)(ii) of this section, the results of continuous monitoring by a COMS that indicate that the opacity at the time visual observations were made was not in excess of the emission standard are probative but not conclusive evidence of the actual opacity of an emission, provided that the affected source proves that, at the time of the alleged violation, the instrument used was properly maintained, as specified in § 63.8(c), and met Performance Specification 1 in appendix B of part 60 of this chapter, and that the resulting data have not been altered in any way.

(8) *Finding of compliance.* The Administrator will make a finding concerning an affected source's compliance with an opacity or visible emission standard upon obtaining all the compliance information required by the relevant standard (including the written reports of the results of the performance tests required by § 63.7, the results of Test Method 9 or another required opacity or visible emission test method, the observer certification required by paragraph (h)(6) of this section, and the continuous opacity monitoring system results, whichever is/are applicable) and any information available to the Administrator needed to determine whether proper operation and maintenance practices are being used.

(9) *Adjustment to an opacity emission standard.*

(i) If the Administrator finds under paragraph (h)(8) of this section that an affected source is in compliance with all relevant standards for which initial performance tests were conducted under § 63.7, but during the time such performance tests were conducted fails to meet any relevant opacity emission standard, the owner or operator of such source may petition the Administrator to make appropriate adjustment to the opacity emission standard for the affected source. Until the Administrator notifies the owner or operator of the appropriate adjustment, the relevant opacity emission standard remains applicable.

(ii) The Administrator may grant such a petition upon a demonstration by the owner or operator that -

(A) The affected source and its associated air pollution control equipment were operated and maintained in a manner to minimize the opacity of emissions during the performance tests;

(B) The performance tests were performed under the conditions established by the Administrator; and

(C) The affected source and its associated air pollution control equipment were incapable of being adjusted or operated to meet the relevant opacity emission standard.

(iii) The Administrator will establish an adjusted opacity emission standard for the affected source meeting the above requirements at a level at which the source will be able, as indicated by the performance and opacity tests, to meet the opacity emission standard at all times during which the source is meeting the mass or concentration emission standard. The Administrator will promulgate the new opacity emission standard in the Federal Register.

(iv) After the Administrator promulgates an adjusted opacity emission standard for an affected source, the owner or operator of such source shall be subject to the new opacity emission standard, and the new opacity emission standard shall apply to such source during any subsequent performance tests.

(i) Extension of compliance with emission standards.

(1) Until an extension of compliance has been granted by the Administrator (or a State with an approved permit program) under this paragraph, the owner or operator of an affected source subject to the requirements of this section shall comply with all applicable requirements of this part.

(2) Extension of compliance for early reductions and other reductions -

(i) *Early reductions.* Pursuant to section 112(i)(5) of the Act, if the owner or operator of an existing source demonstrates that the source has achieved a reduction in emissions of hazardous air pollutants in accordance with the provisions of subpart D of this part, the Administrator (or the State with an approved permit program) will grant the owner or operator an extension of compliance with specific requirements of this part, as specified in subpart D.

(ii) *Other reductions.* Pursuant to section 112(i)(6) of the Act, if the owner or operator of an existing source has installed best available control technology (BACT) (as defined in section 169(3) of the Act) or technology required to meet a lowest achievable emission rate (LAER) (as defined in section 171 of the Act) prior to the promulgation of an emission standard in this part applicable to such source and the same pollutant (or stream of pollutants) controlled pursuant to the BACT or LAER installation, the Administrator will grant the owner or operator an extension of compliance with such emission standard that will apply until the date 5 years after the date on which such installation was achieved, as determined by the Administrator.

(3) *Request for extension of compliance.* Paragraphs (i)(4) through (i)(7) of this section concern requests for an extension of compliance with a relevant standard under this part (except requests for an extension of compliance under paragraph (i)(2)(i) of this section will be handled through procedures specified in subpart D of this part).

(4) (i) (A) The owner or operator of an existing source who is unable to comply with a relevant standard established under this part pursuant to section 112(d) of the Act may request that the Administrator (or a State, when the State has an approved part 70 permit program and the source is required to obtain a part 70 permit under that program, or a State, when the State has been delegated the authority to implement and enforce the emission standard for that source) grant an extension allowing the source up to 1 additional year to comply with the standard, if such additional period is necessary for the installation of controls. An additional extension of up to 3 years may be added for mining waste operations, if the 1-year extension of compliance is insufficient to dry and cover mining waste in order to reduce emissions of any hazardous air pollutant. The owner or operator of an affected source who has requested an extension of compliance under this paragraph and who is otherwise required to obtain a title V permit shall apply for such permit or apply to have the source's title V permit revised to incorporate the conditions of the extension of compliance. The conditions of an extension of compliance granted under this paragraph will be incorporated into the affected source's title V permit according to the provisions of part 70 or Federal title V regulations in this chapter (42 U.S.C. 7661), whichever are applicable.

(B) Any request under this paragraph for an extension of compliance with a relevant standard must be submitted in writing to the appropriate authority no later than 120 days prior to the affected source's compliance date (as specified in paragraphs (b) and (c) of this section), except as provided for in paragraph (i)(4)(i)(C) of this section. Nonfrivolous requests submitted under this paragraph will stay the applicability of the rule as to the emission points in question until such time as the request is granted or denied. A denial will be effective as of the date of denial. Emission standards established under this part may specify alternative dates for the submittal of requests for an extension of compliance if alternatives are appropriate for the source categories affected by those standards.

(C) An owner or operator may submit a compliance extension request after the date specified in paragraph (i)(4)(i)(B) of this section provided the need for the compliance extension arose after that date, and before the otherwise applicable compliance date and the need arose due to circumstances beyond reasonable control of the owner or operator. This request must include, in addition to the information required in paragraph (i)(6)(i) of this section, a statement of the reasons additional time is needed and the date when the owner or operator first learned of the problems. Nonfrivolous requests submitted under this paragraph will stay the applicability of the rule as to the emission points in question until such time as the request is granted or denied. A denial will be effective as of the original compliance date.

(ii) The owner or operator of an existing source unable to comply with a relevant standard established under this part pursuant to section 112(f) of the Act may request that the Administrator grant an extension allowing the source up to 2 years after the standard's effective date to comply with the standard. The Administrator may grant such an extension if he/she finds that such additional period is necessary for the installation of controls and that steps will be taken during the period of the extension to assure that the health of persons will be protected from imminent endangerment. Any request for an extension of compliance with a relevant standard under this paragraph must be submitted in writing to the Administrator not later than 90 calendar days after the effective date of the relevant standard.

(5) The owner or operator of an existing source that has installed BACT or technology required to meet LAER [as specified in paragraph (i)(2)(ii) of this section] prior to the promulgation of a relevant emission standard in this part may request that the Administrator grant an extension allowing the source 5 years from the date on which such installation was achieved, as determined by the Administrator, to comply with the standard. Any request for an extension of compliance with a relevant standard under this paragraph shall be submitted in writing to the Administrator not later than 120 days after the promulgation date of the standard. The Administrator may grant such an extension if he or she finds that the installation of BACT or technology to meet LAER controls the same pollutant (or stream of pollutants) that would be controlled at that source by the relevant emission standard.

(6) (i) The request for a compliance extension under paragraph (i)(4) of this section shall include the following information:

(A) A description of the controls to be installed to comply with the standard;

(B) A compliance schedule, including the date by which each step toward compliance will be reached. At a minimum, the list of dates shall include:

- (1) The date by which on-site construction, installation of emission control equipment, or a process change is planned to be initiated; and
- (2) The date by which final compliance is to be achieved.
- (3) The date by which on-site construction, installation of emission control equipment, or a process change is to be completed; and
- (4) The date by which final compliance is to be achieved;

(C)-(D)

(ii) The request for a compliance extension under paragraph (i)(5) of this section shall include all information needed to demonstrate to the Administrator's satisfaction that the installation of BACT or technology to meet LAER controls the same pollutant (or stream of pollutants) that would be controlled at that source by the relevant emission standard.

(7) Advice on requesting an extension of compliance may be obtained from the Administrator (or the State with an approved permit program).

(8) *Approval of request for extension of compliance.* Paragraphs (i)(9) through (i)(14) of this section concern approval of an extension of compliance requested under paragraphs (i)(4) through (i)(6) of this section.

(9) Based on the information provided in any request made under paragraphs (i)(4) through (i)(6) of this section, or other information, the Administrator (or the State with an approved permit program) may grant an extension of compliance with an emission standard, as specified in paragraphs (i)(4) and (i)(5) of this section.

(10) The extension will be in writing and will -

- (i) Identify each affected source covered by the extension;
- (ii) Specify the termination date of the extension;
- (iii) Specify the dates by which steps toward compliance are to be taken, if appropriate;
- (iv) Specify other applicable requirements to which the compliance extension applies (e.g., performance tests); and
- (v) (A) Under paragraph (i)(4), specify any additional conditions that the Administrator (or the State) deems necessary to assure installation of the necessary controls and protection of the health of persons during the extension period; or
(B) Under paragraph (i)(5), specify any additional conditions that the Administrator deems necessary to assure the proper operation and maintenance of the installed controls during the extension period.

(11) The owner or operator of an existing source that has been granted an extension of compliance under paragraph (i)(10) of this section may be required to submit to the Administrator (or the State with an approved permit program) progress reports indicating whether the steps toward compliance

outlined in the compliance schedule have been reached. The contents of the progress reports and the dates by which they shall be submitted will be specified in the written extension of compliance granted under paragraph (i)(10) of this section.

(12) (i) The Administrator (or the State with an approved permit program) will notify the owner or operator in writing of approval or intention to deny approval of a request for an extension of compliance within 30 calendar days after receipt of sufficient information to evaluate a request submitted under paragraph (i)(4)(i) or (i)(5) of this section. The Administrator (or the State) will notify the owner or operator in writing of the status of his/her application, that is, whether the application contains sufficient information to make a determination, within 30 calendar days after receipt of the original application and within 30 calendar days after receipt of any supplementary information that is submitted. The 30-day approval or denial period will begin after the owner or operator has been notified in writing that his/her application is complete.

(ii) When notifying the owner or operator that his/her application is not complete, the Administrator will specify the information needed to complete the application and provide notice of opportunity for the applicant to present, in writing, within 30 calendar days after he/she is notified of the incomplete application, additional information or arguments to the Administrator to enable further action on the application.

(iii) Before denying any request for an extension of compliance, the Administrator (or the State with an approved permit program) will notify the owner or operator in writing of the Administrator's (or the State's) intention to issue the denial, together with -

(A) Notice of the information and findings on which the intended denial is based; and

(B) Notice of opportunity for the owner or operator to present in writing, within 15 calendar days after he/she is notified of the intended denial, additional information or arguments to the Administrator (or the State) before further action on the request.

(iv) The Administrator's final determination to deny any request for an extension will be in writing and will set forth the specific grounds on which the denial is based. The final determination will be made within 30 calendar days after presentation of additional information or argument (if the application is complete), or within 30 calendar days after the final date specified for the presentation if no presentation is made.

(13) (i) The Administrator will notify the owner or operator in writing of approval or intention to deny approval of a request for an extension of compliance within 30 calendar days after receipt of sufficient information to evaluate a request submitted under paragraph (i)(4)(ii) of this section. The 30-day approval or denial period will begin after the owner or operator has been notified in writing that his/her application is complete. The Administrator (or the State) will notify the owner or operator in writing of the status of his/her application, that is, whether the application contains sufficient information to make a determination, within 15 calendar days after receipt of the original application and within 15 calendar days after receipt of any supplementary information that is submitted.

(ii) When notifying the owner or operator that his/her application is not complete, the Administrator will specify the information needed to complete the application and provide notice of opportunity for the applicant to present, in writing, within 15 calendar days after

he/she is notified of the incomplete application, additional information or arguments to the Administrator to enable further action on the application.

(iii) Before denying any request for an extension of compliance, the Administrator will notify the owner or operator in writing of the Administrator's intention to issue the denial, together with -

(A) Notice of the information and findings on which the intended denial is based; and

(B) Notice of opportunity for the owner or operator to present in writing, within 15 calendar days after he/she is notified of the intended denial, additional information or arguments to the Administrator before further action on the request.

(iv) A final determination to deny any request for an extension will be in writing and will set forth the specific grounds on which the denial is based. The final determination will be made within 30 calendar days after presentation of additional information or argument (if the application is complete), or within 30 calendar days after the final date specified for the presentation if no presentation is made.

(14) The Administrator (or the State with an approved permit program) may terminate an extension of compliance at an earlier date than specified if any specification under paragraph (i)(10)(iii) or (iv) of this section is not met. Upon a determination to terminate, the Administrator will notify, in writing, the owner or operator of the Administrator's determination to terminate, together with:

(i) Notice of the reason for termination; and

(ii) Notice of opportunity for the owner or operator to present in writing, within 15 calendar days after he/she is notified of the determination to terminate, additional information or arguments to the Administrator before further action on the termination.

(iii) A final determination to terminate an extension of compliance will be in writing and will set forth the specific grounds on which the termination is based. The final determination will be made within 30 calendar days after presentation of additional information or arguments, or within 30 calendar days after the final date specified for the presentation if no presentation is made.

(15) [Reserved]

(16) The granting of an extension under this section shall not abrogate the Administrator's authority under section 114 of the Act.

(j) *Exemption from compliance with emission standards.* The President may exempt any stationary source from compliance with any relevant standard established pursuant to section 112 of the Act for a period of not more than 2 years if the President determines that the technology to implement such standard is not available and that it is in the national security interests of the United States to do so. An exemption under this paragraph may be extended for 1 or more additional periods, each period not to exceed 2 years.

§ 63.7 Performance testing requirements.

(a) *Applicability and performance test dates.*

(1) The applicability of this section is set out in § 63.1(a)(4).

(2) Except as provided in paragraph (a)(4) of this section, if required to do performance testing by a relevant standard, and unless a waiver of performance testing is obtained under this section or the conditions of paragraph (c)(3)(ii)(B) of this section apply, the owner or operator of the affected source must perform such tests within 180 days of the compliance date for such source.

(i)-(viii) [Reserved]

(ix) Except as provided in paragraph (a)(4) of this section, when an emission standard promulgated under this part is more stringent than the standard proposed (see § 63.6(b)(3)), the owner or operator of a new or reconstructed source subject to that standard for which construction or reconstruction is commenced between the proposal and promulgation dates of the standard shall comply with performance testing requirements within 180 days after the standard's effective date, or within 180 days after startup of the source, whichever is later. If the promulgated standard is more stringent than the proposed standard, the owner or operator may choose to demonstrate compliance with either the proposed or the promulgated standard. If the owner or operator chooses to comply with the proposed standard initially, the owner or operator shall conduct a second performance test within 3 years and 180 days after the effective date of the standard, or after startup of the source, whichever is later, to demonstrate compliance with the promulgated standard.

(3) The Administrator may require an owner or operator to conduct performance tests at the affected source at any other time when the action is authorized by section 114 of the Act.

(4) If a force majeure is about to occur, occurs, or has occurred for which the affected owner or operator intends to assert a claim of force majeure:

(i) The owner or operator shall notify the Administrator, in writing as soon as practicable following the date the owner or operator first knew, or through due diligence should have known that the event may cause or caused a delay in testing beyond the regulatory deadline specified in paragraph (a)(2) or (a)(3) of this section, or elsewhere in this part, but the notification must occur before the performance test deadline unless the initial force majeure or a subsequent force majeure event delays the notice, and in such cases, the notification shall occur as soon as practicable.

(ii) The owner or operator shall provide to the Administrator a written description of the force majeure event and a rationale for attributing the delay in testing beyond the regulatory deadline to the force majeure; describe the measures taken or to be taken to minimize the delay; and identify a date by which the owner or operator proposes to conduct the performance test. The performance test shall be conducted as soon as practicable after the force majeure occurs.

(iii) The decision as to whether or not to grant an extension to the performance test deadline is solely within the discretion of the Administrator. The Administrator will notify the owner or operator in writing of approval or disapproval of the request for an extension as soon as practicable.

(iv) Until an extension of the performance test deadline has been approved by the Administrator under paragraphs (a)(4)(i), (a)(4)(ii), and (a)(4)(iii) of this section, the owner or operator of the affected facility remains strictly subject to the requirements of this part.

(b) Notification of performance test.

(1) The owner or operator of an affected source must notify the Administrator in writing of his or her intention to conduct a performance test at least 60 calendar days before the performance test is initially scheduled to begin to allow the Administrator, upon request, to review and approve the site-specific test plan required under paragraph (c) of this section and to have an observer present during the test.

(2) In the event the owner or operator is unable to conduct the performance test on the date specified in the notification requirement specified in paragraph (b)(1) of this section due to unforeseeable circumstances beyond his or her control, the owner or operator must notify the Administrator as soon as practicable and without delay prior to the scheduled performance test date and specify the date when the performance test is rescheduled. This notification of delay in conducting the performance test shall not relieve the owner or operator of legal responsibility for compliance with any other applicable provisions of this part or with any other applicable Federal, State, or local requirement, nor will it prevent the Administrator from implementing or enforcing this part or taking any other action under the Act.

(c) Quality assurance program.

(1) The results of the quality assurance program required in this paragraph will be considered by the Administrator when he/she determines the validity of a performance test.

(2) (i) *Submission of site-specific test plan.* Before conducting a required performance test, the owner or operator of an affected source shall develop and, if requested by the Administrator, shall submit a site-specific test plan to the Administrator for approval. The test plan shall include a test program summary, the test schedule, data quality objectives, and both an internal and external quality assurance (QA) program. Data quality objectives are the pretest expectations of precision, accuracy, and completeness of data.

(ii) The internal QA program shall include, at a minimum, the activities planned by routine operators and analysts to provide an assessment of test data precision; an example of internal QA is the sampling and analysis of replicate samples.

(iii) The performance testing shall include a test method performance audit (PA) during the performance test. The PAs consist of blind audit samples supplied by an accredited audit sample provider and analyzed during the performance test in order to provide a measure of test data bias. Gaseous audit samples are designed to audit the performance of the sampling system as well as the analytical system and must be collected by the sampling system during the compliance test just as the compliance samples are collected. If a liquid or solid audit sample is designed to audit the sampling system, it must also be collected by the sampling system during the compliance test. If multiple sampling systems or sampling trains are used during the compliance test for any of the test methods, the tester is only required to use one of the sampling systems per method to collect the audit sample. The audit sample must be analyzed by the same analyst using the same analytical reagents and analytical system and at the same time as the compliance samples. Retests are required when there is a failure to produce acceptable results for an audit sample. However, if the audit results do not affect the compliance or noncompliance status of the affected facility, the compliance authority may

waive the reanalysis requirement, further audits, or retests and accept the results of the compliance test. Acceptance of the test results shall constitute a waiver of the reanalysis requirement, further audits, or retests. The compliance authority may also use the audit sample failure and the compliance test results as evidence to determine the compliance or noncompliance status of the affected facility. A blind audit sample is a sample whose value is known only to the sample provider and is not revealed to the tested facility until after they report the measured value of the audit sample. For pollutants that exist in the gas phase at ambient temperature, the audit sample shall consist of an appropriate concentration of the pollutant in air or nitrogen that can be introduced into the sampling system of the test method at or near the same entry point as a sample from the emission source. If no gas phase audit samples are available, an acceptable alternative is a sample of the pollutant in the same matrix that would be produced when the sample is recovered from the sampling system as required by the test method. For samples that exist only in a liquid or solid form at ambient temperature, the audit sample shall consist of an appropriate concentration of the pollutant in the same matrix that would be produced when the sample is recovered from the sampling system as required by the test method. An accredited audit sample provider (AASP) is an organization that has been accredited to prepare audit samples by an independent, third party accrediting body.

(A) The source owner, operator, or representative of the tested facility shall obtain an audit sample, if commercially available, from an AASP for each test method used for regulatory compliance purposes. No audit samples are required for the following test methods: Methods 3A and 3C of appendix A-3 of part 60 of this chapter; Methods 6C, 7E, 9, and 10 of appendix A-4 of part 60; Methods 18 and 19 of appendix A-6 of part 60; Methods 20, 22, and 25A of appendix A-7 of part 60; Methods 30A and 30B of appendix A-8 of part 60; and Methods 303, 318, 320, and 321 of appendix A of this part. If multiple sources at a single facility are tested during a compliance test event, only one audit sample is required for each method used during a compliance test. The compliance authority responsible for the compliance test may waive the requirement to include an audit sample if they believe that an audit sample is not necessary. "Commercially available" means that two or more independent AASPs have blind audit samples available for purchase. If the source owner, operator, or representative cannot find an audit sample for a specific method, the owner, operator, or representative shall consult the EPA Web site at the following URL, www.epa.gov/ttn/emc, to confirm whether there is a source that can supply an audit sample for that method. If the EPA Web site does not list an available audit sample at least 60 days prior to the beginning of the compliance test, the source owner, operator, or representative shall not be required to include an audit sample as part of the quality assurance program for the compliance test. When ordering an audit sample, the source owner, operator, or representative shall give the sample provider an estimate for the concentration of each pollutant that is emitted by the source or the estimated concentration of each pollutant based on the permitted level and the name, address, and phone number of the compliance authority. The source owner, operator, or representative shall report the results for the audit sample along with a summary of the emission test results for the audited pollutant to the compliance authority and shall report the results of the audit sample to the AASP.

The source owner, operator, or representative shall make both reports at the same time and in the same manner or shall report to the compliance authority first and then report to the AASP. If the method being audited is a method that allows the samples to be analyzed in the field and the tester plans to analyze the samples in the field, the tester may analyze the audit samples prior to collecting the emission samples provided a representative of the compliance authority is present at the testing site. The tester may request, and the compliance authority may grant, a waiver to the requirement that a representative of the compliance authority must be present at the testing site during the field analysis of an audit sample. The source owner, operator, or representative may report the results of the audit sample to the compliance authority and then report the results of the audit sample to the AASP prior to collecting any emission samples. The test protocol and final test report shall document whether an audit sample was ordered and utilized and the pass/fail results as applicable.

(B) An AASP shall have and shall prepare, analyze, and report the true value of audit samples in accordance with a written technical criteria document that describes how audit samples will be prepared and distributed in a manner that will ensure the integrity of the audit sample program. An acceptable technical criteria document shall contain standard operating procedures for all of the following operations:

- (1) Preparing the sample;
- (2) Confirming the true concentration of the sample;
- (3) Defining the acceptance limits for the results from a well qualified tester. This procedure must use well established statistical methods to analyze historical results from well qualified testers. The acceptance limits shall be set so that there is 95 percent confidence that 90 percent of well qualified labs will produce future results that are within the acceptance limit range;
- (4) Providing the opportunity for the compliance authority to comment on the selected concentration level for an audit sample;
- (5) Distributing the sample to the user in a manner that guarantees that the true value of the sample is unknown to the user;
- (6) Recording the measured concentration reported by the user and determining if the measured value is within acceptable limits;
- (7) Reporting the results from each audit sample in a timely manner to the compliance authority and to the source owner, operator, or representative by the AASP. The AASP shall make both reports at the same time and in the same manner or shall report to the compliance authority first and then report to the source owner, operator, or representative. The results shall include the name of the facility tested, the date on which the compliance test was conducted, the name of the company performing the sample collection, the name of the company that analyzed the compliance samples including the audit sample, the measured result for the audit sample, and whether the testing company passed or failed the audit. The AASP shall report the true value of the audit sample to the compliance authority. The AASP may report the true value to the source owner, operator, or representative if the AASP's operating plan ensures that no laboratory will receive the same audit sample twice.

(8) Evaluating the acceptance limits of samples at least once every two years to determine in consultation with the voluntary consensus standard body if they should be changed.

(9) Maintaining a database, accessible to the compliance authorities, of results from the audit that shall include the name of the facility tested, the date on which the compliance test was conducted, the name of the company performing the sample collection, the name of the company that analyzed the compliance samples including the audit sample, the measured result for the audit sample, the true value of the audit sample, the acceptance range for the measured value, and whether the testing company passed or failed the audit.

(C) The accrediting body shall have a written technical criteria document that describes how it will ensure that the AASP is operating in accordance with the AASP technical criteria document that describes how audit samples are to be prepared and distributed. This document shall contain standard operating procedures for all of the following operations:

(1) Checking audit samples to confirm their true value as reported by the AASP.

(2) Performing technical systems audits of the AASP's facilities and operating procedures at least once every two years.

(3) Providing standards for use by the voluntary consensus standard body to approve the accrediting body that will accredit the audit sample providers.

(D) The technical criteria documents for the accredited sample providers and the accrediting body shall be developed through a public process guided by a voluntary consensus standards body (VCSB). The VCSB shall operate in accordance with the procedures and requirements in the Office of Management and Budget *Circular A-119*. A copy of Circular A-119 is available upon request by writing the Office of Information and Regulatory Affairs, Office of Management and Budget, 725 17th Street, NW., Washington, DC 20503, by calling (202) 395-6880 or downloading online at http://standards.gov/standards_gov/a119.cfm. The VCSB shall approve all accrediting bodies. The Administrator will review all technical criteria documents. If the technical criteria documents do not meet the minimum technical requirements in paragraphs (c)(2)(iii)(B) through (C) of this section, the technical criteria documents are not acceptable and the proposed audit sample program is not capable of producing audit samples of sufficient quality to be used in a compliance test. All acceptable technical criteria documents shall be posted on the EPA Web site at the following URL, <http://www.epa.gov/ttn/emc>.

(iv) The owner or operator of an affected source shall submit the site-specific test plan to the Administrator upon the Administrator's request at least 60 calendar days before the performance test is scheduled to take place, that is, simultaneously with the notification of intention to conduct a performance test required under paragraph (b) of this section, or on a mutually agreed upon date.

(v) The Administrator may request additional relevant information after the submittal of a site-specific test plan.

(3) Approval of site-specific test plan.

(i) The Administrator will notify the owner or operator of approval or intention to deny approval of the site-specific test plan (if review of the site-specific test plan is requested) within 30 calendar days after receipt of the original plan and within 30 calendar days after receipt of any supplementary information that is submitted under paragraph (c)(3)(i)(B) of this section. Before disapproving any site-specific test plan, the Administrator will notify the applicant of the Administrator's intention to disapprove the plan together with -

(A) Notice of the information and findings on which the intended disapproval is based; and

(B) Notice of opportunity for the owner or operator to present, within 30 calendar days after he/she is notified of the intended disapproval, additional information to the Administrator before final action on the plan.

(ii) In the event that the Administrator fails to approve or disapprove the site-specific test plan within the time period specified in paragraph (c)(3)(i) of this section, the following conditions shall apply:

(A) If the owner or operator intends to demonstrate compliance using the test method(s) specified in the relevant standard or with only minor changes to those tests methods (see paragraph (e)(2)(i) of this section), the owner or operator must conduct the performance test within the time specified in this section using the specified method(s);

(B) If the owner or operator intends to demonstrate compliance by using an alternative to any test method specified in the relevant standard, the owner or operator is authorized to conduct the performance test using an alternative test method after the Administrator approves the use of the alternative method when the Administrator approves the site-specific test plan (if review of the site-specific test plan is requested) or after the alternative method is approved (see paragraph (f) of this section). However, the owner or operator is authorized to conduct the performance test using an alternative method in the absence of notification of approval 45 days after submission of the site-specific test plan or request to use an alternative method. The owner or operator is authorized to conduct the performance test within 60 calendar days after he/she is authorized to demonstrate compliance using an alternative test method. Notwithstanding the requirements in the preceding three sentences, the owner or operator may proceed to conduct the performance test as required in this section (without the Administrator's prior approval of the site-specific test plan) if he/she subsequently chooses to use the specified testing and monitoring methods instead of an alternative.

(iii) Neither the submission of a site-specific test plan for approval, nor the Administrator's approval or disapproval of a plan, nor the Administrator's failure to approve or disapprove a plan in a timely manner shall -

(A) Relieve an owner or operator of legal responsibility for compliance with any applicable provisions of this part or with any other applicable Federal, State, or local requirement; or

(B) Prevent the Administrator from implementing or enforcing this part or taking any other action under the Act.

(d) *Performance testing facilities.* If required to do performance testing, the owner or operator of each new source and, at the request of the Administrator, the owner or operator of each existing source, shall provide performance testing facilities as follows:

(1) Sampling ports adequate for test methods applicable to such source. This includes:

(i) Constructing the air pollution control system such that volumetric flow rates and pollutant emission rates can be accurately determined by applicable test methods and procedures; and

(ii) Providing a stack or duct free of cyclonic flow during performance tests, as demonstrated by applicable test methods and procedures;

(2) Safe sampling platform(s);

(3) Safe access to sampling platform(s);

(4) Utilities for sampling and testing equipment; and

(5) Any other facilities that the Administrator deems necessary for safe and adequate testing of a source.

(e) *Conduct of performance tests.*

(1) Performance tests shall be conducted under such conditions as the Administrator specifies to the owner or operator based on representative performance (i.e., performance based on normal operating conditions) of the affected source. Operations during periods of startup, shutdown, and malfunction shall not constitute representative conditions for the purpose of a performance test, nor shall emissions in excess of the level of the relevant standard during periods of startup, shutdown, and malfunction be considered a violation of the relevant standard unless otherwise specified in the relevant standard or a determination of noncompliance is made under § 63.6(e). Upon request, the owner or operator shall make available to the Administrator such records as may be necessary to determine the conditions of performance tests.

(2) Performance tests shall be conducted and data shall be reduced in accordance with the test methods and procedures set forth in this section, in each relevant standard, and, if required, in applicable appendices of parts 51, 60, 61, and 63 of this chapter unless the Administrator -

(i) Specifies or approves, in specific cases, the use of a test method with minor changes in methodology (see definition in § 63.90(a)). Such changes may be approved in conjunction with approval of the site-specific test plan (see paragraph (c) of this section); or

(ii) Approves the use of an intermediate or major change or alternative to a test method (see definitions in § 63.90(a)), the results of which the Administrator has determined to be adequate for indicating whether a specific affected source is in compliance; or

(iii) Approves shorter sampling times or smaller sample volumes when necessitated by process variables or other factors; or

(iv) Waives the requirement for performance tests because the owner or operator of an affected source has demonstrated by other means to the Administrator's satisfaction that the affected source is in compliance with the relevant standard.

(3) Unless otherwise specified in a relevant standard or test method, each performance test shall consist of three separate runs using the applicable test method. Each run shall be conducted for the time and under the conditions specified in the relevant standard. For the purpose of determining compliance with a relevant standard, the arithmetic mean of the results of the three runs shall apply. Upon receiving approval from the Administrator, results of a test run may be replaced with results of an additional test run in the event that -

(i) A sample is accidentally lost after the testing team leaves the site; or

(ii) Conditions occur in which one of the three runs must be discontinued because of forced shutdown; or

(iii) Extreme meteorological conditions occur; or

(iv) Other circumstances occur that are beyond the owner or operator's control.

(4) Nothing in paragraphs (e)(1) through (e)(3) of this section shall be construed to abrogate the Administrator's authority to require testing under section 114 of the Act.

(f) Use of an alternative test method -

(1) *General.* Until authorized to use an intermediate or major change or alternative to a test method, the owner or operator of an affected source remains subject to the requirements of this section and the relevant standard.

(2) The owner or operator of an affected source required to do performance testing by a relevant standard may use an alternative test method from that specified in the standard provided that the owner or operator -

(i) Notifies the Administrator of his or her intention to use an alternative test method at least 60 days before the performance test is scheduled to begin;

(ii) Uses Method 301 in appendix A of this part to validate the alternative test method. This may include the use of specific procedures of Method 301 if use of such procedures are sufficient to validate the alternative test method; and

(iii) Submits the results of the Method 301 validation process along with the notification of intention and the justification for not using the specified test method. The owner or operator may submit the information required in this paragraph well in advance of the deadline specified in paragraph (f)(2)(i) of this section to ensure a timely review by the Administrator in order to meet the performance test date specified in this section or the relevant standard.

(3) The Administrator will determine whether the owner or operator's validation of the proposed alternative test method is adequate and issue an approval or disapproval of the alternative test method. If the owner or operator intends to demonstrate compliance by using an alternative to any

test method specified in the relevant standard, the owner or operator is authorized to conduct the performance test using an alternative test method after the Administrator approves the use of the alternative method. However, the owner or operator is authorized to conduct the performance test using an alternative method in the absence of notification of approval/disapproval 45 days after submission of the request to use an alternative method and the request satisfies the requirements in paragraph (f)(2) of this section. The owner or operator is authorized to conduct the performance test within 60 calendar days after he/she is authorized to demonstrate compliance using an alternative test method. Notwithstanding the requirements in the preceding three sentences, the owner or operator may proceed to conduct the performance test as required in this section (without the Administrator's prior approval of the site-specific test plan) if he/she subsequently chooses to use the specified testing and monitoring methods instead of an alternative.

(4) If the Administrator finds reasonable grounds to dispute the results obtained by an alternative test method for the purposes of demonstrating compliance with a relevant standard, the Administrator may require the use of a test method specified in a relevant standard.

(5) If the owner or operator uses an alternative test method for an affected source during a required performance test, the owner or operator of such source shall continue to use the alternative test method for subsequent performance tests at that affected source until he or she receives approval from the Administrator to use another test method as allowed under § 63.7(f).

(6) Neither the validation and approval process nor the failure to validate an alternative test method shall abrogate the owner or operator's responsibility to comply with the requirements of this part.

(g) Data analysis, recordkeeping, and reporting.

(1) Unless otherwise specified in a relevant standard or test method, or as otherwise approved by the Administrator in writing, results of a performance test shall include the analysis of samples, determination of emissions, and raw data. A performance test is "completed" when field sample collection is terminated. The owner or operator of an affected source shall report the results of the performance test to the Administrator before the close of business on the 60th day following the completion of the performance test, unless specified otherwise in a relevant standard or as approved otherwise in writing by the Administrator (see § 63.9(i)). The results of the performance test shall be submitted as part of the notification of compliance status required under § 63.9(h). Before a title V permit has been issued to the owner or operator of an affected source, the owner or operator shall send the results of the performance test to the Administrator. After a title V permit has been issued to the owner or operator of an affected source, the owner or operator shall send the results of the performance test to the appropriate permitting authority.

(2) Contents of a performance test, CMS performance evaluation, or CMS quality assurance test report (electronic or paper submitted copy). Unless otherwise specified in a relevant standard, test method, CMS performance specification, or quality assurance requirement for a CMS, or as otherwise approved by the Administrator in writing, the report shall include the elements identified in paragraphs (g)(2)(i) through (vi) of this section.

(i) General identification information for the facility including a mailing address, the physical address, the owner or operator or responsible official (where applicable) and his/her email address, and the appropriate Federal Registry System (FRS) number for the facility.

(ii) Purpose of the test including the applicable regulation requiring the test, the pollutant(s) and other parameters being measured, the applicable emission standard, and any process parameter component, and a brief process description.

(iii) Description of the emission unit tested including fuel burned, control devices, and vent characteristics; the appropriate source classification code (SCC); the permitted maximum process rate (where applicable); and the sampling location.

(iv) Description of sampling and analysis procedures used and any modifications to standard procedures, quality assurance procedures and results, record of process operating conditions that demonstrate the applicable test conditions are met, and values for any operating parameters for which limits were being set during the test.

(v) Where a test method, CEMS, PEMS, or COMS performance specification, or on-going quality assurance requirement for a CEMS, PEMS, or COMS requires you record or report, the following shall be included in your report: Record of preparation of standards, record of calibrations, raw data sheets for field sampling, raw data sheets for field and laboratory analyses, chain-of-custody documentation, and example calculations for reported results.

(vi) Identification of the company conducting the performance test including the primary office address, telephone number, and the contact for this test including his/her email address.

(3) For a minimum of 5 years after a performance test is conducted, the owner or operator shall retain and make available, upon request, for inspection by the Administrator the records or results of such performance test and other data needed to determine emissions from an affected source.

(h) Waiver of performance tests.

(1) Until a waiver of a performance testing requirement has been granted by the Administrator under this paragraph, the owner or operator of an affected source remains subject to the requirements of this section.

(2) Individual performance tests may be waived upon written application to the Administrator if, in the Administrator's judgment, the source is meeting the relevant standard(s) on a continuous basis, or the source is being operated under an extension of compliance, or the owner or operator has requested an extension of compliance and the Administrator is still considering that request.

(3) Request to waive a performance test.

(i) If a request is made for an extension of compliance under § 63.6(i), the application for a waiver of an initial performance test shall accompany the information required for the request for an extension of compliance. If no extension of compliance is requested or if the owner or operator has requested an extension of compliance and the Administrator is still considering that request, the application for a waiver of an initial performance test shall be submitted at least 60 days before the performance test if the site-specific test plan under paragraph (c) of this section is not submitted.

(ii) If an application for a waiver of a subsequent performance test is made, the application may accompany any required compliance progress report, compliance status report, or excess emissions and continuous monitoring system performance report [such as those required

under § 63.6(i), § 63.9(h), and § 63.10(e) or specified in a relevant standard or in the source's title V permit], but it shall be submitted at least 60 days before the performance test if the site-specific test plan required under paragraph (c) of this section is not submitted.

(iii) Any application for a waiver of a performance test shall include information justifying the owner or operator's request for a waiver, such as the technical or economic infeasibility, or the impracticality, of the affected source performing the required test.

(4) *Approval of request to waive performance test.* The Administrator will approve or deny a request for a waiver of a performance test made under paragraph (h)(3) of this section when he/she -

(i) Approves or denies an extension of compliance under § 63.6(i)(8); or

(ii) Approves or disapproves a site-specific test plan under § 63.7(c)(3); or

(iii) Makes a determination of compliance following the submission of a required compliance status report or excess emissions and continuous monitoring systems performance report; or

(iv) Makes a determination of suitable progress towards compliance following the submission of a compliance progress report, whichever is applicable.

(5) Approval of any waiver granted under this section shall not abrogate the Administrator's authority under the Act or in any way prohibit the Administrator from later canceling the waiver. The cancellation will be made only after notice is given to the owner or operator of the affected source.

§ 63.8 Monitoring requirements.

(a) *Applicability.*

(1) The applicability of this section is set out in § 63.1(a)(4).

(2) For the purposes of this part, all CMS required under relevant standards shall be subject to the provisions of this section upon promulgation of performance specifications for CMS as specified in the relevant standard or otherwise by the Administrator.

(3) [Reserved]

(4) Additional monitoring requirements for control devices used to comply with provisions in relevant standards of this part are specified in § 63.11.

(b) *Conduct of monitoring.*

(1) Monitoring shall be conducted as set forth in this section and the relevant standard(s) unless the Administrator -

(i) Specifies or approves the use of minor changes in methodology for the specified monitoring requirements and procedures (see § 63.90(a) for definition); or

(ii) Approves the use of an intermediate or major change or alternative to any monitoring requirements or procedures (see § 63.90(a) for definition).

(iii) Owners or operators with flares subject to § 63.11(b) are not subject to the requirements of this section unless otherwise specified in the relevant standard.

(2) (i) When the emissions from two or more affected sources are combined before being released to the atmosphere, the owner or operator may install an applicable CMS for each emission stream or for the combined emissions streams, provided the monitoring is sufficient to demonstrate compliance with the relevant standard.

(ii) If the relevant standard is a mass emission standard and the emissions from one affected source are released to the atmosphere through more than one point, the owner or operator must install an applicable CMS at each emission point unless the installation of fewer systems is

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(A) Approved by the Administrator; or

(B) Provided for in a relevant standard (e.g., instead of requiring that a CMS be installed at each emission point before the effluents from those points are channeled to a common control device, the standard specifies that only one CMS is required to be installed at the vent of the control device).

(3) When more than one CMS is used to measure the emissions from one affected source (e.g., multiple breechings, multiple outlets), the owner or operator shall report the results as required for each CMS. However, when one CMS is used as a backup to another CMS, the owner or operator shall report the results from the CMS used to meet the monitoring requirements of this part. If both such CMS are used during a particular reporting period to meet the monitoring requirements of this part, then the owner or operator shall report the results from each CMS for the relevant compliance period.

(c) Operation and maintenance of continuous monitoring systems.

(1) The owner or operator of an affected source shall maintain and operate each CMS as specified in this section, or in a relevant standard, and in a manner consistent with good air pollution control practices.

(i) The owner or operator of an affected source must maintain and operate each CMS as specified in § 63.6(e)(1).

(ii) The owner or operator must keep the necessary parts for routine repairs of the affected CMS equipment readily available.

(iii) The owner or operator of an affected source must develop a written startup, shutdown, and malfunction plan for CMS as specified in § 63.6(e)(3).

(2) (i) All CMS must be installed such that representative measures of emissions or process parameters from the affected source are obtained. In addition, CEMS must be located according to procedures contained in the applicable performance specification(s).

(ii) Unless the individual subpart states otherwise, the owner or operator must ensure the read out (that portion of the CMS that provides a visual display or record), or other indication of operation, from any CMS required for compliance with the emission standard is readily accessible on site for operational control or inspection by the operator of the equipment.

(3) All CMS shall be installed, operational, and the data verified as specified in the relevant standard either prior to or in conjunction with conducting performance tests under § 63.7. Verification of

operational status shall, at a minimum, include completion of the manufacturer's written specifications or recommendations for installation, operation, and calibration of the system.

(4) Except for system breakdowns, out-of-control periods, repairs, maintenance periods, calibration checks, and zero (low-level) and high-level calibration drift adjustments, all CMS, including COMS and CEMS, shall be in continuous operation and shall meet minimum frequency of operation requirements as follows:

- (i) All COMS shall complete a minimum of one cycle of sampling and analyzing for each successive 10-second period and one cycle of data recording for each successive 6-minute period.
- (ii) All CEMS for measuring emissions other than opacity shall complete a minimum of one cycle of operation (sampling, analyzing, and data recording) for each successive 15-minute period.

(5) Unless otherwise approved by the Administrator, minimum procedures for COMS shall include a method for producing a simulated zero opacity condition and an upscale (high-level) opacity condition using a certified neutral density filter or other related technique to produce a known obscuration of the light beam. Such procedures shall provide a system check of all the analyzer's internal optical surfaces and all electronic circuitry, including the lamp and photodetector assembly normally used in the measurement of opacity.

(6) The owner or operator of a CMS that is not a CPMS, which is installed in accordance with the provisions of this part and the applicable CMS performance specification(s), must check the zero (low-level) and high-level calibration drifts at least once daily in accordance with the written procedure specified in the performance evaluation plan developed under paragraphs (e)(3)(i) and (ii) of this section. The zero (low-level) and high-level calibration drifts must be adjusted, at a minimum, whenever the 24-hour zero (low-level) drift exceeds two times the limits of the applicable performance specification(s) specified in the relevant standard. The system shall allow the amount of excess zero (low-level) and high-level drift measured at the 24-hour interval checks to be recorded and quantified whenever specified. For COMS, all optical and instrumental surfaces exposed to the effluent gases must be cleaned prior to performing the zero (low-level) and high-level drift adjustments; the optical surfaces and instrumental surfaces must be cleaned when the cumulative automatic zero compensation, if applicable, exceeds 4 percent opacity. The CPMS must be calibrated prior to use for the purposes of complying with this section. The CPMS must be checked daily for indication that the system is responding. If the CPMS system includes an internal system check, results must be recorded and checked daily for proper operation.

(7) (i) A CMS is out of control if -

- (A) The zero (low-level), mid-level (if applicable), or high-level calibration drift (CD) exceeds two times the applicable CD specification in the applicable performance specification or in the relevant standard; or
- (B) The CMS fails a performance test audit (e.g., cylinder gas audit), relative accuracy audit, relative accuracy test audit, or linearity test audit; or
- (C) The COMS CD exceeds two times the limit in the applicable performance specification in the relevant standard.

(ii) When the CMS is out of control, the owner or operator of the affected source shall take the necessary corrective action and shall repeat all necessary tests which indicate that the system is out of control. The owner or operator shall take corrective action and conduct retesting until the performance requirements are below the applicable limits. The beginning of the out-of-control period is the hour the owner or operator conducts a performance check (e.g., calibration drift) that indicates an exceedance of the performance requirements established under this part. The end of the out-of-control period is the hour following the completion of corrective action and successful demonstration that the system is within the allowable limits. During the period the CMS is out of control, recorded data shall not be used in data averages and calculations, or to meet any data availability requirement established under this part.

(8) The owner or operator of a CMS that is out of control as defined in paragraph (c)(7) of this section shall submit all information concerning out-of-control periods, including start and end dates and hours and descriptions of corrective actions taken, in the excess emissions and continuous monitoring system performance report required in § 63.10(e)(3).

(d) Quality control program.

(1) The results of the quality control program required in this paragraph will be considered by the Administrator when he/she determines the validity of monitoring data.

(2) The owner or operator of an affected source that is required to use a CMS and is subject to the monitoring requirements of this section and a relevant standard shall develop and implement a CMS quality control program. As part of the quality control program, the owner or operator shall develop and submit to the Administrator for approval upon request a site-specific performance evaluation test plan for the CMS performance evaluation required in paragraph (e)(3)(i) of this section, according to the procedures specified in paragraph (e). In addition, each quality control program shall include, at a minimum, a written protocol that describes procedures for each of the following operations:

- (i) Initial and any subsequent calibration of the CMS;
- (ii) Determination and adjustment of the calibration drift of the CMS;
- (iii) Preventive maintenance of the CMS, including spare parts inventory;
- (iv) Data recording, calculations, and reporting;
- (v) Accuracy audit procedures, including sampling and analysis methods; and
- (vi) Program of corrective action for a malfunctioning CMS.

(3) The owner or operator shall keep these written procedures on record for the life of the affected source or until the affected source is no longer subject to the provisions of this part, to be made available for inspection, upon request, by the Administrator. If the performance evaluation plan is revised, the owner or operator shall keep previous (i.e., superseded) versions of the performance evaluation plan on record to be made available for inspection, upon request, by the Administrator, for a period of 5 years after each revision to the plan. Where relevant, e.g., program of corrective action for a malfunctioning CMS, these written procedures may be incorporated as part of the affected source's startup, shutdown, and malfunction plan to avoid duplication of planning and recordkeeping efforts.

(e) *Performance evaluation of continuous monitoring systems -*

(1) *General.* When required by a relevant standard, and at any other time the Administrator may require under section 114 of the Act, the owner or operator of an affected source being monitored shall conduct a performance evaluation of the CMS. Such performance evaluation shall be conducted according to the applicable specifications and procedures described in this section or in the relevant standard.

(2) *Notification of performance evaluation.* The owner or operator shall notify the Administrator in writing of the date of the performance evaluation simultaneously with the notification of the performance test date required under § 63.7(b) or at least 60 days prior to the date the performance evaluation is scheduled to begin if no performance test is required.

(3) (i) *Submission of site-specific performance evaluation test plan.* Before conducting a required CMS performance evaluation, the owner or operator of an affected source shall develop and submit a site-specific performance evaluation test plan to the Administrator for approval upon request. The performance evaluation test plan shall include the evaluation program objectives, an evaluation program summary, the performance evaluation schedule, data quality objectives, and both an internal and external QA program. Data quality objectives are the pre-evaluation expectations of precision, accuracy, and completeness of data.

(ii) The internal QA program shall include, at a minimum, the activities planned by routine operators and analysts to provide an assessment of CMS performance. The external QA program shall include, at a minimum, systems audits that include the opportunity for on-site evaluation by the Administrator of instrument calibration, data validation, sample logging, and documentation of quality control data and field maintenance activities.

(iii) The owner or operator of an affected source shall submit the site-specific performance evaluation test plan to the Administrator (if requested) at least 60 days before the performance test or performance evaluation is scheduled to begin, or on a mutually agreed upon date, and review and approval of the performance evaluation test plan by the Administrator will occur with the review and approval of the site-specific test plan (if review of the site-specific test plan is requested).

(iv) The Administrator may request additional relevant information after the submittal of a site-specific performance evaluation test plan.

(v) In the event that the Administrator fails to approve or disapprove the site-specific performance evaluation test plan within the time period specified in § 63.7(c)(3), the following conditions shall apply:

(A) If the owner or operator intends to demonstrate compliance using the monitoring method(s) specified in the relevant standard, the owner or operator shall conduct the performance evaluation within the time specified in this subpart using the specified method(s);

(B) If the owner or operator intends to demonstrate compliance by using an alternative to a monitoring method specified in the relevant standard, the owner or operator shall refrain from conducting the performance evaluation until the Administrator approves

the use of the alternative method. If the Administrator does not approve the use of the alternative method within 30 days before the performance evaluation is scheduled to begin, the performance evaluation deadlines specified in paragraph (e)(4) of this section may be extended such that the owner or operator shall conduct the performance evaluation within 60 calendar days after the Administrator approves the use of the alternative method. Notwithstanding the requirements in the preceding two sentences, the owner or operator may proceed to conduct the performance evaluation as required in this section (without the Administrator's prior approval of the site-specific performance evaluation test plan) if he/she subsequently chooses to use the specified monitoring method(s) instead of an alternative.

(vi) Neither the submission of a site-specific performance evaluation test plan for approval, nor the Administrator's approval or disapproval of a plan, nor the Administrator's failure to approve or disapprove a plan in a timely manner shall -

(A) Relieve an owner or operator of legal responsibility for compliance with any applicable provisions of this part or with any other applicable Federal, State, or local requirement; or

(B) Prevent the Administrator from implementing or enforcing this part or taking any other action under the Act.

(4) *Conduct of performance evaluation and performance evaluation dates.* The owner or operator of an affected source shall conduct a performance evaluation of a required CMS during any performance test required under § 63.7 in accordance with the applicable performance specification as specified in the relevant standard. Notwithstanding the requirement in the previous sentence, if the owner or operator of an affected source elects to submit COMS data for compliance with a relevant opacity emission standard as provided under § 63.6(h)(7), he/she shall conduct a performance evaluation of the COMS as specified in the relevant standard, before the performance test required under § 63.7 is conducted in time to submit the results of the performance evaluation as specified in paragraph (e)(5)(ii) of this section. If a performance test is not required, or the requirement for a performance test has been waived under § 63.7(h), the owner or operator of an affected source shall conduct the performance evaluation not later than 180 days after the appropriate compliance date for the affected source, as specified in § 63.7(a), or as otherwise specified in the relevant standard.

(5) *Reporting performance evaluation results.*

(i) The owner or operator shall furnish the Administrator a copy of a written report of the results of the performance evaluation containing the information specified in § 63.7(g)(2)(i) through (vi) simultaneously with the results of the performance test required under § 63.7 or within 60 days of completion of the performance evaluation, unless otherwise specified in a relevant standard.

(ii) The owner or operator of an affected source using a COMS to determine opacity compliance during any performance test required under § 63.7 and described in § 63.6(d)(6) shall furnish the Administrator two or, upon request, three copies of a written report of the results of the COMS performance evaluation under this paragraph. The copies shall be provided at least 15 calendar days before the performance test required under § 63.7 is conducted.

(f) *Use of an alternative monitoring method -*

(1) *General.* Until permission to use an alternative monitoring procedure (minor, intermediate, or major changes; see definition in § 63.90(a)) has been granted by the Administrator under this paragraph (f)(1), the owner or operator of an affected source remains subject to the requirements of this section and the relevant standard.

(2) After receipt and consideration of written application, the Administrator may approve alternatives to any monitoring methods or procedures of this part including, but not limited to, the following:

(i) Alternative monitoring requirements when installation of a CMS specified by a relevant standard would not provide accurate measurements due to liquid water or other interferences caused by substances within the effluent gases;

(ii) Alternative monitoring requirements when the affected source is infrequently operated;

(iii) Alternative monitoring requirements to accommodate CEMS that require additional measurements to correct for stack moisture conditions;

(iv) Alternative locations for installing CMS when the owner or operator can demonstrate that installation at alternate locations will enable accurate and representative measurements;

(v) Alternate methods for converting pollutant concentration measurements to units of the relevant standard;

(vi) Alternate procedures for performing daily checks of zero (low-level) and high-level drift that do not involve use of high-level gases or test cells;

(vii) Alternatives to the American Society for Testing and Materials (ASTM) test methods or sampling procedures specified by any relevant standard;

(viii) Alternative CMS that do not meet the design or performance requirements in this part, but adequately demonstrate a definite and consistent relationship between their measurements and the measurements of opacity by a system complying with the requirements as specified in the relevant standard. The Administrator may require that such demonstration be performed for each affected source; or

(ix) Alternative monitoring requirements when the effluent from a single affected source or the combined effluent from two or more affected sources is released to the atmosphere through more than one point.

(3) If the Administrator finds reasonable grounds to dispute the results obtained by an alternative monitoring method, requirement, or procedure, the Administrator may require the use of a method, requirement, or procedure specified in this section or in the relevant standard. If the results of the specified and alternative method, requirement, or procedure do not agree, the results obtained by the specified method, requirement, or procedure shall prevail.

(4) (i) *Request to use alternative monitoring procedure.* An owner or operator who wishes to use an alternative monitoring procedure must submit an application to the Administrator as described in paragraph (f)(4)(ii) of this section. The application may be submitted at any time provided that the monitoring procedure is not the performance test method used to demonstrate compliance with a

relevant standard or other requirement. If the alternative monitoring procedure will serve as the performance test method that is to be used to demonstrate compliance with a relevant standard, the application must be submitted at least 60 days before the performance evaluation is scheduled to begin and must meet the requirements for an alternative test method under § 63.7(f).

(ii) The application must contain a description of the proposed alternative monitoring system which addresses the four elements contained in the definition of monitoring in § 63.2 and a performance evaluation test plan, if required, as specified in paragraph (e)(3) of this section. In addition, the application must include information justifying the owner or operator's request for an alternative monitoring method, such as the technical or economic infeasibility, or the impracticality, of the affected source using the required method.

(iii) The owner or operator may submit the information required in this paragraph well in advance of the submittal dates specified in paragraph (f)(4)(i) above to ensure a timely review by the Administrator in order to meet the compliance demonstration date specified in this section or the relevant standard.

(iv) Application for minor changes to monitoring procedures, as specified in paragraph (b)(1) of this section, may be made in the site-specific performance evaluation plan.

(5) Approval of request to use alternative monitoring procedure.

(i) The Administrator will notify the owner or operator of approval or intention to deny approval of the request to use an alternative monitoring method within 30 calendar days after receipt of the original request and within 30 calendar days after receipt of any supplementary information that is submitted. If a request for a minor change is made in conjunction with site-specific performance evaluation plan, then approval of the plan will constitute approval of the minor change. Before disapproving any request to use an alternative monitoring method, the Administrator will notify the applicant of the Administrator's intention to disapprove the request together with -

(A) Notice of the information and findings on which the intended disapproval is based; and

(B) Notice of opportunity for the owner or operator to present additional information to the Administrator before final action on the request. At the time the Administrator notifies the applicant of his or her intention to disapprove the request, the Administrator will specify how much time the owner or operator will have after being notified of the intended disapproval to submit the additional information.

(ii) The Administrator may establish general procedures and criteria in a relevant standard to accomplish the requirements of paragraph (f)(5)(i) of this section.

(iii) If the Administrator approves the use of an alternative monitoring method for an affected source under paragraph (f)(5)(i) of this section, the owner or operator of such source shall continue to use the alternative monitoring method until he or she receives approval from the Administrator to use another monitoring method as allowed by § 63.8(f).

(6) Alternative to the relative accuracy test. An alternative to the relative accuracy test for CEMS specified in a relevant standard may be requested as follows:

(i) *Criteria for approval of alternative procedures.* An alternative to the test method for determining relative accuracy is available for affected sources with emission rates demonstrated to be less than 50 percent of the relevant standard. The owner or operator of an affected source may petition the Administrator under paragraph (f)(6)(ii) of this section to substitute the relative accuracy test in section 7 of Performance Specification 2 with the procedures in section 10 if the results of a performance test conducted according to the requirements in § 63.7, or other tests performed following the criteria in § 63.7, demonstrate that the emission rate of the pollutant of interest in the units of the relevant standard is less than 50 percent of the relevant standard. For affected sources subject to emission limitations expressed as control efficiency levels, the owner or operator may petition the Administrator to substitute the relative accuracy test with the procedures in section 10 of Performance Specification 2 if the control device exhaust emission rate is less than 50 percent of the level needed to meet the control efficiency requirement. The alternative procedures do not apply if the CEMS is used continuously to determine compliance with the relevant standard.

(ii) *Petition to use alternative to relative accuracy test.* The petition to use an alternative to the relative accuracy test shall include a detailed description of the procedures to be applied, the location and the procedure for conducting the alternative, the concentration or response levels of the alternative relative accuracy materials, and the other equipment checks included in the alternative procedure(s). The Administrator will review the petition for completeness and applicability. The Administrator's determination to approve an alternative will depend on the intended use of the CEMS data and may require specifications more stringent than in Performance Specification 2.

(iii) *Rescission of approval to use alternative to relative accuracy test.* The Administrator will review the permission to use an alternative to the CEMS relative accuracy test and may rescind such permission if the CEMS data from a successful completion of the alternative relative accuracy procedure indicate that the affected source's emissions are approaching the level of the relevant standard. The criterion for reviewing the permission is that the collection of CEMS data shows that emissions have exceeded 70 percent of the relevant standard for any averaging period, as specified in the relevant standard. For affected sources subject to emission limitations expressed as control efficiency levels, the criterion for reviewing the permission is that the collection of CEMS data shows that exhaust emissions have exceeded 70 percent of the level needed to meet the control efficiency requirement for any averaging period, as specified in the relevant standard. The owner or operator of the affected source shall maintain records and determine the level of emissions relative to the criterion for permission to use an alternative for relative accuracy testing. If this criterion is exceeded, the owner or operator shall notify the Administrator within 10 days of such occurrence and include a description of the nature and cause of the increased emissions. The Administrator will review the notification and may rescind permission to use an alternative and require the owner or operator to conduct a relative accuracy test of the CEMS as specified in section 7 of Performance Specification 2. The Administrator will review the notification and may rescind permission to use an alternative and require the owner or operator to conduct a relative accuracy test of the CEMS as specified in section 8.4 of Performance Specification 2.

(g) *Reduction of monitoring data.*

(1) The owner or operator of each CMS must reduce the monitoring data as specified in paragraphs (g)(1) through (5) of this section.

(2) The owner or operator of each COMS shall reduce all data to 6-minute averages calculated from 36 or more data points equally spaced over each 6-minute period. Data from CEMS for measurement other than opacity, unless otherwise specified in the relevant standard, shall be reduced to 1-hour averages computed from four or more data points equally spaced over each 1-hour period, except during periods when calibration, quality assurance, or maintenance activities pursuant to provisions of this part are being performed. During these periods, a valid hourly average shall consist of at least two data points with each representing a 15-minute period. Alternatively, an arithmetic or integrated 1-hour average of CEMS data may be used. Time periods for averaging are defined in § 63.2.

(3) The data may be recorded in reduced or nonreduced form (e.g., ppm pollutant and percent O₂ or ng/J of pollutant).

(4) All emission data shall be converted into units of the relevant standard for reporting purposes using the conversion procedures specified in that standard. After conversion into units of the relevant standard, the data may be rounded to the same number of significant digits as used in that standard to specify the emission limit (e.g., rounded to the nearest 1 percent opacity).

(5) Monitoring data recorded during periods of unavoidable CMS breakdowns, out-of-control periods, repairs, maintenance periods, calibration checks, and zero (low-level) and high-level adjustments must not be included in any data average computed under this part. For the owner or operator complying with the requirements of § 63.10(b)(2)(vii)(A) or (B), data averages must include any data recorded during periods of monitor breakdown or malfunction.

§ 63.9 Notification requirements.

(a) Applicability and general information.

(1) The applicability of this section is set out in § 63.1(a)(4).

(2) For affected sources that have been granted an extension of compliance under subpart D of this part, the requirements of this section do not apply to those sources while they are operating under such compliance extensions.

(3) If any State requires a notice that contains all the information required in a notification listed in this section, the owner or operator may send the Administrator a copy of the notice sent to the State to satisfy the requirements of this section for that notification.

(4) (i) Before a State has been delegated the authority to implement and enforce notification requirements established under this part, the owner or operator of an affected source in such State subject to such requirements shall submit notifications to the appropriate Regional Office of the EPA (to the attention of the Director of the Division indicated in the list of the EPA Regional Offices in § 63.13).

(ii) After a State has been delegated the authority to implement and enforce notification requirements established under this part, the owner or operator of an affected source in such State subject to such requirements shall submit notifications to the delegated State authority (which may be the same as the permitting authority). In addition, if the delegated (permitting)

authority is the State, the owner or operator shall send a copy of each notification submitted to the State to the appropriate Regional Office of the EPA, as specified in paragraph (a)(4)(i) of this section. The Regional Office may waive this requirement for any notifications at its discretion.

(b) *Initial notifications.*

(1) (i) The requirements of this paragraph apply to the owner or operator of an affected source when such source becomes subject to a relevant standard.

(ii) If an area source subsequently becomes a major source that is subject to the emission standard or other requirement, such source shall be subject to the notification requirements of this section. Area sources previously subject to major source requirements that become major sources again are also subject to the notification requirements of this paragraph and must submit the notification according to the requirements of paragraph (k) of this section.

(iii) Affected sources that are required under this paragraph to submit an initial notification may use the application for approval of construction or reconstruction under § 63.5(d) of this subpart, if relevant, to fulfill the initial notification requirements of this paragraph.

(2) The owner or operator of an affected source that has an initial startup before the effective date of a relevant standard under this part shall notify the Administrator in writing that the source is subject to the relevant standard. The notification, which shall be submitted not later than 120 calendar days after the effective date of the relevant standard (or within 120 calendar days after the source becomes subject to the relevant standard), shall provide the following information:

(i) The name and address of the owner or operator;

(ii) The address (i.e., physical location) of the affected source;

(iii) An identification of the relevant standard, or other requirement, that is the basis of the notification and the source's compliance date;

(iv) A brief description of the nature, size, design, and method of operation of the source and an identification of the types of emission points within the affected source subject to the relevant standard and types of hazardous air pollutants emitted; and

(v) A statement of whether the affected source is a major source or an area source.

(3) [Reserved]

(4) The owner or operator of a new or reconstructed major affected source for which an application for approval of construction or reconstruction is required under § 63.5(d) must provide the following information in writing to the Administrator:

(i) A notification of intention to construct a new major-emitting affected source, reconstruct a major-emitting affected source, or reconstruct a major source such that the source becomes a major-emitting affected source with the application for approval of construction or reconstruction as specified in § 63.5(d)(1)(i); and

(ii)-(iv) [Reserved]

(v) A notification of the actual date of startup of the source, delivered or postmarked within 15 calendar days after that date.

(5) The owner or operator of a new or reconstructed affected source for which an application for approval of construction or reconstruction is not required under § 63.5(d) must provide the following information in writing to the Administrator:

- (i) A notification of intention to construct a new affected source, reconstruct an affected source, or reconstruct a source such that the source becomes an affected source, and
- (ii) A notification of the actual date of startup of the source, delivered or postmarked within 15 calendar days after that date.
- (iii) Unless the owner or operator has requested and received prior permission from the Administrator to submit less than the information in § 63.5(d), the notification must include the information required on the application for approval of construction or reconstruction as specified in § 63.5(d)(1)(i).

(c) *Request for extension of compliance.* If the owner or operator of an affected source cannot comply with a relevant standard by the applicable compliance date for that source, or if the owner or operator has installed BACT or technology to meet LAER consistent with § 63.6(i)(5) of this subpart, he/she may submit to the Administrator (or the State with an approved permit program) a request for an extension of compliance as specified in § 63.6(i)(4) through § 63.6(i)(6).

(d) *Notification that source is subject to special compliance requirements.* An owner or operator of a new source that is subject to special compliance requirements as specified in § 63.6(b)(3) and § 63.6(b)(4) shall notify the Administrator of his/her compliance obligations not later than the notification dates established in paragraph (b) of this section for new sources that are not subject to the special provisions.

(e) *Notification of performance test.* The owner or operator of an affected source shall notify the Administrator in writing of his or her intention to conduct a performance test at least 60 calendar days before the performance test is scheduled to begin to allow the Administrator to review and approve the site-specific test plan required under § 63.7(c), if requested by the Administrator, and to have an observer present during the test.

(f) *Notification of opacity and visible emission observations.* The owner or operator of an affected source shall notify the Administrator in writing of the anticipated date for conducting the opacity or visible emission observations specified in § 63.6(h)(5), if such observations are required for the source by a relevant standard. The notification shall be submitted with the notification of the performance test date, as specified in paragraph (e) of this section, or if no performance test is required or visibility or other conditions prevent the opacity or visible emission observations from being conducted concurrently with the initial performance test required under § 63.7, the owner or operator shall deliver or postmark the notification not less than 30 days before the opacity or visible emission observations are scheduled to take place.

(g) *Additional notification requirements for sources with continuous monitoring systems.* The owner or operator of an affected source required to use a CMS by a relevant standard shall furnish the Administrator written notification as follows:

- (1) A notification of the date the CMS performance evaluation under § 63.8(e) is scheduled to begin, submitted simultaneously with the notification of the performance test date required under § 63.7(b). If no performance test is required, or if the requirement to conduct a performance test has been

waived for an affected source under § 63.7(h), the owner or operator shall notify the Administrator in writing of the date of the performance evaluation at least 60 calendar days before the evaluation is scheduled to begin;

(2) A notification that COMS data results will be used to determine compliance with the applicable opacity emission standard during a performance test required by § 63.7 in lieu of Method 9 or other opacity emissions test method data, as allowed by § 63.6(h)(7)(ii), if compliance with an opacity emission standard is required for the source by a relevant standard. The notification shall be submitted at least 60 calendar days before the performance test is scheduled to begin; and

(3) A notification that the criterion necessary to continue use of an alternative to relative accuracy testing, as provided by § 63.8(f)(6), has been exceeded. The notification shall be delivered or postmarked not later than 10 days after the occurrence of such exceedance, and it shall include a description of the nature and cause of the increased emissions.

(h) Notification of compliance status.

(1) The requirements of paragraphs (h)(2) through (h)(4) of this section apply when an affected source becomes subject to a relevant standard.

(2) (i) Before a title V permit has been issued to the owner or operator of an affected source, and each time a notification of compliance status is required under this part, the owner or operator of such source shall submit to the Administrator a notification of compliance status, signed by the responsible official who shall certify its accuracy, attesting to whether the source has complied with the relevant standard. The notification shall list -

(A) The methods that were used to determine compliance;

(B) The results of any performance tests, opacity or visible emission observations, continuous monitoring system (CMS) performance evaluations, and/or other monitoring procedures or methods that were conducted;

(C) The methods that will be used for determining continuing compliance, including a description of monitoring and reporting requirements and test methods;

(D) The type and quantity of hazardous air pollutants emitted by the source (or surrogate pollutants if specified in the relevant standard), reported in units and averaging times and in accordance with the test methods specified in the relevant standard;

(E) If the relevant standard applies to both major and area sources, an analysis demonstrating whether the affected source is a major source (using the emissions data generated for this notification);

(F) A description of the air pollution control equipment (or method) for each emission point, including each control device (or method) for each hazardous air pollutant and the control efficiency (percent) for each control device (or method); and

(G) A statement by the owner or operator of the affected existing, new, or reconstructed source as to whether the source has complied with the relevant standard or other requirements.

(ii) The notification must be sent before the close of business on the 60th day following the completion of the relevant compliance demonstration activity specified in the relevant standard (unless a different reporting period is specified in the standard, in which case the letter must be sent before the close of business on the day the report of the relevant testing or monitoring results is required to be delivered or postmarked). For example, the notification shall be sent before close of business on the 60th (or other required) day following completion of the initial performance test and again before the close of business on the 60th (or other required) day following the completion of any subsequent required performance test. If no performance test is required but opacity or visible emission observations are required to demonstrate compliance with an opacity or visible emission standard under this part, the notification of compliance status shall be sent before close of business on the 30th day following the completion of opacity or visible emission observations. Notifications may be combined as long as the due date requirement for each notification is met.

(3) After a title V permit has been issued to the owner or operator of an affected source, the owner or operator of such source shall comply with all requirements for compliance status reports contained in the source's title V permit, including reports required under this part. After a title V permit has been issued to the owner or operator of an affected source, and each time a notification of compliance status is required under this part, the owner or operator of such source shall submit the notification of compliance status to the appropriate permitting authority following completion of the relevant compliance demonstration activity specified in the relevant standard.

(4) [Reserved]

(5) If an owner or operator of an affected source submits estimates or preliminary information in the application for approval of construction or reconstruction required in § 63.5(d) in place of the actual emissions data or control efficiencies required in paragraphs (d)(1)(ii)(H) and (d)(2) of § 63.5, the owner or operator shall submit the actual emissions data and other correct information as soon as available but no later than with the initial notification of compliance status required in this section.

(6) Advice on a notification of compliance status may be obtained from the Administrator.

(i) *Adjustment to time periods or postmark deadlines for submittal and review of required communications.*

(1) (i) Until an adjustment of a time period or postmark deadline has been approved by the Administrator under paragraphs (i)(2) and (i)(3) of this section, the owner or operator of an affected source remains strictly subject to the requirements of this part.

(ii) An owner or operator shall request the adjustment provided for in paragraphs (i)(2) and (i)(3) of this section each time he or she wishes to change an applicable time period or postmark deadline specified in this part.

(2) Notwithstanding time periods or postmark deadlines specified in this part for the submittal of information to the Administrator by an owner or operator, or the review of such information by the Administrator, such time periods or deadlines may be changed by mutual agreement between the owner or operator and the Administrator. An owner or operator who wishes to request a change in a time period or postmark deadline for a particular requirement shall request the adjustment in writing as soon as practicable before the subject activity is required to take place. The owner or operator shall

include in the request whatever information he or she considers useful to convince the Administrator that an adjustment is warranted.

(3) If, in the Administrator's judgment, an owner or operator's request for an adjustment to a particular time period or postmark deadline is warranted, the Administrator will approve the adjustment. The Administrator will notify the owner or operator in writing of approval or disapproval of the request for an adjustment within 15 calendar days of receiving sufficient information to evaluate the request.

(4) If the Administrator is unable to meet a specified deadline, he or she will notify the owner or operator of any significant delay and inform the owner or operator of the amended schedule.

(j) *Change in information already provided.* Any change in the information already provided under this section shall be provided to the Administrator within 15 calendar days after the change. The owner or operator of a major source that reclassifies to area source status is also subject to the notification requirements of this paragraph. The owner or operator may use the application for reclassification with the regulatory authority (e.g., permit application) to fulfill the requirements of this paragraph. A source which reclassified after January 25, 2018, and before January 19, 2021, and has not yet provided the notification of a change in information is required to provide such notification no later than February 2, 2021, according to the requirements of paragraph (k) of this section. Beginning January 19, 2021, the owner or operator of a major source that reclassifies to area source status must submit the notification according to the requirements of paragraph (k) of this section. A notification of reclassification must contain the following information:

- (1) The name and address of the owner or operator;
- (2) The address (i.e., physical location) of the affected source;
- (3) An identification of the standard being reclassified from and to (if applicable); and
- (4) Date of effectiveness of the reclassification.

(k) *Electronic submission of notifications or reports.* If you are required to submit notifications or reports following the procedure specified in this paragraph (k), you must submit notifications or reports to the EPA via CEDRI, which can be accessed through the EPA's Central Data Exchange (CDX) (<https://cdx.epa.gov/>). The notification or report must be submitted by the deadline specified. The EPA will make all the information submitted through CEDRI available to the public without further notice to you. Do not use CEDRI to submit information you claim as confidential business information (CBI). Anything submitted using CEDRI cannot later be claimed to be CBI. Although we do not expect persons to assert a claim of CBI, if persons wish to assert a CBI, submit a complete notification or report, including information claimed to be CBI, to the EPA. Submit the file on a compact disc, flash drive, or other commonly used electronic storage medium and clearly mark the medium as CBI. Mail the electronic medium to U.S. EPA/OAQPS/CORE CBI Office, Attention: Group Leader, Measurement Policy Group, MD C404-02, 4930 Old Page Rd., Durham, NC 27703. The same file with the CBI omitted must be submitted to the EPA via the EPA's CDX as described earlier in this paragraph (k). All CBI claims must be asserted at the time of submission. Furthermore, under section 114(c) of the Act emissions data is not entitled to confidential treatment and requires EPA to make emissions data available to the public. Thus, emissions data will not be protected as CBI and will be made publicly available.

(1) If you are required to electronically submit a notification or report by this paragraph (k) through CEDRI in the EPA's CDX, you may assert a claim of EPA system outage for failure to timely comply with the electronic submittal requirement. To assert a claim of EPA system outage, you must meet the requirements outlined in paragraphs (k)(1)(i) through (vii) of this section.

(i) You must have been or will be precluded from accessing CEDRI and submitting a required notification or report within the time prescribed due to an outage of either the EPA's CEDRI or CDX systems.

(ii) The outage must have occurred within the period of time beginning 5 business days prior to the date that the notification or report is due.

(iii) The outage may be planned or unplanned.

(iv) You must submit notification to the Administrator in writing as soon as possible following the date you first knew, or through due diligence should have known, that the event may cause or has caused a delay in reporting.

(v) You must provide to the Administrator a written description identifying:

(A) The date(s) and time(s) when CDX or CEDRI was accessed and the system was unavailable;

(B) A rationale for attributing the delay in submitting beyond the regulatory deadline to EPA system outage;

(C) Measures taken or to be taken to minimize the delay in submitting; and

(D) The date by which you propose to submit, or if you have already met the electronic submittal requirement in this paragraph (k) at the time of the notification, the date you submitted the notification or report.

(vi) The decision to accept the claim of EPA system outage and allow an extension to the reporting deadline is solely within the discretion of the Administrator.

(vii) In any circumstance, the notification or report must be submitted electronically as soon as possible after the outage is resolved.

(2) If you are required to electronically submit a notification or report by this paragraph (k) through CEDRI in the EPA's CDX, you may assert a claim of force majeure for failure to timely comply with the electronic submittal requirement. To assert a claim of force majeure, you must meet the requirements outlined in paragraphs (k)(2)(i) through (v) of this section.

(i) You may submit a claim if a force majeure event is about to occur, occurs, or has occurred or there are lingering effects from such an event within the period of time beginning five business days prior to the date the submission is due. For the purposes of this section, a force majeure event is defined as an event that will be or has been caused by circumstances beyond the control of the affected facility, its contractors, or any entity controlled by the affected facility that prevents you from complying with the requirement to submit a notification or report electronically within the time period prescribed. Examples of such events are acts of nature

(e.g., hurricanes, earthquakes, or floods), acts of war or terrorism, or equipment failure or safety hazard beyond the control of the affected facility (e.g., large scale power outage).

(ii) You must submit notification to the Administrator in writing as soon as possible following the date you first knew, or through due diligence should have known, that the event may cause or has caused a delay in submitting through CEDRI.

(iii) You must provide to the Administrator:

(A) A written description of the force majeure event;

(B) A rationale for attributing the delay in reporting beyond the regulatory deadline to the force majeure event;

(C) Measures taken or to be taken to minimize the delay in reporting; and

(D) The date by which you propose to submit the notification or report, or if you have already met the electronic submittal requirement in this paragraph (k) at the time of the notification, the date you submitted the notification or report.

(iv) The decision to accept the claim of force majeure and allow an extension to the submittal deadline is solely within the discretion of the Administrator.

(v) In any circumstance, the reporting must occur as soon as possible after the force majeure event occurs.

§ 63.10 Recordkeeping and reporting requirements.

(a) Applicability and general information.

(1) The applicability of this section is set out in § 63.1(a)(4).

(2) For affected sources that have been granted an extension of compliance under subpart D of this part, the requirements of this section do not apply to those sources while they are operating under such compliance extensions.

(3) If any State requires a report that contains all the information required in a report listed in this section, an owner or operator may send the Administrator a copy of the report sent to the State to satisfy the requirements of this section for that report.

(4) (i) Before a State has been delegated the authority to implement and enforce recordkeeping and reporting requirements established under this part, the owner or operator of an affected source in such State subject to such requirements shall submit reports to the appropriate Regional Office of the EPA (to the attention of the Director of the Division indicated in the list of the EPA Regional Offices in § 63.13).

(ii) After a State has been delegated the authority to implement and enforce recordkeeping and reporting requirements established under this part, the owner or operator of an affected source in such State subject to such requirements shall submit reports to the delegated State authority (which may be the same as the permitting authority). In addition, if the delegated (permitting) authority is the State, the owner or operator shall send a copy of each report submitted to the State to the appropriate Regional Office of the EPA, as specified in paragraph

(a)(4)(i) of this section. The Regional Office may waive this requirement for any reports at its discretion.

(5) If an owner or operator of an affected source in a State with delegated authority is required to submit periodic reports under this part to the State, and if the State has an established timeline for the submission of periodic reports that is consistent with the reporting frequency(ies) specified for such source under this part, the owner or operator may change the dates by which periodic reports under this part shall be submitted (without changing the frequency of reporting) to be consistent with the State's schedule by mutual agreement between the owner or operator and the State. For each relevant standard established pursuant to section 112 of the Act, the allowance in the previous sentence applies in each State beginning 1 year after the affected source's compliance date for that standard. Procedures governing the implementation of this provision are specified in § 63.9(i).

(6) If an owner or operator supervises one or more stationary sources affected by more than one standard established pursuant to section 112 of the Act, he/she may arrange by mutual agreement between the owner or operator and the Administrator (or the State permitting authority) a common schedule on which periodic reports required for each source shall be submitted throughout the year. The allowance in the previous sentence applies in each State beginning 1 year after the latest compliance date for any relevant standard established pursuant to section 112 of the Act for any such affected source(s). Procedures governing the implementation of this provision are specified in § 63.9(i).

(7) If an owner or operator supervises one or more stationary sources affected by standards established pursuant to section 112 of the Act (as amended November 15, 1990) and standards set under part 60, part 61, or both such parts of this chapter, he/she may arrange by mutual agreement between the owner or operator and the Administrator (or the State permitting authority) a common schedule on which periodic reports required by each relevant (i.e., applicable) standard shall be submitted throughout the year. The allowance in the previous sentence applies in each State beginning 1 year after the stationary source is required to be in compliance with the relevant section 112 standard, or 1 year after the stationary source is required to be in compliance with the applicable part 60 or part 61 standard, whichever is latest. Procedures governing the implementation of this provision are specified in § 63.9(i).

(b) General recordkeeping requirements.

(1) The owner or operator of an affected source subject to the provisions of this part shall maintain files of all information (including all reports and notifications) required by this part recorded in a form suitable and readily available for expeditious inspection and review. The files shall be retained for at least 5 years following the date of each occurrence, measurement, maintenance, corrective action, report, or record. At a minimum, the most recent 2 years of data shall be retained on site. The remaining 3 years of data may be retained off site. Such files may be maintained on microfilm, on a computer, on computer floppy disks, on magnetic tape disks, or on microfiche.

(2) The owner or operator of an affected source subject to the provisions of this part shall maintain relevant records for such source of -

(i) The occurrence and duration of each startup or shutdown when the startup or shutdown causes the source to exceed any applicable emission limitation in the relevant emission standards;

(ii) The occurrence and duration of each malfunction of operation (i.e., process equipment) or the required air pollution control and monitoring equipment;

(iii) All required maintenance performed on the air pollution control and monitoring equipment;

(iv) (A) Actions taken during periods of startup or shutdown when the source exceeded applicable emission limitations in a relevant standard and when the actions taken are different from the procedures specified in the affected source's startup, shutdown, and malfunction plan (see § 63.6(e)(3)); or

(B) Actions taken during periods of malfunction (including corrective actions to restore malfunctioning process and air pollution control and monitoring equipment to its normal or usual manner of operation) when the actions taken are different from the procedures specified in the affected source's startup, shutdown, and malfunction plan (see § 63.6(e)(3));

(v) All information necessary, including actions taken, to demonstrate conformance with the affected source's startup, shutdown, and malfunction plan (see § 63.6(e)(3)) when all actions taken during periods of startup or shutdown (and the startup or shutdown causes the source to exceed any applicable emission limitation in the relevant emission standards), and malfunction (including corrective actions to restore malfunctioning process and air pollution control and monitoring equipment to its normal or usual manner of operation) are consistent with the procedures specified in such plan. (The information needed to demonstrate conformance with the startup, shutdown, and malfunction plan may be recorded using a "checklist," or some other effective form of recordkeeping, in order to minimize the recordkeeping burden for conforming events);

(vi) Each period during which a CMS is malfunctioning or inoperative (including out-of-control periods);

(vii) All required measurements needed to demonstrate compliance with a relevant standard (including, but not limited to, 15-minute averages of CMS data, raw performance testing measurements, and raw performance evaluation measurements, that support data that the source is required to report);

(A) This paragraph applies to owners or operators required to install a continuous emissions monitoring system (CEMS) where the CEMS installed is automated, and where the calculated data averages do not exclude periods of CEMS breakdown or malfunction. An automated CEMS records and reduces the measured data to the form of the pollutant emission standard through the use of a computerized data acquisition system. In lieu of maintaining a file of all CEMS subhourly measurements as required under paragraph (b)(2)(vii) of this section, the owner or operator shall retain the most recent consecutive three averaging periods of subhourly measurements and a file that contains a hard copy of the data acquisition system algorithm used to reduce the measured data into the reportable form of the standard.

(B) This paragraph applies to owners or operators required to install a CEMS where the measured data is manually reduced to obtain the reportable form of the standard, and

where the calculated data averages do not exclude periods of CEMS breakdown or malfunction. In lieu of maintaining a file of all CEMS subhourly measurements as required under paragraph (b)(2)(vii) of this section, the owner or operator shall retain all subhourly measurements for the most recent reporting period. The subhourly measurements shall be retained for 120 days from the date of the most recent summary or excess emission report submitted to the Administrator.

(C) The Administrator or delegated authority, upon notification to the source, may require the owner or operator to maintain all measurements as required by paragraph (b)(2)(vii), if the administrator or the delegated authority determines these records are required to more accurately assess the compliance status of the affected source.

(viii) All results of performance tests, CMS performance evaluations, and opacity and visible emission observations;

(ix) All measurements as may be necessary to determine the conditions of performance tests and performance evaluations;

(x) All CMS calibration checks;

(xi) All adjustments and maintenance performed on CMS;

(xii) Any information demonstrating whether a source is meeting the requirements for a waiver of recordkeeping or reporting requirements under this part, if the source has been granted a waiver under paragraph (f) of this section;

(xiii) All emission levels relative to the criterion for obtaining permission to use an alternative to the relative accuracy test, if the source has been granted such permission under § 63.8(f)(6); and

(xiv) All documentation supporting initial notifications and notifications of compliance status under § 63.9.

(3) If an owner or operator determines that his or her existing or new stationary source is in the source category regulated by a standard established pursuant to section 112 of the Act, but that source is not subject to the relevant standard (or other requirement established under this part) because of enforceable limitations on the source's potential to emit, or the source otherwise qualifies for an exclusion, the owner or operator must keep a record of the applicability determination. The applicability determination must be kept on site at the source for a period of 5 years after the determination, or until the source changes its operations to become an affected source subject to the relevant standard (or other requirement established under this part), whichever comes first if the determination is made prior to January 19, 2021. The applicability determination must be kept until the source changes its operations to become an affected source subject to the relevant standard (or other requirement established under this part) if the determination was made on or after January 19, 2021. The record of the applicability determination must be signed by the person making the determination and include an emissions analysis (or other information) that demonstrates the owner or operator's conclusion that the source is unaffected (*e.g.*, because the source is an area source). The analysis (or other information) must be sufficiently detailed to allow the Administrator to make an applicability finding for the source with regard to the relevant standard or other requirement. If

applicable, the analysis must be performed in accordance with requirements established in relevant subparts of this part for this purpose for particular categories of stationary sources. If relevant, the analysis should be performed in accordance with EPA guidance materials published to assist sources in making applicability determinations under section 112 of the Act, if any. The requirements to determine applicability of a standard under § 63.1(b)(3) and to record the results of that determination under this paragraph (b)(3) of this section shall not by themselves create an obligation for the owner or operator to obtain a title V permit.

(c) *Additional recordkeeping requirements for sources with continuous monitoring systems.* In addition to complying with the requirements specified in paragraphs (b)(1) and (b)(2) of this section, the owner or operator of an affected source required to install a CMS by a relevant standard shall maintain records for such source of -

- (1) All required CMS measurements (including monitoring data recorded during unavoidable CMS breakdowns and out-of-control periods);
- (2)-(4) [Reserved]
- (5) The date and time identifying each period during which the CMS was inoperative except for zero (low-level) and high-level checks;
- (6) The date and time identifying each period during which the CMS was out of control, as defined in § 63.8(c)(7);
- (7) The specific identification (i.e., the date and time of commencement and completion) of each period of excess emissions and parameter monitoring exceedances, as defined in the relevant standard(s), that occurs during startups, shutdowns, and malfunctions of the affected source;
- (8) The specific identification (i.e., the date and time of commencement and completion) of each time period of excess emissions and parameter monitoring exceedances, as defined in the relevant standard(s), that occurs during periods other than startups, shutdowns, and malfunctions of the affected source;
- (9) [Reserved]
- (10) The nature and cause of any malfunction (if known);
- (11) The corrective action taken or preventive measures adopted;
- (12) The nature of the repairs or adjustments to the CMS that was inoperative or out of control;
- (13) The total process operating time during the reporting period; and
- (14) All procedures that are part of a quality control program developed and implemented for CMS under § 63.8(d).
- (15) In order to satisfy the requirements of paragraphs (c)(10) through (c)(12) of this section and to avoid duplicative recordkeeping efforts, the owner or operator may use the affected source's startup, shutdown, and malfunction plan or records kept to satisfy the recordkeeping requirements of the startup, shutdown, and malfunction plan specified in § 63.6(e), provided that such plan and records adequately address the requirements of paragraphs (c)(10) through (c)(12).

(d) *General reporting requirements.*

- (1) Notwithstanding the requirements in this paragraph or paragraph (e) of this section, and except as provided in § 63.16, the owner or operator of an affected source subject to reporting requirements under this part shall submit reports to the Administrator in accordance with the reporting requirements in the relevant standard(s).
- (2) *Reporting results of performance tests.* Before a title V permit has been issued to the owner or operator of an affected source, the owner or operator shall report the results of any performance test under § 63.7 to the Administrator. After a title V permit has been issued to the owner or operator of an affected source, the owner or operator shall report the results of a required performance test to the appropriate permitting authority. The owner or operator of an affected source shall report the results of the performance test to the Administrator (or the State with an approved permit program) before the close of business on the 60th day following the completion of the performance test, unless specified otherwise in a relevant standard or as approved otherwise in writing by the Administrator. The results of the performance test shall be submitted as part of the notification of compliance status required under § 63.9(h).
- (3) *Reporting results of opacity or visible emission observations.* The owner or operator of an affected source required to conduct opacity or visible emission observations by a relevant standard shall report the opacity or visible emission results (produced using Test Method 9 or Test Method 22, or an alternative to these test methods) along with the results of the performance test required under § 63.7. If no performance test is required, or if visibility or other conditions prevent the opacity or visible emission observations from being conducted concurrently with the performance test required under § 63.7, the owner or operator shall report the opacity or visible emission results before the close of business on the 30th day following the completion of the opacity or visible emission observations.
- (4) *Progress reports.* The owner or operator of an affected source who is required to submit progress reports as a condition of receiving an extension of compliance under § 63.6(i) shall submit such reports to the Administrator (or the State with an approved permit program) by the dates specified in the written extension of compliance.
- (5) (i) *Periodic startup, shutdown, and malfunction reports.* If actions taken by an owner or operator during a startup or shutdown (and the startup or shutdown causes the source to exceed any applicable emission limitation in the relevant emission standards), or malfunction of an affected source (including actions taken to correct a malfunction) are consistent with the procedures specified in the source's startup, shutdown, and malfunction plan (see § 63.6(e)(3)), the owner or operator shall state such information in a startup, shutdown, and malfunction report. Actions taken to minimize emissions during such startups, shutdowns, and malfunctions shall be summarized in the report and may be done in checklist form; if actions taken are the same for each event, only one checklist is necessary. Such a report shall also include the number, duration, and a brief description for each type of malfunction which occurred during the reporting period and which caused or may have caused any applicable emission limitation to be exceeded. Reports shall only be required if a startup or shutdown caused the source to exceed any applicable emission limitation in the relevant emission standards, or if a malfunction occurred during the reporting period. The startup, shutdown, and malfunction report shall consist of a letter, containing the name, title, and signature of the owner or operator or other responsible official who is certifying its accuracy, that shall be submitted to the Administrator semiannually (or on a more frequent basis if specified otherwise in a relevant standard or as

established otherwise by the permitting authority in the source's title V permit). The startup, shutdown, and malfunction report shall be delivered or postmarked by the 30th day following the end of each calendar half (or other calendar reporting period, as appropriate). If the owner or operator is required to submit excess emissions and continuous monitoring system performance (or other periodic) reports under this part, the startup, shutdown, and malfunction reports required under this paragraph may be submitted simultaneously with the excess emissions and continuous monitoring system performance (or other) reports. If startup, shutdown, and malfunction reports are submitted with excess emissions and continuous monitoring system performance (or other periodic) reports, and the owner or operator receives approval to reduce the frequency of reporting for the latter under paragraph (e) of this section, the frequency of reporting for the startup, shutdown, and malfunction reports also may be reduced if the Administrator does not object to the intended change. The procedures to implement the allowance in the preceding sentence shall be the same as the procedures specified in paragraph (e)(3) of this section.

(ii) *Immediate startup, shutdown, and malfunction reports.* Notwithstanding the allowance to reduce the frequency of reporting for periodic startup, shutdown, and malfunction reports under paragraph (d)(5)(i) of this section, any time an action taken by an owner or operator during a startup or shutdown that caused the source to exceed any applicable emission limitation in the relevant emission standards, or malfunction (including actions taken to correct a malfunction) is not consistent with the procedures specified in the affected source's startup, shutdown, and malfunction plan, the owner or operator shall report the actions taken for that event within 2 working days after commencing actions inconsistent with the plan followed by a letter within 7 working days after the end of the event. The immediate report required under this paragraph (d)(5)(ii) shall consist of a telephone call (or facsimile (FAX) transmission) to the Administrator within 2 working days after commencing actions inconsistent with the plan, and it shall be followed by a letter, delivered or postmarked within 7 working days after the end of the event, that contains the name, title, and signature of the owner or operator or other responsible official who is certifying its accuracy, explaining the circumstances of the event, the reasons for not following the startup, shutdown, and malfunction plan, describing all excess emissions and/or parameter monitoring exceedances which are believed to have occurred (or could have occurred in the case of malfunctions), and actions taken to minimize emissions in conformance with § 63.6(e)(1)(i). Notwithstanding the requirements of the previous sentence, after the effective date of an approved permit program in the State in which an affected source is located, the owner or operator may make alternative reporting arrangements, in advance, with the permitting authority in that State. Procedures governing the arrangement of alternative reporting requirements under this paragraph (d)(5)(ii) are specified in § 63.9(i).

(e) *Additional reporting requirements for sources with continuous monitoring systems -*

(1) *General.* When more than one CEMS is used to measure the emissions from one affected source (e.g., multiple breechings, multiple outlets), the owner or operator shall report the results as required for each CEMS.

(2) *Reporting results of continuous monitoring system performance evaluations.*

(i) The owner or operator of an affected source required to install a CMS by a relevant standard shall furnish the Administrator a copy of a written report of the results of the CMS performance

evaluation, as required under § 63.8(e), simultaneously with the results of the performance test required under § 63.7, unless otherwise specified in the relevant standard.

(ii) The owner or operator of an affected source using a COMS to determine opacity compliance during any performance test required under § 63.7 and described in § 63.6(d)(6) shall furnish the Administrator two or, upon request, three copies of a written report of the results of the COMS performance evaluation conducted under § 63.8(e). The copies shall be furnished at least 15 calendar days before the performance test required under § 63.7 is conducted.

(3) *Excess emissions and continuous monitoring system performance report and summary report.*

(i) Excess emissions and parameter monitoring exceedances are defined in relevant standards. The owner or operator of an affected source required to install a CMS by a relevant standard shall submit an excess emissions and continuous monitoring system performance report and/or a summary report to the Administrator semiannually, except when -

- (A) More frequent reporting is specifically required by a relevant standard;
- (B) The Administrator determines on a case-by-case basis that more frequent reporting is necessary to accurately assess the compliance status of the source; or
- (C) [Reserved]
- (D) The affected source is complying with the Performance Track Provisions of § 63.16, which allows less frequent reporting.

(ii) *Request to reduce frequency of excess emissions and continuous monitoring system performance reports.* Notwithstanding the frequency of reporting requirements specified in paragraph (e)(3)(i) of this section, an owner or operator who is required by a relevant standard to submit excess emissions and continuous monitoring system performance (and summary) reports on a quarterly (or more frequent) basis may reduce the frequency of reporting for that standard to semiannual if the following conditions are met:

- (A) For 1 full year (e.g., 4 quarterly or 12 monthly reporting periods) the affected source's excess emissions and continuous monitoring system performance reports continually demonstrate that the source is in compliance with the relevant standard;
- (B) The owner or operator continues to comply with all recordkeeping and monitoring requirements specified in this subpart and the relevant standard; and
- (C) The Administrator does not object to a reduced frequency of reporting for the affected source, as provided in paragraph (e)(3)(iii) of this section.

(iii) The frequency of reporting of excess emissions and continuous monitoring system performance (and summary) reports required to comply with a relevant standard may be reduced only after the owner or operator notifies the Administrator in writing of his or her intention to make such a change and the Administrator does not object to the intended change. In deciding whether to approve a reduced frequency of reporting, the Administrator may review information concerning the source's entire previous performance history during the 5-year recordkeeping period prior to the intended change, including performance test results, monitoring data, and evaluations of an owner or operator's conformance with operation and

maintenance requirements. Such information may be used by the Administrator to make a judgment about the source's potential for noncompliance in the future. If the Administrator disapproves the owner or operator's request to reduce the frequency of reporting, the Administrator will notify the owner or operator in writing within 45 days after receiving notice of the owner or operator's intention. The notification from the Administrator to the owner or operator will specify the grounds on which the disapproval is based. In the absence of a notice of disapproval within 45 days, approval is automatically granted.

(iv) As soon as CMS data indicate that the source is not in compliance with any emission limitation or operating parameter specified in the relevant standard, the frequency of reporting shall revert to the frequency specified in the relevant standard, and the owner or operator shall submit an excess emissions and continuous monitoring system performance (and summary) report for the noncomplying emission points at the next appropriate reporting period following the noncomplying event. After demonstrating ongoing compliance with the relevant standard for another full year, the owner or operator may again request approval from the Administrator to reduce the frequency of reporting for that standard, as provided for in paragraphs (e)(3)(ii) and (e)(3)(iii) of this section.

(v) *Content and submittal dates for excess emissions and monitoring system performance reports.* All excess emissions and monitoring system performance reports and all summary reports, if required, shall be delivered or postmarked by the 30th day following the end of each calendar half or quarter, as appropriate. Written reports of excess emissions or exceedances of process or control system parameters shall include all the information required in paragraphs (c)(5) through (c)(13) of this section, in §§ 63.8(c)(7) and 63.8(c)(8), and in the relevant standard, and they shall contain the name, title, and signature of the responsible official who is certifying the accuracy of the report. When no excess emissions or exceedances of a parameter have occurred, or a CMS has not been inoperative, out of control, repaired, or adjusted, such information shall be stated in the report.

(vi) *Summary report.* As required under paragraphs (e)(3)(vii) and (e)(3)(viii) of this section, one summary report shall be submitted for the hazardous air pollutants monitored at each affected source (unless the relevant standard specifies that more than one summary report is required, e.g., one summary report for each hazardous air pollutant monitored). The summary report shall be entitled "Summary Report - Gaseous and Opacity Excess Emission and Continuous Monitoring System Performance" and shall contain the following information:

- (A) The company name and address of the affected source;
- (B) An identification of each hazardous air pollutant monitored at the affected source;
- (C) The beginning and ending dates of the reporting period;
- (D) A brief description of the process units;
- (E) The emission and operating parameter limitations specified in the relevant standard(s);
- (F) The monitoring equipment manufacturer(s) and model number(s);
- (G) The date of the latest CMS certification or audit;

(H) The total operating time of the affected source during the reporting period;

(I) An emission data summary (or similar summary if the owner or operator monitors control system parameters), including the total duration of excess emissions during the reporting period (recorded in minutes for opacity and hours for gases), the total duration of excess emissions expressed as a percent of the total source operating time during that reporting period, and a breakdown of the total duration of excess emissions during the reporting period into those that are due to startup/shutdown, control equipment problems, process problems, other known causes, and other unknown causes;

(J) A CMS performance summary (or similar summary if the owner or operator monitors control system parameters), including the total CMS downtime during the reporting period (recorded in minutes for opacity and hours for gases), the total duration of CMS downtime expressed as a percent of the total source operating time during that reporting period, and a breakdown of the total CMS downtime during the reporting period into periods that are due to monitoring equipment malfunctions, nonmonitoring equipment malfunctions, quality assurance/quality control calibrations, other known causes, and other unknown causes;

(K) A description of any changes in CMS, processes, or controls since the last reporting period;

(L) The name, title, and signature of the responsible official who is certifying the accuracy of the report; and

(M) The date of the report.

(vii) If the total duration of excess emissions or process or control system parameter exceedances for the reporting period is less than 1 percent of the total operating time for the reporting period, and CMS downtime for the reporting period is less than 5 percent of the total operating time for the reporting period, only the summary report shall be submitted, and the full excess emissions and continuous monitoring system performance report need not be submitted unless required by the Administrator.

(viii) If the total duration of excess emissions or process or control system parameter exceedances for the reporting period is 1 percent or greater of the total operating time for the reporting period, or the total CMS downtime for the reporting period is 5 percent or greater of the total operating time for the reporting period, both the summary report and the excess emissions and continuous monitoring system performance report shall be submitted.

(4) *Reporting continuous opacity monitoring system data produced during a performance test.* The owner or operator of an affected source required to use a COMS shall record the monitoring data produced during a performance test required under § 63.7 and shall furnish the Administrator a written report of the monitoring results. The report of COMS data shall be submitted simultaneously with the report of the performance test results required in paragraph (d)(2) of this section.

(f) *Waiver of recordkeeping or reporting requirements.*

- (1) Until a waiver of a recordkeeping or reporting requirement has been granted by the Administrator under this paragraph, the owner or operator of an affected source remains subject to the requirements of this section.
- (2) Recordkeeping or reporting requirements may be waived upon written application to the Administrator if, in the Administrator's judgment, the affected source is achieving the relevant standard(s), or the source is operating under an extension of compliance, or the owner or operator has requested an extension of compliance and the Administrator is still considering that request.
- (3) If an application for a waiver of recordkeeping or reporting is made, the application shall accompany the request for an extension of compliance under § 63.6(i), any required compliance progress report or compliance status report required under this part (such as under §§ 63.6(i) and 63.9(h)) or in the source's title V permit, or an excess emissions and continuous monitoring system performance report required under paragraph (e) of this section, whichever is applicable. The application shall include whatever information the owner or operator considers useful to convince the Administrator that a waiver of recordkeeping or reporting is warranted.
- (4) The Administrator will approve or deny a request for a waiver of recordkeeping or reporting requirements under this paragraph when he/she -
 - (i) Approves or denies an extension of compliance; or
 - (ii) Makes a determination of compliance following the submission of a required compliance status report or excess emissions and continuous monitoring systems performance report; or
 - (iii) Makes a determination of suitable progress towards compliance following the submission of a compliance progress report, whichever is applicable.
- (5) A waiver of any recordkeeping or reporting requirement granted under this paragraph may be conditioned on other recordkeeping or reporting requirements deemed necessary by the Administrator.
- (6) Approval of any waiver granted under this section shall not abrogate the Administrator's authority under the Act or in any way prohibit the Administrator from later canceling the waiver. The cancellation will be made only after notice is given to the owner or operator of the affected source.

§ 63.11 Control device and work practice requirements.

(a) Applicability.

- (1) The applicability of this section is set out in § 63.1(a)(4).
- (2) This section contains requirements for control devices used to comply with applicable subparts of this part. The requirements are placed here for administrative convenience and apply only to facilities covered by subparts referring to this section.
- (3) This section also contains requirements for an alternative work practice used to identify leaking equipment. This alternative work practice is placed here for administrative convenience and is available to all subparts in 40 CFR parts 60, 61, 63, and 65 that require monitoring of equipment with a 40 CFR part 60, appendix A-7, Method 21 monitor.

(b) Flares.

- (1) Owners or operators using flares to comply with the provisions of this part shall monitor these control devices to assure that they are operated and maintained in conformance with their designs. Applicable subparts will provide provisions stating how owners or operators using flares shall monitor these control devices.
- (2) Flares shall be steam-assisted, air-assisted, or non-assisted.
- (3) Flares shall be operated at all times when emissions may be vented to them.
- (4) Flares shall be designed for and operated with no visible emissions, except for periods not to exceed a total of 5 minutes during any 2 consecutive hours. Test Method 22 in appendix A of part 60 of this chapter shall be used to determine the compliance of flares with the visible emission provisions of this part. The observation period is 2 hours and shall be used according to Method 22.
- (5) Flares shall be operated with a flame present at all times. The presence of a flare pilot flame shall be monitored using a thermocouple or any other equivalent device to detect the presence of a flame.
- (6) An owner/operator has the choice of adhering to the heat content specifications in paragraph (b)(6)(ii) of this section, and the maximum tip velocity specifications in paragraph (b)(7) or (b)(8) of this section, or adhering to the requirements in paragraph (b)(6)(i) of this section.

(i) (A) Flares shall be used that have a diameter of 3 inches or greater, are nonassisted, have a hydrogen content of 8.0 percent (by volume) or greater, and are designed for and operated with an exit velocity less than 37.2 m/sec (122 ft/sec) and less than the velocity $V_{\max}$, as determined by the following equation:

$$V_{\max} = (X_{H_2} - K_1) * K_2$$

Where:

$V_{\max}$ = Maximum permitted velocity, m/sec.

K_1 = Constant, 6.0 volume-percent hydrogen.

K_2 = Constant, 3.9(m/sec)/volume-percent hydrogen.

X_{H_2} = The volume-percent of hydrogen, on a wet basis, as calculated by using the American Society for Testing and Materials (ASTM) Method D1946-77. (Incorporated by reference as specified in § 63.14).

(B) The actual exit velocity of a flare shall be determined by the method specified in paragraph (b)(7)(i) of this section.

(ii) Flares shall be used only with the net heating value of the gas being combusted at 11.2 MJ/scm (300 Btu/scf) or greater if the flare is steam-assisted or air-assisted; or with the net heating value of the gas being combusted at 7.45 MJ/scm (200 Btu/scf) or greater if the flares is non-assisted. The net heating value of the gas being combusted in a flare shall be calculated using the following equation:

$$H_T = K \sum_{i=1}^n C_i H_i$$

Where:

H_T = Net heating value of the sample, MJ/scm; where the net enthalpy per mole of offgas is based on combustion at 25 °C and 760 mm Hg, but the standard temperature for determining the volume corresponding to one mole is 20 °C.

K = Constant =

$$1.740 \times 10^{-7} \left(\frac{1}{\text{ppmv}} \right) \left(\frac{\text{g-mole}}{\text{scm}} \right) \left(\frac{\text{MJ}}{\text{kcal}} \right)$$

where the standard temperature for (g-mole/scm) is 20 °C.

C_i = Concentration of sample component i in ppmv on a wet basis, as measured for organics by Test Method 18 and measured for hydrogen and carbon monoxide by American Society for Testing and Materials (ASTM) D1946-77 or 90 (Reapproved 1994) (incorporated by reference as specified in § 63.14).

H_i = Net heat of combustion of sample component i, kcal/g-mole at 25 °C and 760 mm Hg. The heats of combustion may be determined using ASTM D2382-76 or 88 or D4809-95 (incorporated by reference as specified in § 63.14) if published values are not available or cannot be calculated.

n = Number of sample components.

(7) (i) Steam-assisted and nonassisted flares shall be designed for and operated with an exit velocity less than 18.3 m/sec (60 ft/sec), except as provided in paragraphs (b)(7)(ii) and (b)(7)(iii) of this section. The actual exit velocity of a flare shall be determined by dividing by the volumetric flow rate of gas being combusted (in units of emission standard temperature and pressure), as determined by Test Method 2, 2A, 2C, or 2D in appendix A to 40 CFR part 60 of this chapter, as appropriate, by the unobstructed (free) cross-sectional area of the flare tip.

(ii) Steam-assisted and nonassisted flares designed for and operated with an exit velocity, as determined by the method specified in paragraph (b)(7)(i) of this section, equal to or greater than 18.3 m/sec (60 ft/sec) but less than 122 m/sec (400 ft/sec), are allowed if the net heating value of the gas being combusted is greater than 37.3 MJ/scm (1,000 Btu/scf).

(iii) Steam-assisted and nonassisted flares designed for and operated with an exit velocity, as determined by the method specified in paragraph (b)(7)(i) of this section, less than the velocity $V_{\max}$, as determined by the method specified in this paragraph, but less than 122 m/sec (400 ft/sec) are allowed. The maximum permitted velocity, $V_{\max}$, for flares complying with this paragraph shall be determined by the following equation:

$$\text{Log}_{10}(V_{\max}) = (H_T + 28.8)/31.7$$

Where:

$V_{\max}$ = Maximum permitted velocity, m/sec.

28.8 = Constant.

31.7 = Constant.

H_T = The net heating value as determined in paragraph (b)(6) of this section.

(8) Air-assisted flares shall be designed and operated with an exit velocity less than the velocity $V_{\max}$. The maximum permitted velocity, $V_{\max}$, for air-assisted flares shall be determined by the following equation:

$$V_{\max} = 8.71 + 0.708(H_T)$$

Where:

$V_{\max}$ = Maximum permitted velocity, m/sec.

8.71 = Constant.

0.708 = Constant.

H_T = The net heating value as determined in paragraph (b)(6)(ii) of this section.

(c) *Alternative work practice for monitoring equipment for leaks.* Paragraphs (c), (d), and (e) of this section apply to all equipment for which the applicable subpart requires monitoring with a 40 CFR part 60, appendix A-7, Method 21 monitor, except for closed vent systems, equipment designated as leakless, and equipment identified in the applicable subpart as having no detectable emissions, as indicated by an instrument reading of less than 500 ppm above background. An owner or operator may use an optical gas imaging instrument instead of a 40 CFR part 60, appendix A-7, Method 21 monitor. Requirements in the existing subparts that are specific to the Method 21 instrument do not apply under this section. All other requirements in the applicable subpart that are not addressed in paragraphs (c), (d), and (e) of this section continue to apply. For example, equipment specification requirements, and non-Method 21 instrument recordkeeping and reporting requirements in the applicable subpart continue to apply. The terms defined in paragraphs (c)(1) through (5) of this section have meanings that are specific to the alternative work practice standard in paragraphs (c), (d), and (e) of this section.

(1) *Applicable subpart* means the subpart in 40 CFR parts 60, 61, 63, and 65 that requires monitoring of equipment with a 40 CFR part 60, appendix A-7, Method 21 monitor.

(2) *Equipment* means pumps, valves, pressure relief valves, compressors, open-ended lines, flanges, connectors, and other equipment covered by the applicable subpart that require monitoring with a 40 CFR part 60, appendix A-7, Method 21 monitor.

(3) *Imaging* means making visible emissions that may otherwise be invisible to the naked eye.

(4) *Optical gas imaging instrument* means an instrument that makes visible emissions that may otherwise be invisible to the naked eye.

(5) *Repair* means that equipment is adjusted, or otherwise altered, in order to eliminate a leak.

(6) *Leak* means:

(i) Any emissions imaged by the optical gas instrument;

(ii) Indications of liquids dripping;

(iii) Indications by a sensor that a seal or barrier fluid system has failed; or

(iv) Screening results using a 40 CFR part 60, appendix A-7, Method 21 monitor that exceed the leak definition in the applicable subpart to which the equipment is subject.

(d) The alternative work practice standard for monitoring equipment for leaks is available to all subparts in 40 CFR parts 60, 61, 63, and 65 that require monitoring of equipment with a 40 CFR part 60, appendix A-7, Method 21 monitor.

(1) An owner or operator of an affected source subject to 40 CFR parts 60, 61, 63, or 65 can choose to comply with the alternative work practice requirements in paragraph (e) of this section instead of using the 40 CFR part 60, appendix A-7, Method 21 monitor to identify leaking equipment. The owner or operator must document the equipment, process units, and facilities for which the alternative work practice will be used to identify leaks.

(2) Any leak detected when following the leak survey procedure in paragraph (e)(3) of this section must be identified for repair as required in the applicable subpart.

(3) If the alternative work practice is used to identify leaks, re-screening after an attempted repair of leaking equipment must be conducted using either the alternative work practice or the 40 CFR part 60, Appendix A-7, Method 21 monitor at the leak definition required in the applicable subparts to which the equipment is subject.

(4) The schedule for repair is as required in the applicable subpart.

(5) When this alternative work practice is used for detecting leaking equipment, choose one of the monitoring frequencies listed in Table 1 to subpart A of this part in lieu of the monitoring frequency specified for regulated equipment in the applicable subpart. Reduced monitoring frequencies for good performance are not applicable when using the alternative work practice.

(6) When this alternative work practice is used for detecting leaking equipment, the following are not applicable for the equipment being monitored:

- (i) Skip period leak detection and repair;
- (ii) Quality improvement plans; or
- (iii) Complying with standards for allowable percentage of valves and pumps to leak.

(7) When the alternative work practice is used to detect leaking equipment, the regulated equipment in paragraph (d)(1)(i) of this section must also be monitored annually using a 40 CFR part 60, Appendix A-7, Method 21 monitor at the leak definition required in the applicable subpart. The owner or operator may choose the specific monitoring period (for example, first quarter) to conduct the annual monitoring. Subsequent monitoring must be conducted every 12 months from the initial period. Owners or operators must keep records of the annual Method 21 screening results, as specified in paragraph (i)(4)(vii) of this section.

(e) An owner or operator of an affected source who chooses to use the alternative work practice must comply with the requirements of paragraphs (e)(1) through (e)(5) of this section.

(1) *Instrument specifications.* The optical gas imaging instrument must comply with the requirements specified in paragraphs (e)(1)(i) and (e)(1)(ii) of this section.

- (i) Provide the operator with an image of the potential leak points for each piece of equipment at both the detection sensitivity level and within the distance used in the daily instrument

check described in paragraph (e)(2) of this section. The detection sensitivity level depends upon the frequency at which leak monitoring is to be performed.

(ii) Provide a date and time stamp for video records of every monitoring event.

(2) *Daily instrument check.* On a daily basis, and prior to beginning any leak monitoring work, test the optical gas imaging instrument at the mass flow rate determined in paragraph (e)(2)(i) of this section in accordance with the procedure specified in paragraphs (e)(2)(ii) through (e)(2)(iv) of this section for each camera configuration used during monitoring (for example, different lenses used), unless an alternative method to demonstrate daily instrument checks has been approved in accordance with paragraph (e)(2)(v) of this section.

(i) Calculate the mass flow rate to be used in the daily instrument check by following the procedures in paragraphs (e)(2)(i)(A) and (e)(2)(i)(B) of this section.

(A) For a specified population of equipment to be imaged by the instrument, determine the piece of equipment in contact with the lowest mass fraction of chemicals that are detectable, within the distance to be used in paragraph (e)(2)(iv)(B) of this section, at or below the standard detection sensitivity level.

(B) Multiply the standard detection sensitivity level, corresponding to the selected monitoring frequency in Table 1 of subpart A of this part, by the mass fraction of detectable chemicals from the stream identified in paragraph (e)(2)(i)(A) of this section to determine the mass flow rate to be used in the daily instrument check, using the following equation.

$$E_{dic} = (E_{sds}) \sum_{i=1}^k x_i$$

Where:

E_{dic} = Mass flow rate for the daily instrument check, grams per hour

x_i = Mass fraction of detectable chemical(s) i seen by the optical gas imaging instrument, within the distance to be used in paragraph (e)(2)(iv)(B) of this section, at or below the standard detection sensitivity level, E_{sds} .

E_{sds} = Standard detection sensitivity level from Table 1 to subpart A, grams per hour

k = Total number of detectable chemicals emitted from the leaking equipment and seen by the optical gas imaging instrument.

(ii) Start the optical gas imaging instrument according to the manufacturer's instructions, ensuring that all appropriate settings conform to the manufacturer's instructions.

(iii) Use any gas chosen by the user that can be viewed by the optical gas imaging instrument and that has a purity of no less than 98 percent.

(iv) Establish a mass flow rate by using the following procedures:

(A) Provide a source of gas where it will be in the field of view of the optical gas imaging instrument.

(B) Set up the optical gas imaging instrument at a recorded distance from the outlet or leak orifice of the flow meter that will not be exceeded in the actual performance of the leak survey. Do not exceed the operating parameters of the flow meter.

(C) Open the valve on the flow meter to set a flow rate that will create a mass emission rate equal to the mass rate calculated in paragraph (e)(2)(i) of this section while observing the gas flow through the optical gas imaging instrument viewfinder. When an image of the gas emission is seen through the viewfinder at the required emission rate, make a record of the reading on the flow meter.

(v) Repeat the procedures specified in paragraphs (e)(2)(ii) through (e)(2)(iv) of this section for each configuration of the optical gas imaging instrument used during the leak survey.

(vi) To use an alternative method to demonstrate daily instrument checks, apply to the Administrator for approval of the alternative under § 63.177 or § 63.178, whichever is applicable.

(3) *Leak survey procedure.* Operate the optical gas imaging instrument to image every regulated piece of equipment selected for this work practice in accordance with the instrument manufacturer's operating parameters. All emissions imaged by the optical gas imaging instrument are considered to be leaks and are subject to repair. All emissions visible to the naked eye are also considered to be leaks and are subject to repair.

(4) *Recordkeeping.* Keep the records described in paragraphs (e)(4)(i) through (e)(4)(vii) of this section:

(i) The equipment, processes, and facilities for which the owner or operator chooses to use the alternative work practice.

(ii) The detection sensitivity level selected from Table 1 to subpart A of this part for the optical gas imaging instrument.

(iii) The analysis to determine the piece of equipment in contact with the lowest mass fraction of chemicals that are detectable, as specified in paragraph (e)(2)(i)(A) of this section.

(iv) The technical basis for the mass fraction of detectable chemicals used in the equation in paragraph (e)(2)(i)(B) of this section.

(v) The daily instrument check. Record the distance, per paragraph (e)(2)(iv)(B) of this section, and the flow meter reading, per paragraph (e)(2)(iv)(C) of this section, at which the leak was imaged. Keep a video record of the daily instrument check for each configuration of the optical gas imaging instrument used during the leak survey (for example, the daily instrument check must be conducted for each lens used). The video record must include a time and date stamp for each daily instrument check. The video record must be kept for 5 years.

(vi) *Recordkeeping requirements in the applicable subpart.* A video record must be used to document the leak survey results. The video record must include a time and date stamp for each monitoring event. A video record can be used to meet the recordkeeping requirements of the applicable subparts if each piece of regulated equipment selected for this work practice can be identified in the video record. The video record must be kept for 5 years.

(vii) The results of the annual Method 21 screening required in paragraph (h)(7) of this section. Records must be kept for all regulated equipment specified in paragraph (h)(1) of this section. Records must identify the equipment screened, the screening value measured by Method 21, the time and date of the screening, and calibration information required in the existing applicable subparts.

(5) *Reporting.* Submit the reports required in the applicable subpart. Submit the records of the annual Method 21 screening required in paragraph (h)(7) of this section to the Administrator via e-mail to CCG-AWP@EPA.GOV.

§ 63.12 State authority and delegations.

(a) The provisions of this part shall not be construed in any manner to preclude any State or political subdivision thereof from -

(1) Adopting and enforcing any standard, limitation, prohibition, or other regulation applicable to an affected source subject to the requirements of this part, provided that such standard, limitation, prohibition, or regulation is not less stringent than any requirement applicable to such source established under this part;

(2) Requiring the owner or operator of an affected source to obtain permits, licenses, or approvals prior to initiating construction, reconstruction, modification, or operation of such source; or

(3) Requiring emission reductions in excess of those specified in subpart D of this part as a condition for granting the extension of compliance authorized by section 112(i)(5) of the Act.

(b) (1) Section 112(l) of the Act directs the Administrator to delegate to each State, when appropriate, the authority to implement and enforce standards and other requirements pursuant to section 112 for stationary sources located in that State. Because of the unique nature of radioactive material, delegation of authority to implement and enforce standards that control radionuclides may require separate approval.

(2) Subpart E of this part establishes procedures consistent with section 112(l) for the approval of State rules or programs to implement and enforce applicable Federal rules promulgated under the authority of section 112. Subpart E also establishes procedures for the review and withdrawal of section 112 implementation and enforcement authorities granted through a section 112(l) approval.

(c) All information required to be submitted to the EPA under this part also shall be submitted to the appropriate state agency of any state to which authority has been delegated under section 112(l) of the Act, provided that each specific delegation may exempt sources from a certain federal or state reporting requirement. Any information required to be submitted electronically by this part via the EPA's CEDRI may, at the discretion of the delegated authority, satisfy the requirements of this paragraph. The Administrator may permit all or some of the information to be submitted to the appropriate state agency only, instead of to the EPA and the state agency with the exception of federal electronic reporting requirements under this part. Sources may not be exempted from federal electronic reporting requirements.

§ 63.13 Addresses of State air pollution control agencies and EPA Regional Offices.

(a) All requests, reports, applications, submittals, and other communications to the Administrator pursuant to this part shall be submitted to the appropriate Regional Office of the U.S. Environmental Protection Agency indicated in the following list of EPA Regional offices. If a request, report, application, submittal, or other communication is required by this part to be submitted electronically via the EPA's CEDRI then such submission satisfies the requirements of this paragraph (a).

EPA Region I (Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, Vermont) Director, Enforcement and Compliance Assurance Division, U.S. EPA Region I, 5 Post Office Square - Suite 100 (04-2), Boston, MA 02109-3912, Attn: Air Compliance Clerk.

EPA Region II (New Jersey, New York, Puerto Rico, Virgin Islands), Director, Air and Waste Management Division, 26 Federal Plaza, New York, NY 10278.

EPA Region III (Delaware, District of Columbia, Maryland, Pennsylvania, Virginia, West Virginia), Director, Air Protection Division, 1650 Arch Street, Philadelphia, PA 19103.

EPA Region IV (Alabama, Florida, Georgia, Kentucky, Mississippi, North Carolina, South Carolina, Tennessee). Director, Air, Pesticides and Toxics Management Division, Atlanta Federal Center, 61 Forsyth Street, Atlanta, GA 30303-3104.

EPA Region V (Illinois, Indiana, Michigan, Minnesota, Ohio, Wisconsin), Director, Air and Radiation Division, 77 West Jackson Blvd., Chicago, IL 60604-3507.

EPA Region VI (Arkansas, Louisiana, New Mexico, Oklahoma, Texas); Director; Enforcement and Compliance Assurance Division; U.S. Environmental Protection Agency, 1201 Elm Street, Suite 500, Mail Code 6ECD, Dallas, Texas 75270-2102.

EPA Region VII (Iowa, Kansas, Missouri, Nebraska), Director, Air and Waste Management Division, 11201 Renner Boulevard, Lenexa, Kansas 66219.

EPA Region VIII (Colorado, Montana, North Dakota, South Dakota, Utah, Wyoming) Director, Air and Toxics Technical Enforcement Program, Office of Enforcement, Compliance and Environmental Justice, Mail Code 8ENF-AT, 1595 Wynkoop Street, Denver, CO 80202-1129.

EPA Region IX (Arizona, California, Hawaii, Nevada; the territories of American Samoa and Guam; the Commonwealth of the Northern Mariana Islands; the territories of Baker Island, Howland Island, Jarvis Island, Johnston Atoll, Kingman Reef, Midway Atoll, Palmyra Atoll, and Wake Islands; and certain U.S. Government activities in the freely associated states of the Republic of the Marshall Islands, the Federated States of Micronesia, and the Republic of Palau), Director, Air Division, 75 Hawthorne Street, San Francisco, CA 94105.

EPA Region X (Alaska, Idaho, Oregon, Washington), Director, Office of Air Quality, 1200 Sixth Avenue (OAQ-107), Seattle, WA 98101.

(b) All information required to be submitted to the Administrator under this part also shall be submitted to the appropriate State agency of any State to which authority has been delegated under section 112(l) of the Act. The owner or operator of an affected source may contact the appropriate EPA Regional Office for the mailing addresses for those States whose delegation requests have been approved.

(c) If any State requires a submittal that contains all the information required in an application, notification, request, report, statement, or other communication required in this part, an owner or

operator may send the appropriate Regional Office of the EPA a copy of that submittal to satisfy the requirements of this part for that communication.

§ 63.14 Incorporations by reference.

(a) The materials listed in this section are incorporated by reference into this part with the approval of the Director of the Federal Register under 5 U.S.C. 552(a) and 1 CFR part 51. To enforce any edition other than that specified in this section, a document must be published in the Federal Register and the material must be available to the public. All approved materials are available for inspection at the Air and Radiation Docket and Information Center (Air Docket) in the EPA Docket Center (EPA/DC) at Rm. 3334, EPA West Bldg., 1301 Constitution Ave. NW, Washington, DC. The EPA/DC Public Reading Room hours of operation are 8:30 a.m. to 4:30 p.m., Monday through Friday, excluding legal holidays. The telephone number of the EPA/DC Public Reading Room is (202) 566–1744, and the telephone number for the Air Docket is (202) 566–1742. These approved materials are also available for inspection at the National Archives and Records Administration (NARA). For information on the availability of this material at NARA, email fedreg.legal@nara.gov or go to www.archives.gov/federal-register/cfr/ibr-locations.html. In addition, these materials are available from the following sources:

(b) American Conference of Governmental Industrial Hygienists (ACGIH), Customer Service Department, 1330 Kemper Meadow Drive, Cincinnati, Ohio 45240, telephone number (513) 742–2020.

(1) Industrial Ventilation: A Manual of Recommended Practice, 22nd Edition, 1995, Chapter 3, “Local Exhaust Hoods” and Chapter 5, “Exhaust System Design Procedure.” IBR approved for §§ 63.843(b) and 63.844(b).

(2) Industrial Ventilation: A Manual of Recommended Practice, 23rd Edition, 1998, Chapter 3, “Local Exhaust Hoods” and Chapter 5, “Exhaust System Design Procedure.” IBR approved for §§ 63.1503, 63.1506(c), 63.1512(e), Table 2 to subpart RRR, Table 3 to subpart RRR, and appendix A to subpart RRR, and § 63.2984(e).

(3) Industrial Ventilation: A Manual of Recommended Practice for Design, 27th Edition, 2010. IBR approved for §§ 63.1503, 63.1506(c), 63.1512(e), Table 2 to subpart RRR, Table 3 to subpart RRR, and appendix A to subpart RRR, and § 63.2984(e).

(c) American Petroleum Institute (API), 1220 L Street NW., Washington, DC 20005.

(1) API Publication 2517, Evaporative Loss from External Floating-Roof Tanks, Third Edition, February 1989, IBR approved for §§ 63.111, 63.1402, 63.2406 and 63.7944.

Note 1 to paragraph (c)(1):

API Publication 2517 available through reseller HIS Markit at <https://global.ihs.com/>

(2) API Publication 2518, Evaporative Loss from Fixed-roof Tanks, Second Edition, October 1991, IBR approved for § 63.150(g).

(3) API Manual of Petroleum Measurement Specifications (MPMS) Chapter 19.2 (API MPMS 19.2), Evaporative Loss From Floating-Roof Tanks, First Edition, April 1997, IBR approved for §§ 63.1251 and 63.12005.

(d) American Public Health Association, 1015 18th Street NW, Washington, DC 20036; phone (844) 232–3707; email: standardmethods@subscriptionoffice.com; website: www.standardmethods.org.

(1) Standard Method 5210, Biochemical Oxygen Demand (BOD), revised December 10, 2019; IBR approved for § 63.457(c)

(2) [Reserved]

(e) American Society of Heating, Refrigerating, and Air-Conditioning Engineers at 1791 Tullie Circle, NE., Atlanta, GA 30329 orders@ashrae.org.

(1) American Society of Heating, Refrigerating, and Air-Conditioning Engineers Method 52.1, *Gravimetric and Dust-Spot Procedures for Testing Air-Cleaning Devices Used in General Ventilation for Removing Particulate Matter* June 4, 1992; IBR approved for § 63.11516(d).

(2) ANSI/ASHRAE Standard 52.2–2017, *Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size*, copyright 2017; IBR approved for § 63.11173(e).

(f) American Society of Mechanical Engineers (ASME), Three Park Avenue, New York, NY 10016–5990, Telephone (800) 843–2763, <http://www.asme.org>; also available from HIS, Incorporated, 15 Inverness Way East, Englewood, CO 80112, Telephone (877) 413–5184, <http://global.ihs.com>.

(1) ANSI/ASME PTC 19.10–1981, Flue and Exhaust Gas Analyses [Part 10, Instruments and Apparatus], issued August 31, 1981, IBR approved for §§ 63.309(k), 63.457(k), 63.772(e) and (h), 63.865(b), 63.997(e), 63.1282(d) and (g), and 63.1625(b), table 5 to subpart EEEE, §§ 63.3166(a), 63.3360(e), 63.3545(a), 63.3555(a), 63.4166(a), 63.4362(a), 63.4766(a), 63.4965(a), and 63.5160(d), table 4 to subpart UUUU, table 3 to subpart YYYY, §§ 63.7822(b), 63.7824(e), 63.7825(b), 63.8000(d), 63.9307(c), 63.9323(a), 63.9621(b) and (c), 63.11148(e), 63.11155(e), 63.11162(f), 63.11163(g), 63.11410(j), 63.11551(a), 63.11646(a), and 63.11945, and table 4 to subpart AAAAA, table 5 to subpart DDDDD, table 4 to subpart JJJJ, table 4 to subpart KKKKK, table 4 to subpart SSSSS, tables 4 and 5 of subpart UUUUU, table 1 to subpart ZZZZZ, and table 4 to subpart JJJJJ.

(2) [Reserved]

(g) The Association of Florida Phosphate Chemists, P.O. Box 1645, Bartow, Florida 33830.

(1) Book of Methods Used and Adopted By The Association of Florida Phosphate Chemists, Seventh Edition 1991:

(i) Section IX, Methods of Analysis for Phosphate Rock, No. 1 Preparation of Sample, IBR approved for § 63.606(f), § 63.626(f).

(ii) Section IX, Methods of Analysis for Phosphate Rock, No. 3 Phosphorus-P₂O₅ or Ca₃(PO₄)₂, Method A—Volumetric Method, IBR approved for § 63.606(f), § 63.626(f).

(iii) Section IX, Methods of Analysis for Phosphate Rock, No. 3 Phosphorus-P₂O₅ or Ca₃(PO₄)₂, Method B—Gravimetric Quimociac Method, IBR approved for § 63.606(f), § 63.626(f).

(iv) Section IX, Methods of Analysis For Phosphate Rock, No. 3 Phosphorus-P₂O₅ or Ca₃(PO₄)₂, Method C—Spectrophotometric Method, IBR approved for § 63.606(f), § 63.626(f).

(v) Section XI, Methods of Analysis for Phosphoric Acid, Superphosphate, Triple Superphosphate, and Ammonium Phosphates, No. 3 Total Phosphorus-P₂O₅, Method A—Volumetric Method, IBR approved for § 63.606(f), § 63.626(f), and (g).

(vi) Section XI, Methods of Analysis for Phosphoric Acid, Superphosphate, Triple Superphosphate, and Ammonium Phosphates, No. 3 Total Phosphorus-P₂O₅, Method B—Gravimetric Quimociac Method, IBR approved for § 63.606(f), § 63.626(f), and (g).

(vii) Section XI, Methods of Analysis for Phosphoric Acid, Superphosphate, Triple Superphosphate, and Ammonium Phosphates, No. 3 Total Phosphorus-P₂O₅, Method C—Spectrophotometric Method, IBR approved for § 63.606(f), § 63.626(f), and (g).

(2) [Reserved]

(h) Association of Official Analytical Chemists (AOAC) International, Customer Services, Suite 400, 2200 Wilson Boulevard, Arlington, Virginia 22201–3301, Telephone (703) 522–3032, Fax (703) 522–5468.

- (1) AOAC Official Method 929.01 Sampling of Solid Fertilizers, Sixteenth edition, 1995, IBR approved for § 63.626(g).
- (2) AOAC Official Method 929.02 Preparation of Fertilizer Sample, Sixteenth edition, 1995, IBR approved for § 63.626(g).
- (3) AOAC Official Method 957.02 Phosphorus (Total) in Fertilizers, Preparation of Sample Solution, Sixteenth edition, 1995, IBR approved for § 63.626(g).
- (4) AOAC Official Method 958.01 Phosphorus (Total) in Fertilizers, Spectrophotometric Molybdovanadophosphate Method, Sixteenth edition, 1995, IBR approved for § 63.626(g).
- (5) AOAC Official Method 962.02 Phosphorus (Total) in Fertilizers, Gravimetric Quinolinium Molybdophosphate Method, Sixteenth edition, 1995, IBR approved for § 63.626(g).
- (6) AOAC Official Method 969.02 Phosphorus (Total) in Fertilizers, Alkalimetric Quinolinium Molybdophosphate Method, Sixteenth edition, 1995, IBR approved for § 63.626(g).
- (7) AOAC Official Method 978.01 Phosphorus (Total) in Fertilizers, Automated Method, Sixteenth edition, 1995, IBR approved for § 63.626(g).
- (i) ASTM International, 100 Barr Harbor Drive, Post Office Box C700, West Conshohocken, PA 19428-2959, Telephone (610) 832-9585, <http://www.astm.org>; also available from ProQuest, 789 East Eisenhower Parkway, Ann Arbor, MI 48106-1346, Telephone (734) 761-4700, <http://www.proquest.com>.
 - (1) ASTM D95-05 (Reapproved 2010), Standard Test Method for Water in Petroleum Products and Bituminous Materials by Distillation, approved May 1, 2010, IBR approved for § 63.10005(i) and table 6 to subpart DDDDD.
 - (2) ASTM D240-09 Standard Test Method for Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter, approved July 1, 2009, IBR approved for table 6 to subpart DDDDD.
 - (3) ASTM Method D388-05, Standard Classification of Coals by Rank, approved September 15, 2005, IBR approved for §§ 63.7575, 63.10042, and 63.11237.
 - (4) ASTM Method D396-10, Standard Specification for Fuel Oils, including Appendix X1, approved October 1, 2010, IBR approved for § 63.10042.
 - (5) ASTM D396-10, Standard Specification for Fuel Oils, approved October 1, 2010, IBR approved for §§ 63.7575 and 63.11237.
 - (6) ASTM D523-89, Standard Test Method for Specular Gloss, IBR approved for § 63.782.
 - (7) ASTM D975-11b, Standard Specification for Diesel Fuel Oils, approved December 1, 2011, IBR approved for § 63.7575.
 - (8) ASTM D1193-77, Standard Specification for Reagent Water, IBR approved for appendix A to part 63: Method 306, Sections 7.1.1 and 7.4.2.
 - (9) ASTM D1193-91, Standard Specification for Reagent Water, IBR approved for appendix A to part 63: Method 306, Sections 7.1.1 and 7.4.2.
 - (10) ASTM D1331-89, Standard Test Methods for Surface and Interfacial Tension of Solutions of Surface Active Agents, IBR approved for appendix A to part 63: Method 306B, Sections 6.2, 11.1, and 12.2.2.
 - (11) ASTM D1475-90, Standard Test Method for Density of Paint, Varnish Lacquer, and Related Products, IBR approved for appendix A to subpart II.

- (12) ASTM D1475–13, Standard Test Method for Density of Liquid Coatings, Inks, and Related Products, approved November 1, 2013, IBR approved for §§ 63.3151(b), 63.3941(b) and (c), 63.3951(c), 63.4141(b) and (c), 63.4551(c), 63.4741(b) and (c), 63.4751(c), and 63.4941(b) and (c).
- (13) ASTM Method D1835–05, Standard Specification for Liquefied Petroleum (LP) Gases, approved April 1, 2005, IBR approved for §§ 63.7575 and 63.11237.
- (14) ASTM D1945–03 (Reapproved 2010), Standard Test Method for Analysis of Natural Gas by Gas Chromatography, Approved January 1, 2010, IBR approved for §§ 63.670(j), 63.772(h), and 63.1282(g).
- (15) ASTM D1945–14, Standard Test Method for Analysis of Natural Gas by Gas Chromatography, Approved November 1, 2014, IBR approved for § 63.670(j).
- (16) ASTM D1946–77, Standard Method for Analysis of Reformed Gas by Gas Chromatography, IBR approved for § 63.11(b).
- (17) ASTM D1946–90 (Reapproved 1994), Standard Method for Analysis of Reformed Gas by Gas Chromatography, 1994, IBR approved for §§ 63.11(b), 63.987(b), and 63.1412.
- (18) ASTM D1963–85 (Reapproved 1996), Standard Test Method for Specific Gravity of Drying Oils, Varnishes, Resins, and Related Materials at 25/25 °C, approved November 29, 1985, IBR approved for § 63.3360(c).
- (19) ASTM D2013/D2013M–09, Standard Practice for Preparing Coal Samples for Analysis, (Approved November 1, 2009), IBR approved for table 6 to subpart DDDDD and table 5 to subpart JJJJJ.
- (20) ASTM D2099–00, Standard Test Method for Dynamic Water Resistance of Shoe Upper Leather by the Maeser Water Penetration Tester, IBR approved for § 63.5350.
- (21) ASTM D2111–10 (Reapproved 2015), Standard Test Methods for Specific Gravity and Density of Halogenated Organic Solvents and Their Admixtures, approved June 1, 2015, IBR approved for §§ 63.3360(c), 63.3951(c), 63.4141(b) and (c), 63.4551(c), and 63.4741(a).
- (22) ASTM D2216–05, Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass, IBR approved for the definition of “Free organic liquids” in § 63.10692.
- (23) ASTM D2234/D2234M–10, Standard Practice for Collection of a Gross Sample of Coal, approved January 1, 2010, IBR approved for table 6 to subpart DDDDD and table 5 to subpart JJJJJ.
- (24) ASTM D2369–93, Standard Test Method for Volatile Content of Coatings, IBR approved for appendix A to subpart II.
- (25) ASTM D2369–95, Standard Test Method for Volatile Content of Coatings, IBR approved for appendix A to subpart II.
- (26) ASTM D2369–10 (Reapproved 2015)e1, Standard Test Method for Volatile Content of Coatings, approved June 1, 2015, IBR approved for §§ 63.3151(a), 63.3360(c), 63.3961(j), 63.4141(a) and (b), 63.4161(h), 63.4321(e), 63.4341(e), 63.4351(d), 63.4541(a), and 63.4561(j), appendix A to subpart PPPP, and §§ 63.4741(a), 63.4941(a) and (b), 63.4961(j), and 63.8055(b).
- (27) ASTM D2382–76, Heat of Combustion of Hydrocarbon Fuels by Bomb Calorimeter (High-Precision Method), IBR approved for § 63.11(b).
- (28) ASTM D2382–88, Heat of Combustion of Hydrocarbon Fuels by Bomb Calorimeter (High-Precision Method), IBR approved for § 63.11(b).
- (29) ASTM D2697–86 (Reapproved 1998), Standard Test Method for Volume Nonvolatile Matter in Clear or Pigmented Coatings, IBR approved for §§ 63.3521(b), and 63.5160(c).

- (30) ASTM D2697–03 (Reapproved 2014), Standard Test Method for Volume Nonvolatile Matter in Clear or Pigmented Coatings, approved July 1, 2014, IBR approved for §§ 63.3161(f), 63.3360(c), 63.3941(b), 63.4141(b), 63.4741(a) and (b), 63.4941(b), and 63.8055(b).
- (31) ASTM D2879–83, Standard Method for Vapor Pressure-Temperature Relationship and Initial Decomposition Temperature of Liquids by Isoteniscope, Approved November 28, 1983, IBR approved for §§ 63.111, 63.1402, 63.2406, 63.7944, and 63.12005.
- (32) ASTM D2879–96, Test Method for Vapor Pressure-Temperature Relationship and Initial Decomposition Temperature of Liquids by Isoteniscope, (Approved 1996), IBR approved for §§ 63.111, and 63.12005.
- (33) ASTM D2908–74, Standard Practice for Measuring Volatile Organic Matter in Water by Aqueous-Injection Gas Chromatography, Approved June 27, 1974, IBR approved for § 63.1329(c).
- (34) ASTM D2908–91, Standard Practice for Measuring Volatile Organic Matter in Water by Aqueous-Injection Gas Chromatography, Approved December 15, 1991, IBR approved for § 63.1329(c).
- (35) ASTM D2908–91(Reapproved 2001), Standard Practice for Measuring Volatile Organic Matter in Water by Aqueous-Injection Gas Chromatography, Approved December 15, 1991, IBR approved for § 63.1329(c).
- (36) ASTM D2908–91(Reapproved 2005), Standard Practice for Measuring Volatile Organic Matter in Water by Aqueous-Injection Gas Chromatography, Approved December 1, 2005, IBR approved for § 63.1329(c).
- (37) ASTM D2908–91(Reapproved 2011), Standard Practice for Measuring Volatile Organic Matter in Water by Aqueous-Injection Gas Chromatography, Approved May 1, 2011, IBR approved for § 63.1329(c).
- (38) ASTM D2986–95A, “Standard Practice for Evaluation of Air Assay Media by the Monodisperse DOP (Diocetyl Phthalate) Smoke Test,” approved September 10, 1995, IBR approved for section 7.1.1 of Method 315 in appendix A to this part.
- (39) ASTM D3173–03 (Reapproved 2008), Standard Test Method for Moisture in the Analysis Sample of Coal and Coke, (Approved February 1, 2008), IBR approved for table 6 to subpart DDDDD and table 5 to subpart JJJJJ.
- (40) ASTM D3257–93, Standard Test Methods for Aromatics in Mineral Spirits by Gas Chromatography, IBR approved for § 63.786(b).
- (41) ASTM D3370–76, Standard Practices for Sampling Water, Approved August 27, 1976, IBR approved for § 63.1329(c).
- (42) ASTM D3370–95a, Standard Practices for Sampling Water from Closed Conduits, Approved September 10, 1995, IBR approved for § 63.1329(c).
- (43) ASTM D3370–07, Standard Practices for Sampling Water from Closed Conduits, Approved December 1, 2007, IBR approved for § 63.1329(c).
- (44) ASTM D3370–08, Standard Practices for Sampling Water from Closed Conduits, Approved October 1, 2008, IBR approved for § 63.1329(c).
- (45) ASTM D3370–10, Standard Practices for Sampling Water from Closed Conduits, Approved December 1, 2010, IBR approved for § 63.1329(c).
- (46) ASTM D3588–98 (Reapproved 2003), Standard Practice for Calculating Heat Value, Compressibility Factor, and Relative Density of Gaseous Fuels, (Approved May 10, 2003), IBR approved for §§ 63.772(h) and 63.1282(g).
- (47) ASTM D3695–88, Standard Test Method for Volatile Alcohols in Water by Direct Aqueous-Injection Gas Chromatography, IBR approved for § 63.365(e).

- (48) ASTM D3792–91, Standard Method for Water Content of Water-Reducible Paints by Direct Injection into a Gas Chromatograph, IBR approved for appendix A to subpart II.
- (49) ASTM D3912–80, Standard Test Method for Chemical Resistance of Coatings Used in Light-Water Nuclear Power Plants, IBR approved for § 63.782.
- (50) ASTM D3960–98, Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings, approved November 10, 1998, IBR approved for §§ 63.3360(c) and 63.8055(b).
- (51) ASTM D4006–11, Standard Test Method for Water in Crude Oil by Distillation, including Annex A1 and Appendix X1, (Approved June 1, 2011), IBR approved for § 63.10005(i) and table 6 to subpart DDDDD.
- (52) ASTM D4017–81, Standard Test Method for Water in Paints and Paint Materials by the Karl Fischer Titration Method, IBR approved for appendix A to subpart II.
- (53) ASTM D4017–90, Standard Test Method for Water in Paints and Paint Materials by the Karl Fischer Titration Method, IBR approved for appendix A to subpart II.
- (54) ASTM D4017–96a, Standard Test Method for Water in Paints and Paint Materials by the Karl Fischer Titration Method, IBR approved for appendix A to subpart II.
- (55) ASTM D4057–06 (Reapproved 2011), Standard Practice for Manual Sampling of Petroleum and Petroleum Products, including Annex A1, (Approved June 1, 2011), IBR approved for § 63.10005(i) and table 6 to subpart DDDDD.
- (56) ASTM D4082–89, Standard Test Method for Effects of Gamma Radiation on Coatings for Use in Light-Water Nuclear Power Plants, IBR approved for § 63.782.
- (57) ASTM D4084–07, Standard Test Method for Analysis of Hydrogen Sulfide in Gaseous Fuels (Lead Acetate Reaction Rate Method), (Approved June 1, 2007), IBR approved for table 6 to subpart DDDDD.
- (58) ASTM D4177–95 (Reapproved 2010), Standard Practice for Automatic Sampling of Petroleum and Petroleum Products, including Annexes A1 through A6 and Appendices X1 and X2, (Approved May 1, 2010), IBR approved for § 63.10005(i) and table 6 to subpart DDDDD.
- (59) ASTM D4208–02 (Reapproved 2007), Standard Test Method for Total Chlorine in Coal by the Oxygen Bomb Combustion/Ion Selective Electrode Method, approved May 1, 2007, IBR approved for table 6 to subpart DDDDD.
- (60) ASTM D4239–14e1, “Standard Test Method for Sulfur in the Analysis Sample of Coal and Coke Using High-Temperature Tube Furnace Combustion,” approved March 1, 2014, IBR approved for § 63.849(f).
- (61) ASTM D4256–89, Standard Test Method for Determination of the Decontaminability of Coatings Used in Light-Water Nuclear Power Plants, IBR approved for § 63.782.
- (62) ASTM D4256–89 (Reapproved 94), Standard Test Method for Determination of the Decontaminability of Coatings Used in Light-Water Nuclear Power Plants, IBR approved for § 63.782.
- (63) ASTM D4282–15, Standard Test Method for Determination of Free Cyanide in Water and Wastewater by Microdiffusion, Approved July 15, 2015, IBR approved for § 63.1103(g).
- (64) ASTM D4606–03 (Reapproved 2007), Standard Test Method for Determination of Arsenic and Selenium in Coal by the Hydride Generation/Atomic Absorption Method, (Approved October 1, 2007), IBR approved for table 6 to subpart DDDDD.
- (65) ASTM D4809–95, Standard Test Method for Heat of Combustion of Liquid Hydrocarbon Fuels by Bomb Calorimeter (Precision Method), IBR approved for § 63.11(b).

- (66) ASTM D4840–99 (Reapproved 2018)e, Standard Guide for Sampling Chain-of-Custody Procedures, approved August 15, 2018, IBR approved for appendix A to part 63.
- (67) ASTM D4891–89 (Reapproved 2006), Standard Test Method for Heating Value of Gases in Natural Gas Range by Stoichiometric Combustion, (Approved June 1, 2006), IBR approved for §§ 63.772(h) and 63.1282(g).
- (68) ASTM D5066–91 (Reapproved 2017), Standard Test Method for Determination of the Transfer Efficiency Under Production Conditions for Spray Application of Automotive Paints-Weight Basis, approved June 1, 2017, IBR approved for § 63.3161(g).
- (69) ASTM D5087–02, Standard Test Method for Determining Amount of Volatile Organic Compound (VOC) Released from Solventborne Automotive Coatings and Available for Removal in a VOC Control Device (Abatement), IBR approved for § 63.3165(e) and appendix A to subpart IIII.
- (70) ASTM D5192–09, Standard Practice for Collection of Coal Samples from Core, (Approved June 1, 2009), IBR approved for table 6 to subpart DDDDD.
- (71) ASTM D5198–09, Standard Practice for Nitric Acid Digestion of Solid Waste, (Approved February 1, 2009), IBR approved for table 6 to subpart DDDDD and table 5 to subpart JJJJJ.
- (72) ASTM D5228–92, Standard Test Method for Determination of Butane Working Capacity of Activated Carbon, (Reapproved 2005), IBR approved for § 63.11092(b).
- (73) ASTM D5291–02, Standard Test Methods for Instrumental Determination of Carbon, Hydrogen, and Nitrogen in Petroleum Products and Lubricants, IBR approved for appendix A to subpart MMMM.
- (74) ASTM D5790–95 (Reapproved 2012), Standard Test Method for Measurement of Purgeable Organic Compounds in Water by Capillary Column Gas Chromatography/Mass Spectrometry, Approved June 15, 2012, IBR approved for § 63.2485(h) and Table 4 to subpart UUUU.
- (75) ASTM D5864–11, Standard Test Method for Determining Aerobic Aquatic Biodegradation of Lubricants or Their Components, (Approved March 1, 2011), IBR approved for table 6 to subpart DDDDD.
- (76) ASTM D5865–10a, Standard Test Method for Gross Calorific Value of Coal and Coke, (Approved May 1, 2010), IBR approved for table 6 to subpart DDDDD and table 5 to subpart JJJJJ.
- (77) ASTM D5954–98 (Reapproved 2006), Test Method for Mercury Sampling and Measurement in Natural Gas by Atomic Absorption Spectroscopy, (Approved December 1, 2006), IBR approved for table 6 to subpart DDDDD.
- (78) ASTM D5965–02 (Reapproved 2013), Standard Test Methods for Specific Gravity of Coating Powders, approved June 1, 2013, IBR approved for §§ 63.3151(b) and 63.3951(c).
- (79) ASTM D6053–00, Standard Test Method for Determination of Volatile Organic Compound (VOC) Content of Electrical Insulating Varnishes, IBR approved for appendix A to subpart MMMM.
- (80) ASTM D6093–97 (Reapproved 2003), Standard Test Method for Percent Volume Nonvolatile Matter in Clear or Pigmented Coatings Using a Helium Gas Pycnometer, IBR approved for §§ 63.3521 and 63.5160(c).
- (81) ASTM D6093–97 (Reapproved 2016), Standard Test Method for Percent Volume Nonvolatile Matter in Clear or Pigmented Coatings Using a Helium Gas Pycnometer, approved December 1, 2016, IBR approved for §§ 63.3161(f), 63.3360(c), 63.3941(b), 63.4141(b), 63.4741(a) and (b), and 63.4941(b).
- (82) ASTM D6196–03 (Reapproved 2009), Standard Practice for Selection of Sorbents, Sampling, and Thermal Desorption Analysis Procedures for Volatile Organic Compounds in Air, Approved March 1, 2009, IBR approved for appendix A to this part: Method 325A and Method 325B.

(83) ASTM D6266–00a (Reapproved 2017), Standard Test Method for Determining the Amount of Volatile Organic Compound (VOC) Released from Waterborne Automotive Coatings and Available for Removal in a VOC Control Device (Abatement), approved July 1, 2017, IBR approved for § 63.3165(e).

(84) ASTM D6323–98 (Reapproved 2003), Standard Guide for Laboratory Subsampling of Media Related to Waste Management Activities, (Approved August 10, 2003), IBR approved for table 6 to subpart DDDDD and table 5 to subpart JJJJJ.

(85) ASTM D6348–03, Standard Test Method for Determination of Gaseous Compounds by Extractive Direct Interface Fourier Transform Infrared (FTIR) Spectroscopy, including Annexes A1 through A8, Approved October 1, 2003, IBR approved for §§ 63.457(b), 63.997(e), and 63.1349, table 4 to subpart DDDD, table 5 to subpart EEEE, table 4 to subpart UUUU, table 4 subpart ZZZZ, and table 8 to subpart HHHHHH.

(86) ASTM D6348–03 (Reapproved 2010), Standard Test Method for Determination of Gaseous Compounds by Extractive Direct Interface Fourier Transform Infrared (FTIR) Spectroscopy, including Annexes A1 through A8, Approved October 1, 2010, IBR approved for §§ 63.1571(a), 63.4751(i), 63.4752(e), 63.4766(b), 63.7142(a) and (b), tables 4 and 5 to subpart JJJJ, tables 4 and 6 to subpart KKKKK, tables 1, 2, and 5 to subpart UUUUU and appendix B to subpart UUUUU.

(87) ASTM D6348–12e1, Standard Test Method for Determination of Gaseous Compounds by Extractive Direct Interface Fourier Transform Infrared (FTIR) Spectroscopy, Approved February 1, 2012, IBR approved for §§ 63.997(e), 63.1571(a), and 63.2354(b), table 5 to subpart EEEE, table 4 to subpart UUUU, §§ 63.7142(a) and (b) and 63.8000(d), and table 4 to subpart SSSSS.

(88) ASTM D6350–98 (Reapproved 2003), Standard Test Method for Mercury Sampling and Analysis in Natural Gas by Atomic Fluorescence Spectroscopy, (Approved May 10, 2003), IBR approved for table 6 to subpart DDDDD.

(89) ASTM D6357–11, Test Methods for Determination of Trace Elements in Coal, Coke, and Combustion Residues from Coal Utilization Processes by Inductively Coupled Plasma Atomic Emission Spectrometry, (Approved April 1, 2011), IBR approved for table 6 to subpart DDDDD.

(90) ASTM D6376–10, “Standard Test Method for Determination of Trace Metals in Petroleum Coke by Wavelength Dispersive X-Ray Fluorescence Spectroscopy,” Approved July 1, 2010, IBR approved for § 63.849(f).

(91) [Reserved]

(92) ASTM D6420–99, Standard Test Method for Determination of Gaseous Organic Compounds by Direct Interface Gas Chromatography-Mass Spectrometry, IBR approved for §§ 63.5799 and 63.5850.

(93) ASTM D6420–99 (Reapproved 2004), Standard Test Method for Determination of Gaseous Organic Compounds by Direct Interface Gas Chromatography-Mass Spectrometry (Approved October 1, 2004), IBR approved for §§ 63.457(b), 63.772(a), 63.772(e), 63.1282(a) and (d), and table 8 to subpart HHHHHH.

(94) ASTM D6420–99 (Reapproved 2010), Standard Test Method for Determination of Gaseous Organic Compounds by Direct Interface Gas Chromatography-Mass Spectrometry, Approved October 1, 2010, IBR approved for §§ 63.670(j), Table 4 to subpart UUUU, 63.7142(b), and appendix A to this part: Method 325B.

(95) ASTM D6420–18, Standard Test Method for Determination of Gaseous Organic Compounds by Direct Interface Gas Chromatography-Mass Spectrometry, approved November 1, 2018, IBR approved for §§ 63.987(b), 63.997(e), and 63.2354(b), table 5 to subpart EEEE, and §§ 63.2450(j) and 63.8000(d).

(96) ASTM D6522–00, Standard Test Method for Determination of Nitrogen Oxides, Carbon Monoxide, and Oxygen Concentrations in Emissions from Natural Gas Fired Reciprocating Engines, Combustion Turbines, Boilers, and Process Heaters Using Portable Analyzers, IBR approved for § 63.9307(c).

(97) ASTM D6522–00 (Reapproved 2005), Standard Test Method for Determination of Nitrogen Oxides, Carbon Monoxide, and Oxygen Concentrations in Emissions from Natural Gas Fired Reciprocating Engines, Combustion Turbines, Boilers, and Process Heaters Using Portable Analyzers, (Approved October 1, 2005), IBR approved for table 4 to subpart ZZZZ, table 5 to subpart DDDDDD, table 4 to subpart JJJJJ, and §§ 63.772(e) and (h)) and 63.1282(d) and (g).

(98) ASTM D6522–11 Standard Test Method for Determination of Nitrogen Oxides, Carbon Monoxide, and Oxygen Concentrations in Emissions from Natural Gas-Fired Reciprocating Engines, Combustion Turbines, Boilers, and Process Heaters Using Portable Analyzers, Approved December 1, 2011, IBR approved for § 63.1961(a) and table 3 to subpart YYYY.

(99) ASTM D6721–01 (Reapproved 2006), Standard Test Method for Determination of Chlorine in Coal by Oxidative Hydrolysis Microcoulometry, (Approved April 1, 2006), IBR approved for table 6 to subpart DDDDD.

(100) ASTM D6722–01 (Reapproved 2006), Standard Test Method for Total Mercury in Coal and Coal Combustion Residues by the Direct Combustion Analysis, (Approved April 1, 2006), IBR approved for Table 6 to subpart DDDDD and Table 5 to subpart JJJJJ.

(101) ASTM D6735–01 (Reapproved 2009), Standard Test Method for Measurement of Gaseous Chlorides and Fluorides from Mineral Calcining Exhaust Sources—Impinger Method, IBR approved for § 63.7142(b), tables 4 and 5 to subpart JJJJJ, and tables 4 and 6 to subpart KKKKK.

(102) ASTM D6751–11b, Standard Specification for Biodiesel Fuel Blend Stock (B100) for Middle Distillate Fuels, (Approved July 15, 2011), IBR approved for §§ 63.7575 and 63.11237.

(103) ASTM D6784–02 (Reapproved 2008), Standard Test Method for Elemental, Oxidized, Particle-Bound and Total Mercury in Flue Gas Generated from Coal-Fired Stationary Sources (Ontario Hydro Method), Approved April 1, 2008; IBR approved for §§ 63.2465(d); 63.11646(a); 63.11647(a) and (d); tables 1, 2, 5, 11, 12t, and 13 to subpart DDDDD; tables 4 and 5 to subpart JJJJJ; tables 4 and 6 to subpart KKKKK; table 4 to subpart JJJJJ.

(104) ASTM D6784–16, Standard Test Method for Elemental, Oxidized, Particle-Bound and Total Mercury in Flue Gas Generated from Coal-Fired Stationary Sources (Ontario Hydro Method), Approved March 1, 2016; IBR approved for table 5 to subpart UUUUU; appendix A to subpart UUUUU.

(105) ASTM D6883–04, Standard Practice for Manual Sampling of Stationary Coal from Railroad Cars, Barges, Trucks, or Stockpiles, (Approved June 1, 2004), IBR approved for table 6 to subpart DDDDD.

(106) ASTM D6886–18, Standard Test Method for Determination of the Weight Percent Individual Volatile Organic Compounds in Waterborne Air-Dry Coatings by Gas Chromatography, approved October 1, 2018, IBR approved for § 63.2354(c).

(107) ASTM D7237–18, Standard Test Method for Free Cyanide and Aquatic Free Cyanide with Flow Injection Analysis (FIA) Utilizing Gas Diffusion Separation and Amperometric Detection, Approved December 1, 2018, IBR approved for § 63.1103(g).

(108) ASTM D7430–11ae1, Standard Practice for Mechanical Sampling of Coal, (Approved October 1, 2011), IBR approved for table 6 to subpart DDDDD.

(109) ASTM D7520–16, Standard Test Method for Determining the Opacity of a Plume in the Outdoor Ambient Atmosphere, approved April 1, 2016; IBR approved for §§ 63.1625(b); table 3 to subpart LLLLL; 63.7823(c) through (e), 63.7833(g); 63.11423(c).

(110) [Reserved]

(111) ASTM E145–94 (Reapproved 2001), Standard Specification for Gravity-Convection and Forced-Ventilation Ovens, IBR approved for appendix A to subpart PPPP.

(112) ASTM E180–93, Standard Practice for Determining the Precision of ASTM Methods for Analysis and Testing of Industrial Chemicals, IBR approved for § 63.786(b).

(113) ASTM E260–91, General Practice for Packed Column Gas Chromatography, IBR approved for §§ 63.750(b) and 63.786(b).

(114) ASTM E260–96, General Practice for Packed Column Gas Chromatography, IBR approved for §§ 63.750(b) and 63.786(b).

(115) ASTM E515–95 (Reapproved 2000), Standard Test Method for Leaks Using Bubble Emission Techniques, IBR approved for § 63.425(i).

(116) ASTM E711–87 (Reapproved 2004), Standard Test Method for Gross Calorific Value of Refuse-Derived Fuel by the Bomb Calorimeter, (Approved August 28, 1987), IBR approved for table 6 to subpart DDDDD and table 5 to subpart JJJJJ.

(117) ASTM E776–87 (Reapproved 2009), Standard Test Method for Forms of Chlorine in Refuse-Derived Fuel, (Approved July 1, 2009), IBR approved for table 6 to subpart DDDDD.

(118) ASTM E871–82 (Reapproved 2006), Standard Test Method for Moisture Analysis of Particulate Wood Fuels, (Approved November 1, 2006), IBR approved for table 6 to subpart DDDDD and table 5 to subpart JJJJJ.

(119) ASTM UOP539–12, Refinery Gas Analysis by GC, Copyright 2012 (to UOP), IBR approved for § 63.670(j).

(j) Bay Area Air Quality Management District (BAAQMD), 939 Ellis Street, San Francisco, California 94109, <http://www.arb.ca.gov/DRDB/BA/CURHTML/ST/st30.pdf>.

(1) “BAAQMD Source Test Procedure ST–30—Static Pressure Integrity Test, Underground Storage Tanks,” adopted November 30, 1983, and amended December 21, 1994, IBR approved for § 63.11120(a).

(2) [Reserved]

(k) British Standards Institute, 389 Chiswick High Road, London W4 4AL, United Kingdom.

(1) BS EN 1593:1999, Non-destructive Testing: Leak Testing—Bubble Emission Techniques, IBR approved for § 63.425(i).

(2) BS EN 14662–4:2005, Ambient air quality standard method for the measurement of benzene concentrations—Part 4: Diffusive sampling followed by thermal desorption and gas chromatography, Published June 27, 2005, IBR approved for appendix A to this part: Method 325A and Method 325B.

(l) California Air Resources Board (CARB), 1001 I Street, P.O. Box 2815, Sacramento, CA 95812–2815, Telephone (916) 327–0900, <http://www.arb.ca.gov/>.

(1) Method 310, “Determination of Volatile Organic Compounds (VOC) in Consumer Products and Reactive Organic Compounds (ROC) in Aerosol Coating Products,” amended May 25, 2018, IBR approved for § 63.8055(b).

(2) Method 428, “Determination Of Polychlorinated Dibenzo-P-Dioxin (PCDD), Polychlorinated Dibenzofuran (PCDF), and Polychlorinated Biphenyl Emissions from Stationary Sources,” amended September 12, 1990, IBR approved for § 63.849(a)(13) and (14).

(3) Method 429, Determination of Polycyclic Aromatic Hydrocarbon (PAH) Emissions from Stationary Sources, Adopted September 12, 1989, Amended July 28, 1997, IBR approved for § 63.1625(b).

(4) California Air Resources Board Vapor Recovery Test Procedure TP–201.1—“Volumetric Efficiency for Phase I Vapor Recovery Systems,” adopted April 12, 1996, and amended February 1, 2001 and October 8, 2003, IBR approved for § 63.11120(b).

(5) California Air Resources Board Vapor Recovery Test Procedure TP-201.1E—"Leak Rate and Cracking Pressure of Pressure/Vacuum Vent Valves," adopted October 8, 2003, IBR approved for § 63.11120(a).

(6) California Air Resources Board Vapor Recovery Test Procedure TP-201.3—"Determination of 2-Inch WC Static Pressure Performance of Vapor Recovery Systems of Dispensing Facilities," adopted April 12, 1996 and amended March 17, 1999, IBR approved for § 63.11120(a).

(m) Composite Panel Association, 19465 Deerfield Avenue, Suite 306, Leesburg, VA 20176, Telephone (703)724-1128, and www.compositepanel.org.

(1) ANSI A135.4-2012, Basic Hardboard, approved June 8, 2012, IBR approved for § 63.4781.

(2) [Reserved]

(n) Environmental Protection Agency. Air and Radiation Docket and Information Center, 1200 Pennsylvania Avenue NW., Washington, DC 20460, telephone number (202) 566-1745.

(1) *California Regulatory Requirements Applicable to the Air Toxics Program*, November 16, 2010, IBR approved for § 63.99(a).

(2) *New Jersey's Toxic Catastrophe Prevention Act Program*, (July 20, 1998), IBR approved for § 63.99(a).

(3) Delaware Department of Natural Resources and Environmental Control, Division of Air and Waste Management, Accidental Release Prevention Regulation, sections 1 through 5 and sections 7 through 14, effective January 11, 1999, IBR approved for § 63.99(a).

(4) State of Delaware Regulations Governing the Control of Air Pollution (October 2000), IBR approved for § 63.99(a).

(5) Massachusetts Department of Environmental Protection regulations at 310 CMR 7.26(10)-(16), Air Pollution Control, effective as of September 5, 2008, corrected March 6, 2009, and 310 CMR 70.00, Environmental Results Program Certification, effective as of December 28, 2007. IBR approved for § 63.99(a).

(6)

(i) New Hampshire Regulations at Env-Sw 2100, Management and Control of Asbestos Disposal Sites Not Operated after July 9, 1981, effective February 16, 2010 (including a letter from Thomas S. Burack, Commissioner, Department of Environmental Services, State of New Hampshire, to Carol J. Holahan, Director, Office of Legislative Services, dated February 12, 2010, certifying that the enclosed rule, Env-Sw 2100, is the official version of this rule), IBR approved for § 63.99(a).

(ii) New Hampshire Code of Administrative Rules: Chapter Env-A 1800, Asbestos Management and Control, effective as of May 5, 2017 (certified with June 23, 2017 letter from Clark B. Freise, Assistant Commissioner, Department of Environmental Services, State of New Hampshire), as follows: Revision Notes #1 and #2; Part Env-A 1801-1807, excluding Env-A 1801.02(e), Env-A 1801.07, Env-A 1802.02, Env-A 1802.04, Env-A 1802.07-1802.09, Env-A 1802.13, Env-A 1802.15-1802.17, Env-A 1802.25, Env-A 1802.31, Env-A 1802.37, Env-A 1802.40, Env-A 1802.44, and Env-A 1803.05-1803.09; and Appendices B, C, and D; IBR approved for § 63.99(a).

(7) Maine Department of Environmental Protection regulations at Chapter 125, Perchloroethylene Dry Cleaner Regulation, effective as of June 2, 1991, last amended on June 24, 2009. IBR approved for § 63.99(a).

(8) California South Coast Air Quality Management District's "Spray Equipment Transfer Efficiency Test Procedure for Equipment User, May 24, 1989," IBR approved for §§ 63.11173(e) and 63.11516(d).

(9) California South Coast Air Quality Management District's "Guidelines for Demonstrating Equivalency with District Approved Transfer Efficient Spray Guns, September 26, 2002," Revision 0, IBR approved for §§ 63.11173(e) and 63.11516(d).

(10) Rhode Island Department of Environmental Management regulations at Air Pollution Control Regulation No. 36, Control of Emissions from Organic Solvent Cleaning, effective April 8, 1996, last amended October 9, 2008, IBR approved for § 63.99(a).

(11) Rhode Island Air Pollution Control, General Definitions Regulation, effective July 19, 2007, last amended October 9, 2008. IBR approved for § 63.99(a).

(12) Alaska Statute 42.45.045. Renewable energy grant fund and recommendation program, available at <http://www.legis.state.ak.us/basis/folio.asp>, IBR approved for § 63.6675.

(13) Vermont Air Pollution Control Regulations, Chapter 5, Air Pollution Control, section 5–253.11, Perchloroethylene Dry Cleaning, effective as of December 15, 2016. Incorporation by reference approved for § 63.99(a).

(o) U.S. Environmental Protection Agency, 1200 Pennsylvania Avenue NW., Washington, DC 20460, (202) 272–0167, <http://www.epa.gov>.

(1) EPA–453/R–08–002, Protocol for Determining the Daily Volatile Organic Compound Emission Rate of Automobile and Light-Duty Truck Primer-Surfacer and Topcoat, published September 2008, IBR approved for §§ 63.3130(c), 63.3161(d) and (g), 63.3165(e), and appendix A to subpart IIII.

(2) EPA–453/R–01–005, National Emission Standards for Hazardous Air Pollutants (NESHAP) for Integrated Iron and Steel Plants—Background Information for Proposed Standards, Final Report, January 2001, IBR approved for § 63.7491(g).

(3) [Reserved]

(4) EPA–454/R–98–015, Office of Air Quality Planning and Standards (OAQPS), Fabric Filter Bag Leak Detection Guidance, September 1997, <https://nepis.epa.gov/Exe/ZyPDF.cgi?Dockey=2000D5T6.PDF>; IBR approved for §§ 63.548(e); 63.864(e); 63.7525(j); 63.8450(e); 63.8600(e); 63.9632(a); 63.9804(f); 63.11224(f); 63.11423(e).

(5) EPA–454/R–99–005, Office of Air Quality Planning and Standards (OAQPS), Meteorological Monitoring Guidance for Regulatory Modeling Applications, February 2000, IBR approved for appendix A to this part: Method 325A.

(6) EPA/600/R–12/531, EPA Traceability Protocol for Assay and Certification of Gaseous Calibration Standards, May 2012, IBR approved for § 63.2163(b).

(7) EPA–625/3–89–016, Interim Procedures for Estimating Risks Associated with Exposures to Mixtures of Chlorinated Dibenzo-p-Dioxins and –Dibenzofurans (CDDs and CDFs) and 1989 Update, March 1989. IBR approved for § 63.1513(d).

(8) SW–846–0011, Sampling for Selected Aldehyde and Ketone Emissions from Stationary Sources, Revision 0, December 1996, in EPA Publication No. SW–846, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, Third Edition, IBR approved for table 4 to subpart DDDD.

(9) SW–846–3020A, Acid Digestion of Aqueous Samples And Extracts For Total Metals For Analysis By GFAA Spectroscopy, Revision 1, July 1992, in EPA Publication No. SW–846, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, Third Edition, IBR approved for table 6 to subpart DDDDD and table 5 to subpart JJJJJ.

(10) SW–846–3050B, Acid Digestion of Sediments, Sludges, and Soils, Revision 2, December 1996, in EPA Publication No. SW–846, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, Third Edition, IBR approved for table 6 to subpart DDDDD and table 5 to subpart JJJJJ.

- (11) SW-846-5030B, Purge-And-Trap For Aqueous Samples, Revision 2, December 1996, in EPA Publication No. SW-846, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, Third Edition, IBR approved for § 63.2492(b) and (c).
- (12) SW-846-5031, Volatile, Nonpurgeable, Water-Soluble Compounds by Azeotropic Distillation, Revision 0, December 1996, in EPA Publication No. SW-846, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, Third Edition, IBR approved for § 63.2492(b) and (c).
- (13) SW-846-7470A, Mercury In Liquid Waste (Manual Cold-Vapor Technique), Revision 1, September 1994, in EPA Publication No. SW-846, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, Third Edition, IBR approved for table 6 to subpart DDDDD and table 5 to subpart JJJJJ.
- (14) SW-846-7471B, Mercury In Solid Or Semisolid Waste (Manual Cold-Vapor Technique), Revision 2, February 2007, in EPA Publication No. SW-846, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, Third Edition, IBR approved for table 6 to subpart DDDDD and table 5 to subpart JJJJJ.
- (15) SW-846-8015C, Nonhalogenated Organics by Gas Chromatography, Revision 3, February 2007, in EPA Publication No. SW-846, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, Third Edition, IBR approved for §§ 63.11960, 63.11980, and table 10 to subpart HHHHHHH.
- (16) SW-846-8260B, Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS), Revision 2, December 1996, in EPA Publication No. SW-846, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, Third Edition, IBR approved for §§ 63.1107(a), 63.11960, 63.11980, and table 10 to subpart HHHHHHH.
- (17) SW-846-8260D, Volatile Organic Compounds By Gas Chromatography/Mass Spectrometry, Revision 4, June 2018, in EPA Publication No. SW-846, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, Third Edition, IBR approved for § 63.2492(b) and (c).
- (18) SW-846-8270D, Semivolatile Organic Compounds by Gas Chromatography/Mass Spectrometry (GC/MS), Revision 4, February 2007, in EPA Publication No. SW-846, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, Third Edition, IBR approved for §§ 63.1107(a), 63.11960, 63.11980, and table 10 to subpart HHHHHHH.
- (19) SW-846-8315A, Determination of Carbonyl Compounds by High Performance Liquid Chromatography (HPLC), Revision 1, December 1996, in EPA Publication No. SW-846, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, Third Edition, IBR approved for §§ 63.11960 and 63.11980, and table 10 to subpart HHHHHHH.
- (20) SW-846-5050, Bomb Preparation Method for Solid Waste, Revision 0, September 1994, in EPA Publication No. SW-846, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, Third Edition IBR approved for table 6 to subpart DDDDD.
- (21) SW-846-6010C, Inductively Coupled Plasma-Atomic Emission Spectrometry, Revision 3, February 2007, in EPA Publication No. SW-846, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, Third Edition, IBR approved for table 6 to subpart DDDDD.
- (22) SW-846-6020A, Inductively Coupled Plasma-Mass Spectrometry, Revision 1, February 2007, in EPA Publication No. SW-846, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, Third Edition, IBR approved for table 6 to subpart DDDDD.
- (23) SW-846-7060A, Arsenic (Atomic Absorption, Furnace Technique), Revision 1, September 1994, in EPA Publication No. SW-846, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, Third Edition, IBR approved for table 6 to subpart DDDDD.

(24) SW-846-7740, Selenium (Atomic Absorption, Furnace Technique), Revision 0, September 1986, in EPA Publication No. SW-846, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, Third Edition, IBR approved for table 6 to subpart DDDDD.

(25) SW-846-9056, Determination of Inorganic Anions by Ion Chromatography, Revision 1, February 2007, in EPA Publication No. SW-846, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, Third Edition, IBR approved for table 6 to subpart DDDDD.

(26) SW-846-9076, Test Method for Total Chlorine in New and Used Petroleum Products by Oxidative Combustion and Microcoulometry, Revision 0, September 1994, in EPA Publication No. SW-846, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, Third Edition, IBR approved for table 6 to subpart DDDDD.

(27) SW-846-9250, Chloride (Colorimetric, Automated Ferricyanide AAI), Revision 0, September 1986, in EPA Publication No. SW-846, Test Methods for Evaluating Solid Waste, Physical/Chemical Methods, Third Edition, IBR approved for table 6 to subpart DDDDD.

(28) Method 200.8, Determination of Trace Elements in Waters and Wastes by Inductively Coupled Plasma—Mass Spectrometry, Revision 5.4, 1994, IBR approved for table 6 to subpart DDDDD.

(29) Method 1631 Revision E, Mercury in Water by Oxidation, Purge and Trap, and Cold Vapor Atomic Absorption Fluorescence Spectrometry, Revision E, EPA-821-R-02-019, August 2002, IBR approved for table 6 to subpart DDDDD.

(p) International Standards Organization (ISO), 1, ch. de la Voie-Creuse, Case postale 56, CH-1211 Geneva 20, Switzerland, + 41 22 749 01 11, <http://www.iso.org/iso/home.htm>.

(1) ISO 6978-1:2003(E), Natural Gas—Determination of Mercury—Part 1: Sampling of Mercury by Chemisorption on Iodine, First edition, October 15, 2003, IBR approved for table 6 to subpart DDDDD.

(2) ISO 6978-2:2003(E), Natural gas—Determination of Mercury—Part 2: Sampling of Mercury by Amalgamation on Gold/Platinum Alloy, First edition, October 15, 2003, IBR approved for table 6 to subpart DDDDD.

(3) ISO 16017-2:2003(E): Indoor, ambient and workplace air—sampling and analysis of volatile organic compounds by sorbent tube/thermal desorption/capillary gas chromatography—Part 2: Diffusive sampling, May 15, 2003, IBR approved for appendix A to this part: Method 325A and Method 325B.

(q) National Council of the Paper Industry for Air and Stream Improvement, Inc. (NCASI), P.O. Box 133318, Research Triangle Park, NC 27709-3318 or at <http://www.ncasi.org>.

(1) NCASI Method DI/MEOH-94.03, Methanol in Process Liquids and Wastewaters by GC/FID, Issued May 2000, IBR approved for §§ 63.457 and 63.459.

(2) NCASI Method CI/WP-98.01, Chilled Impinger Method For Use At Wood Products Mills to Measure Formaldehyde, Methanol, and Phenol, 1998, Methods Manual, IBR approved for table 4 to subpart DDDD.

(3) NCASI Method DI/HAPS-99.01, Selected HAPs In Condensates by GC/FID, Issued February 2000, IBR approved for § 63.459(b).

(4) NCASI Method IM/CAN/WP-99.02, Impinger/Canister Source Sampling Method for Selected HAPs and Other Compounds at Wood Products Facilities, January 2004, Methods Manual, IBR approved for table 4 to subpart DDDD.

(5) NCASI Method ISS/FP A105.01, Impinger Source Sampling Method for Selected Aldehydes, Ketones, and Polar Compounds, December 2005, Methods Manual, IBR approved for table 4 to subpart DDDD and §§ 63.4751(i) and 63.4752(e).

(r) National Technical Information Service (NTIS), 5285 Port Royal Road, Springfield, VA 22161, (703) 605–6000 or (800) 553–6847; or for purchase from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402, (202) 512–1800.

(1) Handbook 44, Specifications, Tolerances, and Other Technical Requirements for Weighing and Measuring Devices 1998, IBR approved for § 63.1303(e).

(2) “Test Methods for Evaluating Solid Waste, Physical/Chemical Methods,” EPA Publication SW–846, Third Edition. (A suffix of “A” in the method number indicates revision one (the method has been revised once). A suffix of “B” in the method number indicates revision two (the method has been revised twice).

(i) Method 0023A, “Sampling Method for Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofuran Emissions from Stationary Sources,” Revision 2, dated August 2018, IBR approved for § 63.1208(b).

(ii) Method 9071B, “n-Hexane Extractable Material (HEM) for Sludge, Sediment, and Solid Samples,” dated April 1998, IBR approved for § 63.7824(e).

(iii) Method 9095A, “Paint Filter Liquids Test,” dated December 1996, IBR approved for §§ 63.7700(b) and 63.7765.

(iv) Method 9095B, “Paint Filter Liquids Test,” (revision 2), dated November 2004, IBR approved for the definition of “Free organic liquids” in §§ 63.10692, 63.10885(a), and the definition of “Free liquids” in § 63.10906.

(v) SW–846 74741B, Revision 2, “Mercury in Solid or Semisolid Waste (Manual Cold-Vapor Technique),” February 2007, IBR approved for § 63.11647(f).

(3) National Institute of Occupational Safety and Health (NIOSH) test method compendium, “NIOSH Manual of Analytical Methods,” NIOSH publication no. 94–113, Fourth Edition, August 15, 1994.

(i) NIOSH Method 2010, “Amines, Aliphatic,” Issue 2, August 15, 1994, IBR approved for § 63.7732(g).

(ii) [Reserved]

(s) North American Electric Reliability Corporation, 1325 G Street, NW., Suite 600, Washington, DC 20005–3801, <http://www.nerc.com>, http://www.nerc.com/files/EOP0002-3_1.pdf.

(1) North American Electric Reliability Corporation Reliability Standard EOP–002–3, Capacity and Energy Emergencies, adopted August 5, 2010, IBR approved for § 63.6640(f).

(2) [Reserved]

(t) Technical Association of the Pulp and Paper Industry (TAPPI), 15 Technology Parkway South, Norcross, GA 30092, (800) 332–8686, <http://www.tappi.org>.

(1) TAPPI T 266, Determination of Sodium, Calcium, Copper, Iron, and Manganese in Pulp and Paper by Atomic Absorption Spectroscopy (Reaffirmation of T 266 om-02), Draft No. 2, July 2006, IBR approved for table 6 to subpart DDDDD.

(2) [Reserved]

(u) Texas Commission on Environmental Quality (TCEQ) Library, Post Office Box 13087, Austin, Texas 78711–3087, telephone number (512) 239–0028, http://www.tceq.state.tx.us/assets/public/implementation/air/sip/sipdocs/2002-12-HGB/02046sipapp_ado.pdf.

(1) “Air Stripping Method (Modified El Paso Method) for Determination of Volatile Organic Compound Emissions from Water Sources,” Revision Number One, dated January 2003, Sampling Procedures Manual, Appendix P:

Cooling Tower Monitoring, January 31, 2003, IBR approved for §§ 63.654(c) and (g), 63.655(i), 63.1086(e), 63.1089, 63.2490(d), 63.2525(r), and 63.11920.

(2) [Reserved]

Editorial Note

Editorial Note: For Federal Register citations affecting § 63.14, see the List of CFR Sections Affected, which appears in the Finding Aids section of the printed volume and at www.govinfo.gov.

§ 63.15 Availability of information and confidentiality.

(a) Availability of information.

(1) With the exception of information protected through part 2 of this chapter, all reports, records, and other information collected by the Administrator under this part are available to the public. In addition, a copy of each permit application, compliance plan (including the schedule of compliance), notification of compliance status, excess emissions and continuous monitoring systems performance report, and title V permit is available to the public, consistent with protections recognized in section 503(e) of the Act.

(2) The availability to the public of information provided to or otherwise obtained by the Administrator under this part shall be governed by part 2 of this chapter.

(b) Confidentiality.

(1) If an owner or operator is required to submit information entitled to protection from disclosure under section 114(c) of the Act, the owner or operator may submit such information separately. The requirements of section 114(c) shall apply to such information.

(2) The contents of a title V permit shall not be entitled to protection under section 114(c) of the Act; however, information submitted as part of an application for a title V permit may be entitled to protection from disclosure.

§ 63.16 Performance Track Provisions.

(a) Notwithstanding any other requirements in this part, an affected source at any major source or any area source at a Performance Track member facility, which is subject to regular periodic reporting under any subpart of this part, may submit such periodic reports at an interval that is twice the length of the regular period specified in the applicable subparts; provided, that for sources subject to permits under 40 CFR part 70 or 71 no interval so calculated for any report of the results of any required monitoring may be less frequent than once in every six months.

(b) Notwithstanding any other requirements in this part, the modifications of reporting requirements in paragraph (c) of this section apply to any major source at a Performance Track member facility which is subject to requirements under any of the subparts of this part and which has:

(1) Reduced its total HAP emissions to less than 25 tons per year;

(2) Reduced its emissions of each individual HAP to less than 10 tons per year; and

(3) Reduced emissions of all HAPs covered by each MACT standard to at least the level required for full compliance with the applicable emission standard.

(c) For affected sources at any area source at a Performance Track member facility and which meet the requirements of paragraph (b)(3) of this section, or for affected sources at any major source that meet the requirements of paragraph (b) of this section:

(1) If the emission standard to which the affected source is subject is based on add-on control technology, and the affected source complies by using add-on control technology, then all required reporting elements in the periodic report may be met through an annual certification that the affected source is meeting the emission standard by continuing to use that control technology. The affected source must continue to meet all relevant monitoring and recordkeeping requirements. The compliance certification must meet the requirements delineated in Clean Air Act section 114(a)(3).

(2) If the emission standard to which the affected source is subject is based on add-on control technology, and the affected source complies by using pollution prevention, then all required reporting elements in the periodic report may be met through an annual certification that the affected source is continuing to use pollution prevention to reduce HAP emissions to levels at or below those required by the applicable emission standard. The affected source must maintain records of all calculations that demonstrate the level of HAP emissions required by the emission standard as well as the level of HAP emissions achieved by the affected source. The affected source must continue to meet all relevant monitoring and recordkeeping requirements. The compliance certification must meet the requirements delineated in Clean Air Act section 114(a)(3).

(3) If the emission standard to which the affected source is subject is based on pollution prevention, and the affected source complies by using pollution prevention and reduces emissions by an additional 50 percent or greater than required by the applicable emission standard, then all required reporting elements in the periodic report may be met through an annual certification that the affected source is continuing to use pollution prevention to reduce HAP emissions by an additional 50 percent or greater than required by the applicable emission standard. The affected source must maintain records of all calculations that demonstrate the level of HAP emissions required by the emission standard as well as the level of HAP emissions achieved by the affected source. The affected source must continue to meet all relevant monitoring and recordkeeping requirements. The compliance certification must meet the requirements delineated in Clean Air Act section 114(a)(3).

(4) Notwithstanding the provisions of paragraphs (c)(1) through (3), of this section, for sources subject to permits under 40 CFR part 70 or 71, the results of any required monitoring and recordkeeping must be reported not less frequently than once in every six months.

Table 1 to Subpart A of Part 63 - Detection Sensitivity Levels (grams per hour)

Monitoring frequency per subpart ^a	Detection sensitivity level
Bi-Monthly	60
Semi-Quarterly	85
Monthly	100

^a When this alternative work practice is used to identify leaking equipment, the owner or operator must choose one of the monitoring frequencies listed in this table, in lieu of the monitoring frequency specified in

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the applicable subpart. Bi-monthly means every other month. Semi-quarterly means twice per quarter. Monthly means once per month.

**Technical Support Document
for
Draft Air Emission Permit No. 03700138-101**

This technical support document (TSD) is intended for all parties interested in the draft permit and to meet the requirements that have been set forth by the federal and state regulations (40 CFR section 70.7(a)(5) and Minn. R. 7007.0850, subp. 1). The purpose of this document is to provide the legal and factual justification for each applicable requirement or policy decision considered in the preliminary determination to issue the draft permit.

1. General information

1.1 Applicant and stationary source location

Table 1. Applicant and source address

Applicant/Address	Stationary source/Address (SIC Code: 4953 - Refuse Systems)
Pine Bend RNG Inc 2495 117th St E Inver Grove Heights, Minnesota 55077-5919	Pine Bend RNG LLC 2345 117th St E Inver Grove Heights, MN 55077-5917
Contact: Aaron Janusz Phone: 651-450-2153	

1.2 Facility description

The Pine Bend Landfill (PBL) is located at 2495 117th St E, Inver Grove Heights, Dakota County, Minnesota.

PBL is a single stationary source composed of a municipal solid waste (MSW) landfill and a renewable natural gas (RNG) plant. The MSW landfill is owned and operated by BFI Waste Systems of North America, LLC. The RNG Plant is owned and operated by Pine Bend RNG, LLC (PBR). The landfill gas (LFG) generated through waste decomposition in the MSW landfill is routed to the RNG Plant that converts the LFG to pipeline quality natural gas equivalent. The RNG plant processes include compression, filtration, water removal (through a chiller), combustion and removal of non-methane gas. A thermal oxidizer combusts waste gas generated by the conversion of LFG to RNG. LFG not converted to RNG as well as RNG not meeting pipeline quality of natural gas (otherwise known as off-spec gas) is combusted in the open flare.

This facility previously burned LFG on-site to generate electricity. This equipment has been removed and replaced by the RNG plant as a minor amendment. In total, three minor amendments and one administrative amendment are being rolled into the Part 70 permit reissuance. One minor amendment was for installation of a diesel fired tipper on the working face of the landfill to assist in unloading waste that arrives in large semi-trucks. The second minor amendment allowed installation of the RNG treatment system, along with a thermal oxidizer and open flare. The third minor amendment increased the landfill's capacity. These amendments allowed minor increases of combustion products and landfill gas emissions. The administrative amendment requested that the facility's name be changed from Pine Bend Energy, LLC to Pine Bend RNG, LLC. As stated above, two turbines and two duct burners that were previously used to generate electricity have been removed, along with two enclosed flares.

Primary emissions at the facility include landfill gas (LFG) containing primarily methane (CH₄), carbon dioxide (CO₂), and non-methane organic compounds (NMOC). The facility also emits nitrogen oxides (NO_x), carbon monoxide (CO), sulfur dioxide (SO₂), and greenhouse gases (CO₂e) from the open flare and thermal oxidizer. The facility also has equipment that qualifies as insignificant activities under Minn. R. 7007.1300. Emissions

of particulate matter (PM) come from paved and unpaved roads and are controlled by water spray from trucks. This permit does not cover emissions related to the end use of the natural gas that is produced.

1.3 Description of the activities allowed by this permit action

This permit action is a Part 70 Reissuance, three minor amendments and an administrative amendment for a name change at the facility. The first minor amendment is for the use of an 82 hp diesel fired tipper, which is used to assist in unloading waste that arrives at the landfill in semi-trucks. Emission changes due to this unit are shown in Tables 5 and 6. The tipper was proposed as a minor amendment but actually qualifies as an insignificant activity as a nonroad engine, so this is how it is addressed in the permit. The second minor amendment is for the installation of the RNG plant, which conditions landfill gas into pipeline quality natural gas. Emission changes due to this plant are shown in Tables 7 and 8 and include an increase in vehicle miles traveled at the facility as well as the removal of two gas-fired turbines, two duct burners, an enclosed flare, and a siloxane flare. The third minor amendment is for a vertical expansion at the landfill. Emission changes due to this expansion are shown in Tables 9 and 10 and calculations are shown in Attachment 1. The MPCA has a combined operating and construction-permitting program under Minn. R. ch. 7007 and Minn. R. 7007.0800.

1.4 Description of notifications and applications included in this action

Table 2. Notifications and applications included in this action

Date received	Application/Notification type and description
12/15/2020	Administrative Amendment (IND20200002)
05/25/2021	Minor Amendment (IND20210002)
12/18/2020	Minor Amendment (IND20210001)
11/03/2009	Minor Amendment (IND20090002)
09/01/2009	Part 70 Reissuance (IND20090001)

1.5 Facility emissions

Table 3. Total facility potential to emit summary

	PM tpy	PM ₁₀ tpy	PM _{2.5} tpy	SO ₂ tpy	NO _x tpy	CO tpy	CO ₂ e tpy	VOC tpy	Single HAP tpy	All HAPs tpy
Total facility limited potential emissions	97.0	32.0	13.5	90.6	40.8	163.2	250,790	10.52	3.55	8.95
Total facility actual emissions (2022)	31.34	31.34	5.80	4.57	17.96	58.47	*	10.69	*	

*Not reported in Minnesota emission inventory.

Table 4. Facility classification

Classification	Major	Synthetic minor/area	Minor/Area
New Source Review			X
Part 70	X		
Part 63			X

Table 5. Title I emissions increase summary for use of tipper

Pollutant	Unlimited potential emissions from the modification (tpy)	Limited potential emissions from the modification (tpy)	NSR/112(g) threshold for new major source (tpy)	NSR/112(g) review required? (yes/no)
PM	0.224	0.224	250	N
PM ₁₀	0.106	0.106	250	N
PM _{2.5}	0.016	0.016	250	N
NO _x	0.00	N/A	250	N
SO ₂	0.00	N/A	250	N
CO	0.00	N/A	250	N
Ozone (VOC)	0.00	N/A	250	N
CO ₂ e*	0.00	N/A	100,000	N
Total HAPs	0.00	N/A	25	N
Single HAP	0.00	N/A	10	N

*Carbon dioxide equivalents as defined in Minn. R. 7007.0100.

Table 6. Non-title I emissions increase summary for use of tipper

Pollutant	After change (lb/hr)	Before change (lb/hr)	Net change* (lb/hr)	Insignificant modification thresholds (lb/hr <)	Minor and moderate amendment thresholds (lb/hr < or ≥)	Type of amendment (minor or moderate)
PM ₁₀	0.082	0.00	0.082	0.855	3.42	Minor
NO _x	0.00	0.00	0.00	2.28	9.13	Minor
SO ₂	0.00	0.00	0.00	2.28	9.13	Minor
CO	0.00	0.00	0.00	5.70	22.80	Minor
VOC	0.00	0.00	0.00	2.28	9.13	Minor
Lead	0.00	0.00	0.00	0.025	0.11	Minor

*The term 'Net Change' is not equivalent to 'Net Emissions Increase' as defined at 40 CFR Section 52.21(b)(3).

Table 7. Title I emissions increase summary for installation of RNG plant

Pollutant	Unlimited potential emissions from the modification (tpy)	Limited potential emissions from the modification (tpy)	NSR/112(g) threshold for new major source (tpy)	NSR/112(g) review required? (yes/no)
PM	46.3	28.1	250	N
PM ₁₀	46.3	28.1	250	N
PM _{2.5}	13.4	11.6	250	N
NO _x	146.1	40.8	250	N
SO ₂	90.6	90.6	250	N
CO	163.2	163.2	250	N
Ozone (VOC)	110.2	9.52	250	N
CO ₂ e*	255,939	184,415	100,000	N
Total HAPs	59.5	9.17	25	N
Single HAP	18.4	7.8	10	N

*Carbon dioxide equivalents as defined in Minn. R. 7007.0100.

Table 8. Non-title I emissions increase summary for installation of RNG plant

Pollutant	After change (lb/hr)	Before change (lb/hr)	Net change* (lb/hr)	Insignificant modification thresholds (lb/hr <)	Minor and moderate amendment thresholds (lb/hr < or ≥)	Type of amendment (minor or moderate)
PM ₁₀	13.4	10.9	2.50	0.855	3.42	Minor
NO _x	9.32	25.3	-15.9	2.28	9.13	Minor
SO ₂	20.7	39.2	-18.5	2.28	9.13	Minor
CO	37.3	50.1	-12.9	5.70	22.80	Minor
VOC	2.17	0.49	1.68	2.28	9.13	Minor
Lead	0.00	0.00	0.00	0.025	0.11	Minor

*The term 'Net Change' is not equivalent to 'Net Emissions Increase' as defined at 40 CFR Section 52.21(b)(3).

Table 9. Title I emissions increase summary for landfill vertical expansion

Pollutant	Unlimited potential emissions from the modification (tpy)	Limited potential emissions from the modification (tpy)	NSR/112(g) threshold for new major source (tpy)	NSR/112(g) review required? (yes/no)
PM	0.00	0.00	250	N
PM ₁₀	0.00	0.00	250	N
PM _{2.5}	0.00	0.00	250	N
NO _x	0.00	0.00	250	N
SO ₂	0.00	0.00	250	N
CO	0.00	0.00	250	N
Ozone (VOC)	0.252	0.252	250	N
CO ₂ e*	2,147	2,147	100,000	N
Total HAPs	0.60	0.60	25	N
Single HAP	0.33	0.33	10	N

*Carbon dioxide equivalents as defined in Minn. R. 7007.0100.

Table 10. Non-title I emissions increase summary for landfill vertical expansion

Pollutant	After change (lb/hr)	Before change (lb/hr)	Net change* (lb/hr)	Insignificant modification thresholds (lb/hr <)	Minor and moderate amendment thresholds (lb/hr < or ≥)	Type of amendment (minor or moderate)
PM ₁₀	0.00	0.00	0.00	0.855	3.42	Minor
NO _x	0.00	0.00	0.00	2.28	9.13	Minor
SO ₂	0.00	0.00	0.00	2.28	9.13	Minor
CO	0.00	0.00	0.00	5.70	22.80	Minor
VOC	1.98	1.92	0.058	2.28	9.13	Minor
Lead	0.00	0.00	0.00	0.025	0.11	Minor

*The term 'Net Change' is not equivalent to 'Net Emissions Increase' as defined at 40 CFR Section 52.21(b)(3).

1.6 Changes to permit

The permit does not authorize any specific modifications, however, the MPCA has a combined operating and construction permitting program under Minnesota Rules Chapter 7007, and under Minn. R. 7007.0800, the

MPCA has authority to include additional requirements in an operating permit. The following changes to the permit are made through this permit action:

- The permit has been updated to reflect current MPCA templates and standard citation formatting;
- Completed requirements and the requirements for equipment that has been removed have been deleted;
- Changes due to the three minor amendments and one administrative amendment have been made to the calculations for this facility and permit conditions have been added as needed;
- Subject items have been added or deleted based on the equipment that was installed or removed;
- The insignificant activities for the facility have been updated to reflect the current activities on site as well as to reflect changes to these rules since the last permit was issued.

2. Regulatory and/or statutory basis

2.1 New source review (NSR)

The facility is an existing minor source under New Source Review regulations.

2.2 Part 70 permit program

The facility is a major source under the Part 70 permit program.

2.3 New source performance standards (NSPS)

The facility is subject to 40 CFR pt. 60, subp. XXX - Standards of Performance for Municipal Solid Waste Landfills That Commenced Construction, Reconstruction, or Modification After July 17, 2014. This standard applies to landfills that commenced construction, reconstruction, or modification after July 17, 2014, and have a design capacity greater than or equal to 2.5 million cubic meters. Pine Bend received a solid waste permit in 2019 to vertically expand the landfill and they have commenced construction of the expansion since that time. According to the definitions in 40 CFR § 60.761, a “modification means an increase in the permitted volume design capacity of the landfill by either lateral or vertical expansion based on its permitted design capacity as of July 17, 2014. Modification does not occur until the owner or operator commences construction on the lateral or vertical expansion.” Therefore, the facility became subject to NSPS XXX at the time they began construction on the expansion. The MPCA has determined that the thermal oxidizer is not subject to any federal landfill regulations. The RNG plant is considered to be a treatment system under these regulations but the treated landfill gas (now pipeline quality natural gas) has to go either to the pipeline or the off-spec flare, and has no path to go to the thermal oxidizer. The oxidizer only burns waste gases that have been separated from landfill gas. The facility has accepted a permit condition stating that 100% of the landfill gas stream goes to the RNG plant, with no vents or bypasses.

The facility is no longer subject to 40 CFR pt. 60, subp. WWW – Standards of Performance for Municipal Solid Waste Landfills That Commenced Construction, Reconstruction, or Modification on or After May 30, 1991, but Before July 18, 2014, because the facility became subject to the 40 CFR 32 subpart OOO – Federal Plan Requirements for Municipal Solid Waste Landfills in June 2021. Additionally, PBL initiated work on the vertical expansion to the landfill on May 15, 2023, thus triggering the requirements of 40 CFR 60 Subpart XXX - Standards of Performance for Municipal Solid Waste Landfills That Commenced Construction, Reconstruction, or Modification After July 17, 2014.

2.4 National emission standards for hazardous air pollutants (NESHAP)

The facility is an area source of HAPs. 40 CFR pt. 63, subp. AAAA - National Emission Standards for Hazardous Air Pollutants at Municipal Solid Waste Landfills can apply to area or major source facilities. Pine Bend landfill is subject to this standard according to 40 CFR § 63.1935(a)(3) because they have accepted waste since November 8, 1987, have additional capacity for waste deposition, have a design capacity greater than 2.5 million megagrams and 2.5 million cubic meters, and have estimated uncontrolled emissions greater than 50 megagrams per year of NMOC (as calculated according to 40 CFR § 63.1959). Uncontrolled

emissions of NMOC as calculated according to the NESHAP are 112 megagrams per year. The compliance date for this subpart was September 27, 2021.

As stated above, federal landfill regulations do not apply to the thermal oxidizer because it burns waste gases from the RNG process, not landfill gas.

2.5 Compliance assurance monitoring (CAM)

CAM does not apply because the uncontrolled emissions of all pollutants are below the major source thresholds.

2.6 Regulatory Overview

Table 11. Regulatory overview of facility

Subject item*	Applicable regulations	Rationale
COMG 7 - Landfill and Treatment Systems	40 CFR pt. 60, subp. XXX and Minn. R. 7011.3515	NSPS for Municipal Solid Waste Landfills That Commenced Construction, Reconstruction, or Modification After July 17, 2014. Applicability criteria include: • Municipal solid waste landfill; • Commenced construction, reconstruction, or modification after July 17, 2014; • Design capacity greater than 2.5 million megagrams and 2.5 million cubic meters; • Calculated NMOC emission rate equal to or greater than 34 megagrams per year; • Will control emissions with a non-enclosed flare; and • Will comply with the provisions of 40 CFR §§ 63.1958, 63.1960, and 63.1961 instead of 40 CFR §§ 60.763, 60.765, and 60.766.
COMG 7 - Landfill and Treatment Systems	40 CFR pt. 63, subp. AAAA and Minn. R. 7011.7390	NESHAP for Municipal Solid Waste Landfills. Applicability criteria include: • Municipal solid waste landfill that has accepted waste since November 8, 1987 and has additional capacity; • Area source for HAPs; • Design capacity greater than 2.5 million megagrams and 2.5 million cubic meters; • Uncontrolled NMOC emissions equal to or greater than 50 megagrams per year as calculated according to 40 CFR § 63.1959; and • Will control emissions with a non-enclosed flare.
TREA 6 – Open Flare	Minn. R. 7007.0800, subp. 2(A)	Emissions of captured landfill gas from EQUI 29 and off-spec gas from EQUI 31 shall vent to TREA 6 at all times.
TREA 6 – Open Flare	Minn. R. 7007.0800, subp. 2 (A) & (B)	Emission limits and standards. The Permittee must operate and maintain the flare, achieve certain control efficiencies for landfill gas and off-spec gas, and combust landfill gas and off-spec gas only in the flare, to ensure compliance with other applicable requirements and protect human health and the environment.

Subject item*	Applicable regulations	Rationale
TREA 6 – Open Flare	40 CFR pt. 60 , subp. XXX, Minn. R. 7011.3515, 40 CFR pt. 63, subp. AAAA, and Minn. R. 7011.7390	NSPS for Municipal Solid Waste Landfills That Commenced Construction, Reconstruction, or Modification After July 17, 2014. NESHA for Municipal Solid Waste Landfills. The Permittee has selected a non-enclosed flare as the control system for the collected landfill gas and must follow the design, operation, testing, and maintenance requirements of the standards.
TREA 7 – Low-BTU Gas Flare	Minn. R. 7007.0800, subp 2(A)	Emissions of waste gas from EQUI 31 shall vent to TREA 7 at all times.
TREA 7 – Low-BTU Gas Flare	Minn. R. 7007.0800, subp. 4 and 5	Emission limits and standards. The Permittee must operate and maintain the thermal oxidizer, achieve certain control efficiencies for waste gas, and combust waste gas only in the thermal oxidizer, to ensure compliance with other applicable requirements and protect human health and the environment.
FUGI 3 – Paved Roads	Minn. R. Minn. R. 7007.0800, subps. 2(A) and 5(A), Minn. R. 7011.0150	Permittee must minimize or eliminate fugitive emissions from all paved surfaces by taking required actions.
FUGI 4 – Unpaved Roads	Minn. R. Minn. R. 7007.0800, subps. 2(A) and 5(A), Minn. R. 7011.0150	Permittee must minimize or eliminate fugitive emissions from all unpaved surfaces by taking required actions.

*Location of the requirement in the permit (e.g., EQUI 1, STRU 2, etc.).

3. Technical information

3.1 Calculations of potential to emit (PTE) and Emissions increase analysis

The MPCA's technical guidance on landfills assumes 75% collection of fugitive landfill gas unless a facility can demonstrate a higher number. Pine Bend Energy was able to demonstrate a higher collection efficiency through the submittal of lab analysis of landfill gases, therefore a capture efficiency of 85% was used in the calculations. There is also an incentive for PBE to operate its landfill gas collection system at a high capture efficiency because the landfill gas is turned into saleable product at the RNG plant.

Operations at the plant include combustion of off-spec gas in the TREA 6. Off-spec gas is gas that is in the process of being converted from landfill gas to pipeline quality natural gas. MPCA has determined that it is appropriate to make the assumption that off-spec gas is similar in characteristics to natural gas. Off-spec gas is only sent to TREA 6 when the pipeline is unable to accept gas that is already in the RNG plant. This release of off-spec gas can be timed so that the gas is much closer in composition to natural gas than to landfill gas. Therefore, it is appropriate to use emission factors for natural gas to estimate emissions from off-spec gas.

Emissions from this facility are limited by the production of landfill gas, which is a function of the landfill itself. The thermal oxidizer and open flare do not necessarily operate at their capacity but operate according to the amount of landfill gas that is being produced and sent to each unit. The calculations have been performed on the worst case scenario (operation of the open flare or of the thermal oxidizer) for each pollutant at the maximum rate of landfill gas production anticipated.

Attachment 1 to this TSD contains a summary of the PTE of the Facility as well as detailed spreadsheets and supporting information prepared by the MPCA and the Permittee.

Attachment 2 to this TSD contains the Title I net emissions increase calculations for three minor modifications being rolled into this reissuance. These calculations demonstrate that the modifications are not major modifications for PSD. Attachment 3 contains the non-Title I calculations for these modifications that demonstrate that the modifications qualify for a minor amendment under Minn. R. 7007.1450. One of these applications for a minor modification was for the installation of tipper which is powered by an 82 horsepower

diesel engine. This unit is used to assist in unloading waste that arrives at the landfill in large semi-trucks. The application did not list this unit as a nonroad engine, but according to 40 CFR Part 1068 it meets the definition of a nonroad engine and does not need to be included in the permit.

Landfill Emissions:

Landfill gas generation rates are calculated using the U.S. EPA Landfill Gas Estimation Model (LandGEM). In conjunction with emission factors from AP-42, all landfill emissions are calculated based on a maximum throughput. The maximum landfill gas generation rate was estimated to be 4,111 scfm in year 2041 based off the facilities ultimate design capacity of 29.8 million cubic yards. PBE has demonstrated that their system likely captures 85% of landfill gas. These emissions appear at the RNG plant (EQUI 31). This means the other 15% of emissions are released into the air as fugitive emissions. Per an MPCA applicability determination from 2013 for another Minnesota landfill, 15% of the uncaptured emissions are considered fugitive emissions and are represented at FUGI 2 (Landfill Fugitive Emissions).

This permit action rolls in a minor modification for a vertical expansion at the landfill. In this action, the MPCA only looked at increased VOC emissions from the landfill, not at potential increased emissions at the thermal oxidizer or open flare. This is because any emissions increase at these units would be minimal, partly due to the relatively small size of the increased emissions from the landfill expansion and partly because there is a monetary incentive for the facility to maximize the amount of landfill gas that is conditioned into natural gas and sold to the pipeline. It is also true that landfill emissions decrease over time, and as emissions from the landfill expansion will increase, emissions from older parts of the landfill will decrease over time.

Flare Emissions:

The flare operates when the RNG plant is unable to accept LFG, either because of an upset or because the plant does not have adequate capacity. Both untreated LFG and off-spec gas can be burned in the flare. Off-spec gas is gas that does not meet specifications for pipeline quality natural gas. The calculations for the combustion of off-spec gas assume that it is similar in composition to natural gas. This is an acceptable assumption because the RNG plant is a closed system and gas is only released from the system in a controlled manner. The origin of the emission factors used is noted in the attached calculations. The flare is assumed to provide 98% control efficiency for VOCs and HAPs.

Thermal Oxidizer Emissions:

The thermal oxidizer is used to burn waste gas from the RNG plant. Waste gas consists of the impurities removed from the LFG as it is conditioned into natural gas. A small amount of natural gas is also burned as a supplemental fuel. Emission factors for NO_x and CO from the combustion of waste gas are supported by stack testing at the facility. Emission factors for products of combustion from natural gas were taken from AP-42, Chapter 1.4.

SO₂ Emissions:

The facility used an SO₂ concentration of 500 parts per million on a volume basis (ppmv) in LFG in most of their calculations. Site-specific analysis shows an actual concentration of 41.3 ppmv but the higher value was chosen to be conservative and to allow for flexibility in case the composition of the waste stream changes over time (this is something the landfill cannot control). An SO₂ concentration of 20 ppmv was used for waste gas calculations because most of the sulfur is recovered during the RNG process.

3.2 Performance testing history

Table 12. Performance Test for Thermal Oxidizer (TREA 7)

Test Date	Pollutant	Test Result	Units
2/16/2023	NO _x	0.04	Lb/MMBtu

2/16/2023	CO	0.11	Lb/MMBtu
2/16/2023	VOC	0.0006	Lb/MMBtu
2/16/2023	Temperature	1639	° F

3.3 Monitoring

In accordance with the Clean Air Act, it is the responsibility of the owner or operator of a facility to have sufficient knowledge of the facility to certify that the facility is in compliance with all applicable requirements.

In evaluating the monitoring included in the permit, the MPCA considered the following:

- the likelihood of the facility violating the applicable requirements;
- whether add-on controls are necessary to meet the emission limits;
- the variability of emissions over time;
- the type of monitoring, process, maintenance, or control equipment data already available for the emission unit;
- the technical and economic feasibility of possible periodic monitoring methods; and
- the kind of monitoring found on similar units elsewhere.

The Table below summarizes the monitoring requirements.

Table 13. Monitoring

Subject Item*	Requirement (basis)	What is the monitoring?	Why is this monitoring adequate?
COMG 7 - Landfill and Treatment Systems	Maintain negative pressure at each wellhead except under certain conditions (40 CFR pt. 63, subp. AAAA)	Monitor pressure monthly	Monitoring required by 40 CFR pt. 63, subp. AAAA is adequate to demonstrate compliance with the requirements of the standard because this standard was promulgated after November 15, 1990, and post-November 15, 1990, NSPS and NESHAPs contain adequate monitoring requirements.
	Temperature < 62.8 degrees for each interior wellhead in the collection system (40 CFR pt. 63, subp. AAAA)	Monitor temperature monthly	Monitoring required by 40 CFR pt. 63, subp. AAAA is adequate to demonstrate compliance with the requirements of the standard because this standard was promulgated after November 15, 1990, and post-November 15, 1990, NSPS and NESHAPs contain adequate monitoring requirements.
	Methane < 500 ppm above background at the surface of the landfill (40 CFR pt. 63, subp. AAAA)	Monitor surface concentrations of methane quarterly	Monitoring required by 40 CFR pt. 63, subp. AAAA is adequate to demonstrate compliance with the requirements of the standard because this standard was promulgated after November 15, 1990, and post-November 15, 1990, NSPS and NESHAPs contain adequate monitoring requirements.

TREA 6 – Open Flare	Control efficiency for Methane Gas ≥ 98 percent; CO ≥ 98 percent; NMOC ≥ 98 percent; VOC ≥ 98 percent; HAPs - Volatile ≥ 98 percent; combust landfill gas only (Minn. R. 7007.0800, subp. 2(A) & (B)) Operate with no visible emissions, except for periods not to exceed a total of 5 minutes during any 2 consecutive hours; operate with a flame present at all times (40 CFR pt. 63, subp. AAAA)	Initial performance test to measure opacity and net heating value of the landfill gas, follow O&M plan, monitoring for continuous presence of a flame, monitoring of landfill gas flow rate to the flare	Monitoring based on the requirements of 40 CFR pt. 60, subp. XXX and 40 CFR pt. 63, subp. AAAA and the Minnesota Performance Standard for Control Equipment provides a reasonable assurance of compliance.
TREA 7 - Thermal Oxidizer	Control efficiency for VOC ≥ 98 percent (Minn. R. 7007.0800, subps. 4-5)	Temperature limit, continuous temperature monitoring and recordkeeping, O & M, inspections, calibration, performance testing	Monitoring based on the Minnesota Performance Standards for Control Equipment is adequate to have a reasonable assurance of compliance.

*Location of the requirement in the permit (e.g., EQUI 1, STRU 2, etc.).

3.4 Insignificant activities

Pine Bend Energy LLC has several operations which are classified as insignificant activities under the MPCA's permitting rules. These are listed in Appendix A to the permit.

Table 14. Insignificant activities

Insignificant activity	General applicable emission limit	Discussion
Fuel Use: space heaters fueled by kerosene, natural gas, or propane, less than 420,000 Btu/hr	PM ≤ 0.6 or 0.4 lb/MMBtu, depending on year constructed Opacity $\leq 20\%$ with exceptions (Minn. R. 7011.0515)	The facility has three (3) 75,000 Btu/hr natural gas-fired space heaters in maintenance shop. For these units, based on the fuels used and EPA published emissions factors, it is highly unlikely that it could violate the applicable requirement.
Indirect heating equipment with a heat input capacity less than 420,000 Btu/hour, etc.	PM ≤ 0.6 or 0.4, depending on year constructed Opacity $\leq 20\%$ with exceptions (Minn. R. 7011.0515)	The facility has one (1) 120,000 Btu/hr natural gas-fired furnace in maintenance shop, one (1) 200,000 Btu/hr natural gas-fired rooftop heater, and one (1) 150,000 Btu/hr natural gas-fired rooftop heater. For these units, based on the fuels used and EPA published emissions factors, it is highly unlikely that they could violate the applicable requirements.

Insignificant activity	General applicable emission limit	Discussion
Brazing, soldering, torch-cutting, or welding equipment	PM, variable depending on airflow Opacity <= 20% (Minn. R. 7011.0715)	Torch-cutting and welding equipment in maintenance shop. For these units, based on EPA published emissions factors, it is highly unlikely that they could violate the applicable requirement. In addition, these units are typically operated and vented inside a building, so testing for PM or opacity is not feasible.
Individual unit with emissions < 2000 lb/yr	PM <= 0.6 or 0.4 lb/MMBtu, depending on year constructed Opacity <= 20% with exceptions (Minn. R. 7011.0515)	Aggregate handling and storage piles. For these units, based on EPA published emissions factors, it is highly unlikely that they could violate the applicable requirement, based on calculations at similar facilities.

3.5 Permit organization

This permit meets the MPCA Tempo Guidance for ordering and grouping of requirements as well as the use of permit appendices.

3.6 Comments received

This Section will be completed after the referenced review periods.

Public Notice Period: [start date] – [end date]

EPA Review Period: [start date] – [end date]

4. Permit fee assessment

This permit action is the reissuance of an individual Part 70; therefore, no application fees apply under Minn. R. 7002.0016, subp. 1 to the changes that are covered by the reissuance application. However, the permit action rolls in four additional permit applications to which fees do apply. Attachment 3 to this TSD contains the MPCA's assessment of Application and Additional Points used to determine the permit application fee as required by Minn. R. 7002.0019. The action includes the incorporation of a new NSPS, which is a chargeable activity, along with one administrative amendment and three minor amendments. This results in ten additional points being charged.

5. Conclusion

Based on the information provided by Pine Bend Energy LLC the MPCA has reasonable assurance that the proposed operation of the emission facility, as described in the Air Emission Permit No. 03700138-101 and this TSD, will not cause or contribute to a violation of applicable federal regulations and Minnesota Rules.

Staff members on permit team: Joy Wiecks (permit engineer)
Dan Dietrich (enforcement)
Adriane Lorsung (peer reviewer)
Curtis Stock (performance testing)
Joe Handtmann (data coordinator)
Beckie Olson (permit writing assistant)
Laurie O'Brien (administrative support)

Tempo Activities: Administrative Amendment (IND20200002), Minor Amendment (IND20090002), Minor Amendment (IND20210001), Minor Amendment (IND20210002), Part 70 Reissuance (IND20090001)

- Attachments:
1. PTE summary and emissions increase calculation spreadsheets
 2. Subject item inventory and facility requirements
 3. Points Calculator
 4. Vendor documentation of emission factors

PM Fugitives from Tipper

Because the tipper is defined as a non-road engine, combustion emissions did not need to be calculated because they are not considered to be part of the stationary source (MPCA guidance)

$E = [(k * 0.0032) * ((U/5)^{1.3})]/((M/2)^{1.4})$ from AP-42 Chapter 13.2.4

Cover material handling assumed to be similar to emissions from heavy construction (AP-42, Chapter 13.2.3)

Chapter 13.2.3 recommends using emission factors from AP-42, Chapter 13.2.4, Aggregate Handling and Storage Piles

<u>Factor</u>	<u>Description</u>	<u>PM2.5 value (lb/ton)</u>	<u>PM10 value (lb/ton)</u>	<u>PM value (lb/ton)</u>
E =	Emission factor (lb/ton), AP-42, Section 13.2.4, Eqn 1	2.87E-05	1.90E-04	4.01E-04
k =	Particle size multiplier, AP-42, Chapter 13.2.4	5.30E-02	3.50E-01	7.40E-01
U (mph) =	Mean wind speed, site specific based on 2014 Emissions Inventory	8	8	8
M =	Surface material moisture content (%) from AP-42 Table 13.2.4-1, factors for municipal solid waste landfill, clay/dirt mix	11	11	11

Assume 2050 tons/day handled

Assume 10 hours/day operation for 260 days/year = 2600 hr/yr

<u>Pollutant</u>	<u>Material handled (tons/day)</u>	<u>Material handled (tons/hr)</u>	<u>Emission factor (lb/ton)</u>	<u>PTE (lb/hr)</u>	<u>PTE (tpy)</u>	<u>Threshold for Minor Amendment (lb/hr)</u>	<u>Minor?</u>
PM2.5	4298	430	2.87E-05	0.012	0.016		
PM10	4298	430	1.90E-04	0.082	0.106	3.42	Yes
PM	4298	430	4.01E-04	0.172	0.224		

RNG PRE-MODIFICATION PTE
PRIMARY OPERATING CONDITION (SCENARIO 1)

Emission Unit	Design Capacity	Units
EU-002 Turbine at Capacity	1,931	scfm
EU-003 Turbine at Capacity	1,931	scfm
Duct Burner	1,212	scfm
Enclosed Flare Burning Remainder of Gas	2,676	scfm
Total LFG Burned	7,750	scfm

Emission Source	Regulated Pollutants	Maximum Gas Consumption		Hours of Operation	Emission Factors		Uncontrolled	Controlled	Uncontrolled	Limited
		cfm	MMCF/yr				PTE	PTE	PTE	PTE
Enclosed Flare	VOCS ⁽¹⁾	2,676	1,407	8,760	8.44	lb/hr	8.44	0.17	37.0	0.74
	NMOC ⁽²⁾	2,676	1,407	8,760	21.6	lb/hr	21.6	0.43	94.8	1.90
	NO _x ⁽³⁾	2,676	1,407	8,760	0.06	lb/MMBTU	4.88	4.88	21.4	21.4
	SO ₂ ⁽⁴⁾	2,676	1,407	8,760	13.5	lb/hr	13.5	13.5	59.3	59.3
	CO ⁽⁵⁾	2,676	1,407	8,760	0.20	lb/MMBTU	16.3	16.3	71.2	71.2
	PM ₁₀ ⁽⁶⁾	2,676	1,407	8,760	1.7E-05	lb/scfm CH ₄	1.36	1.36	5.98	5.98
	PM _{2.5} ⁽⁶⁾	2,676	1,407	8,760	1.7E-05	lb/scfm CH ₄	1.36	1.36	5.98	5.98
	CO ₂ ⁽⁷⁾ Pass Through	2,676	1,407	8,760	52.07	kg/MMBtu	9303	9303	40746	40746
	CO ₂ ⁽⁷⁾ Combustion	2,676	1,407	8,760	52.07	kg/MMBtu	9316	9316	40804	40804
	CH ₄ ⁽⁷⁾	2,676	1,407	8,760	0.0032	kg/MMBtu	0.57	0.57	2.51	2.51
	N ₂ O ⁽⁷⁾	2,676	1,407	8,760	0.0006	kg/MMBtu	0.11	0.11	0.47	0.47
	CO _{2e} ⁽⁷⁾	2,676	1,407	8,760		kg/MMBtu	18665	18665	81753	81753

Emission Factor Source

(1) According to AP-42, Table 2.4-2, Note C, VOC content at MSW sites with unknown concentrations equals 39% by weight of total NMOC concentration. (lb/hr = (scfm*ppmv*MW*0.000001)/(0.7302*520)*60 where the molecular weight (MW) of VOC is 86 lb/lb-mol and VOC concentration is 232 ppmv, which is 39% of the assumed NMOC concentration of 595 ppmv (from AP-42). Assume 98% VOC control.

(2) NMOC concentration as indicated by AP-42. Lb/hr = (86 lb/lb-mol*595 ppmv*scfm*0.000001)/(0.7302*520)*60, assume 98% control.

(3) John Zink Co. Letter dated December 21, 1993, where NO_x = 0.06 lb/MMBtu*506.5 Btu/CF*2676 CF/min*60/1,000,000 = 4.88 lb/hr

(4) SO₂ based on AP-42 default standards with safety factor increase. Lb/hr = (MW*scfm*500 ppmv*64.1 lb/lb-mol *0.0000001)/(0.7302*520*60) where MW is 64 lb/lb-mol and an SO₂ concentration of 500 ppmv was assumed as a conservative value.

(5) John Zink Co. Letter dated December 21, 1993, where CO = 0.20 lb/MMBtu*506.5 Btu/CF*2676 CF/min*60/1,000,000 = 16.3 lb/hr

(6) Emission factor for Particulate Matter (in lb/hr/dscfm CH₄) is from AP-42, Table 2.4-5. PM and PM_{2.5} assumed to be the same as PM₁₀. 1.7E-05 lb/hr/dscfm CH₄*2676 scfm*0.5*60 = 1.36 lb/hr, where the gas flow is assumed to be 50% CH₄.

(7) Emissions based on 40 CFR 98, equipment assumed to operate at maximum capacity 24 hours/day 365 days/year for PTE purposes. 40 CFR 98, Subpart C, Tables C-1, C-2, Rev. September 10, 2010; factors are for landfill gas or biogas if landfill gas was unavailable. 2 GWP of CH₄ increased from 21 to 25, effective Jan. 1, 2014. GWP of N₂O decreased from 310 to 298, effective Jan. 1, 2014.

CO₂ pass through = (scfm*ppmv*MW*0.000001)/(0.7302*520)*60 where ppmv is 500,000 and MW is 44 lb/lb-mol and CO₂ combustion = 52.0 kg/MMBtu*2.2 lb/kg*506.5 Btu/CF*2676 CF/min*0.000001*60

Emission Source	Regulated Pollutants	Maximum Gas Consumption		Hours of Operation (hrs/yr)	Emission Factors		Uncontrolled PTE	Controlled PTE	Uncontrolled PTE	Limited PTE
		cfm	MMCF/yr				(lbs/hr)	(lbs/hr)	(TPY)	(TPY)
EU 002 - Gas Turbine ⁽⁸⁾	VOCs ⁽¹⁾	1,932	1,015	8,760	0.13	lb/hr	0.13	0.13	0.57	0.57
	NMOC ⁽²⁾	1,932	1,015	8,760	0.34	lb/hr	0.34	0.34	1.49	1.49
	NO _x ⁽³⁾	1,932	1,015	8,760	0.136	lb/MMBTU	7.98	7.98	35.0	35.0
	SO ₂ ⁽⁴⁾	1,932	1,015	8,760	9.77	lb/hr	9.77	9.77	42.8	42.8
	CO ⁽⁵⁾	1,932	1,015	8,760	12.5	lb/hr	12.5	12.5	54.8	54.8
	PM ₁₀ ⁽⁶⁾	1,932	1,015	8,760	0.023	lb/MMBTU	1.35	1.35	5.91	5.91
	PM _{2.5} ⁽⁶⁾	1,932	1,015	8,760	0.023	lb/MMBTU	1.35	1.35	5.91	5.91
	CO ₂ ⁽⁷⁾ Pass Through	1,932	1,015	8,760	52.07	kg/MMBtu	6715	6715	29411	29411
	CO ₂ ⁽⁷⁾ Combustion	1,932	1,015	8,760	52.07	kg/MMBtu	6724	6724	29453	29453
	CH ₄ ⁽⁷⁾	1,932	1,015	8,760	0.0032	kg/MMBtu	0.41	0.41	1.81	1.81
	N ₂ O ⁽⁷⁾	1,932	1,015	8,760	0.00063	kg/MMBtu	0.081	0.081	0.36	0.36
	CO _{2e} ⁽⁷⁾	1,932	1,015	8,760			13474	13474	59015	59015

COMMENTS:

(1) VOC emission rate based on stack test performed in 2004. Used the AP-42 guidance that 39% of NMOC is VOC. No safety factor applied.

(2) Source Test performed in 2004

(3) John Zink Co. Letter dated December 21, 1993, where NO_x = 0.136 lb/MMBTU*506.5 Btu/CF*1932 CF/min*60/1,000,000 = 7.98 lb/hr

(4) SO₂ based on AP42 default standards with safety factor increase. Lb/hr = (MW*scfm*500 ppmv*64.1 lb/lb-mol *0.0000001)/(0.7302*520*60) where MW is 64 lb/lb-mol and an SO₂ concentration of 500 ppmv was assumed as a conservative value.

(5) CO emission rate based on maximum stack test result March 2004 as indicated in 2014 Air emission inventory for Pine Bend Energy, LLC.

(6) PM₁₀ emission factor is from AP-42 chapter 3.1 Table 3.1-2b Emissions Factors from Criteria Pollutants and Greenhouse Gases from Stationary Gas Turbines. PM and PM_{2.5} assumed to be the same as PM₁₀ and PM = 0.023 lb/MMBTU*506.5 Btu/CF*1932 CF/min*60*0.000001 = 1.35 lb/hr.

(7) Emissions based on 40 CFR 98, equipment assumed to operate at maximum capacity 24 hours/day 365 days/year for PTE purposes. 40 CFR 98, Subpart C, Tables C-1, C-2, Rev. September 10, 2010; factors are for landfill gas or biogas if landfill gas was unavailable. 2 GWP of CH₄ increased from 21 to 25, effective Jan. 1, 2014. GWP of N₂O decreased from 310 to 298, effective Jan. 1, 2014.

CO₂ pass through = (scfm*ppmv*MW*0.000001)/(0.7302*520)*60 where ppmv is 500,000 and MW is 44 lb/lb-mol and CO₂ combustion = 52.0 kg/MMBTU*2.2 lb/kg*506.5 Btu/CF*1932 CF/min*0.000001*60

(8) Turbines have a Heat input of 58.7 MMBTU/hr capacity. Converted to scfm assuming 50% CH₄, scfm = (58.7 MMBtu/hr*1000000 Btu/MMBtu/506.5 Btu/cft*60min/hr)

Emission Source	Regulated Pollutants	Maximum Gas Consumption		Hours of Operation (hrs/yr)	Emission Factors		Uncontrolled PTE	Controlled PTE	Uncontrolled PTE	Limited PTE
		cfm	MMCF/yr				(lbs/hr)	(lbs/hr)	(TPY)	(TPY)
EU 003 - Gas Turbine	VOCs ⁽¹⁾	1,932	1,015	8,760	0.13	lb/hr	0.13	0.13	0.57	0.57
	NMOC ⁽²⁾	1,932	1,015	8,760	0.34	lb/hr	0.34	0.34	1.49	1.49
	NO _x ⁽³⁾	1,932	1,015	8,760	0.136	lb/MMBTU	7.98	7.98	35.0	35.0
	SO ₂ ⁽⁴⁾	1,932	1,015	8,760	9.77	lb/hr	9.77	9.77	42.8	42.8
	CO ⁽⁵⁾	1,932	1,015	8,760	12.5	lb/hr	12.5	12.5	54.8	54.8
	PM ₁₀ ⁽⁶⁾	1,932	1,015	8,760	0.023	lb/hr	1.35	1.35	5.91	5.91
	PM _{2.5} ⁽⁶⁾	1,932	1,015	8,760	0.023	lb/hr	1.35	1.35	5.91	5.91
	CO ₂ ⁽⁷⁾ Pass Through	1,932	1,015	8,760	52.07	kg/MMBtu	6715	6715	29411	29411
	CO ₂ ⁽⁷⁾ Combustion	1,932	1,015	8,760	52.07	kg/MMBtu	6724	6724	29453	29453
	CH ₄ ⁽⁷⁾	1,932	1,015	8,760	0.0032	kg/MMBtu	0.41	0.41	1.81	1.81
	N ₂ O ⁽⁷⁾	1,932	1,015	8,760	0.00063	kg/MMBtu	0.081	0.081	0.36	0.36
	CO _{2e} ⁽⁷⁾	1,932	1,015	8,760			13474	13473.7	59015	59015

COMMENTS:

(1) VOC emission rate based on stack test performed in 2004. Used the AP-42 guidance that 39% of NMOC is VOC. No safety factor applied.

(2) Source Test performed in 2004

(3) John Zink Co. Letter dated December 21, 1993, where NO_x = 0.136 lb/MMBTU*506.5 Btu/CF*1932 CF/min*60/1,000,000 = 7.98 lb/hr

(4) SO₂ based on AP-42 default standards with safety factor increase. Lb/hr = (MW*scfm*500 ppmv*64.1 lb/lb-mol *0.0000001)/(0.7302*520*60) where MW is 64 lb/lb-mol and an SO₂ concentration of 500 ppmv was assumed as a conservative value.

(5) CO emission rate based on maximum stack test result March 2004 for EU002 for PTE purposes

(6) PM₁₀ emission factor is from AP-42 chapter 3.1 Table 3.1-2b Emissions Factors from Criteria Pollutants and Greenhouse Gases from Stationary Gas Turbines. PM and PM_{2.5} assumed to be the same as PM₁₀ and PM = 0.023 lb/MMBtu*506.5 Btu/CF*1932 CF/min*60*0.000001 = 1.35 lb/hr.

(7) Emissions based on 40 CFR 98, equipment assumed to operate at maximum capacity 24 hours/day 365 days/year for PTE purposes. 40 CFR 98, Subpart C, Tables C-1, C-2, Rev. September 10, 2010; factors are for landfill gas or biogas if landfill gas was unavailable. 2 GWP of CH₄ increased from 21 to 25, effective Jan. 1, 2014. GWP of N₂O decreased from 310 to 298, effective Jan. 1, 2014.

CO₂ pass through = (scfm*ppmv*MW*0.000001)/(0.7302*520)*60 where ppmv is 500,000 and MW is 44 lb/lb-mol and CO₂ combustion = 52.0 kg/MMBtu*2.2 lb/kg*506.5 Btu/CF*1212 CF/min*0.000001*60

(8) Turbines have a Heat input of 58.7 MMBTU/hr capacity. Converted to scfm assuming 50% CH₄, scfm = (58.7 MMBTU/hr*1000000 BTU/MMBTU/506.5 BTU/cft*60min/hr)

Emission Source	Regulated Pollutants	Maximum Gas Consumption		Hours of Operation (hrs/yr)	Emission Factors		Uncontrolled PTE	Controlled PTE	Uncontrolled PTE	Limited PTE
		cfm	MMCF/yr				(lbs/hr)	(lbs/hr)	(TPY)	(TPY)
Duct Burners	VOCs ⁽¹⁾	1,212	637	8,760	0.076	lb/hr	0.076	0.0015	0.335	0.0067
	NMOC ⁽²⁾	1,212	637	8,760	0.196	lb/hr	0.20	0.0039	0.858	0.0172
	NO _x ⁽³⁾	1,212	637	8,760	0.12	lb/MMBTU	4.42	4.42	19.4	19.4
	SO ₂ ⁽⁴⁾	1,212	637	8,760	6.13	lb/hr	6.13	6.13	26.8	26.8
	CO ⁽⁵⁾	1,212	637	8,760	0.24	lb/MMBTU	8.84	8.84	38.7	38.7
	PM ₁₀ ⁽⁶⁾	1,212	637	8,760	1.7E-05	lb/scfm CH ₄	1.24	1.24	5.41	5.41
	PM _{2.5} ⁽⁶⁾	1,212	637	8,760	1.7E-05	lb/scfm CH ₄	1.24	1.24	5.41	5.41
	CO ₂ ⁽⁷⁾ Pass Through	1,212	637	8,760	52.07	kg/MMBtu	4213	4213	18455	18455
	CO ₂ ⁽⁷⁾ Combustion	1,212	637	8,760	52.07	kg/MMBtu	4219	4219	18481	18481
	CH ₄ ⁽⁷⁾	1,212	637	8,760	0.0032	kg/MMBtu	0.26	0.26	1.14	1.14
	N ₂ O ⁽⁷⁾	1,212	637	8,760	0.00063	kg/MMBtu	0.051	0.051	0.22	0.22
	CO _{2e} ⁽⁷⁾	1,212	637	8,760			8454	8454	37030	37030

COMMENTS:

(1) VOC (lb/hr) = [(gas flow in cf²VOC (lb/hr) = [(gas flow in cf²VOC (lb/hr) = [(gas f²VOC (lb/hr) = [(gas flow in cfm * conc (ppmv) * 0.000001 * MW)/(std temp in R * gas constant)] * 60 min/hr * (1-control efficiency)

where VOC fraction in LFG is assumed to be 39% of NMOC concentration (or 232 ppmv), MW = 86.16 lb/lb-mol, std temp = 520 R, gas constant = 0.73 atm-ft³/lb-mol R, control efficiency = 98% (minimum CE required by NSPS)

(2) NMOC (lb/hr) = [(gas flow in cfm * conc (ppmv) * 0.000001 * MW)/(std temp in R * gas constant)] * 60 min/hr * (1-control efficiency) where NMOC conc = 595 ppmv and MW = 86 lb/lb-mol

(3) Guaranteed Emission Factor provided by Applied Thermal Systems, Inc.

(4) Sulfur concentration of 500 ppmv based on AP-42 5th Ed., Section 2.4.4.2, November 1998 with an increased safety factor. Lb/hr = (1212*500*0.000001*64.066)/(0.7302*520)*60 = 6.13 lb/hr

(5) Guaranteed Emission Factor provided by Applied Thermal Systems, Inc.

(6) Emission factor for Particulate Matter (in lb/hr/dscfm CH₄) is from AP-42, Table 2.4-5. PM and PM_{2.5} assumed to be the same as PM₁₀. 1.7E-05 lb/hr/dscfm CH₄*1212 scfm*0.5*60 = 1.24 lb/hr, where the gas flow is assumed to be 50% CH₄.

(7) Emissions based on 40 CFR 98, equipment assumed to operate at maximum capacity 24 hours/day 365 days/year for PTE purposes. 40 CFR 98, Subpart C, Tables C-1, C-2, Rev. September 10, 2010; factors are for landfill gas or biogas if landfill gas was unavailable. 2 GWP of CH₄ increased from 21 to 25, effective Jan. 1, 2014. GWP of N₂O decreased from 310 to 298, effective Jan. 1, 2014.

CO₂ pass through = (scfm*ppmv*MW*0.000001)/(0.7302*520)*60 where ppmv is 500,000 and MW is 44 lb/lb-mol and CO₂ combustion = 52.0 kg/MMBtu*2.2 lb/kg*506.5 Btu/CF*1212 CF/min*0.000001*60

Scenario 1 Totals

Regulated Pollutants	Uncontrolled PTE	Controlled PTE	Uncontrolled PTE	Limited PTE
	(lbs/hr)	(lbs/hr)	(TPY)	(TPY)
VOCs	8.77	0.43	38.4	1.88
NMOC	22.5	1.12	98.6	4.89
NOx	25.3	25.3	110.7	110.7
SO ₂	39.2	39.2	171.7	171.7
CO	50.1	50.1	219.5	219.5
PM ₁₀	5.30	5.30	23.2	23.2
PM _{2.5}	5.30	5.30	23.2	23.2
CO ₂	53930	53930	236213	236213
CH ₄	1.66	1.66	7.26	7.26
N ₂ O	0.32	0.32	1.41	1.41
CO _{2e}	54067	54067	236813	236813

Pre-Modification PTE

Scenario 1 HAPs from Enclosed Flare

Source	Rate (scfm)
Enclosed Flare	2,675.5

HAPS Pollutant	CAS Number	Molecular Weight (lb/lb mol)	Default Concentration (ppmv)	Control Efficiency (%)	PTE Uncontrolled (lb/hr)	PTE Controlled (lb/hr)	PTE Uncontrolled (TPY)	PTE Controlled (TPY)
1,1,1-Trichloroethane (methyl chloroform)	71-55-6	133.41	0.4800	98	2.71E-02	5.41E-04	1.19E-01	2.37E-03
1,1,2,2-Tetrachloroethane	79-34-5	167.85	1.1100	98	7.88E-02	1.58E-03	3.45E-01	6.90E-03
1,1-Dichloroethane (ethylidene dichloride)	75-34-3	98.97	2.3500	98	9.83E-02	1.97E-03	4.31E-01	8.61E-03
1,1-Dichloroethene (vinylidene chloride)	75-35-4	96.94	0.2000	98	8.20E-03	1.64E-04	3.59E-02	7.18E-04
1,2-Dichloroethane (ethylene dichloride)	107-06-2	98.96	0.4100	98	1.72E-02	3.43E-04	7.51E-02	1.50E-03
1,2-Dichloropropane (propylene dichloride)	78-87-5	112.99	0.1800	98	8.60E-03	1.72E-04	3.77E-02	7.53E-04
Acrylonitrile	107-13-1	53.06	6.3300	98	1.42E-01	2.84E-03	6.22E-01	1.24E-02
Benzene (no co-disposal)	71-43-2	78.11	1.9100	98	6.31E-02	1.26E-03	2.76E-01	5.53E-03
Carbon disulfide	75-15-0	76.13	0.5800	98	1.87E-02	3.73E-04	8.18E-02	1.64E-03
Carbon tetrachloride	56-23-5	153.84	0.0040	98	2.60E-04	5.20E-06	1.14E-03	2.28E-05
Carbonyl sulfide	463-58-1	60.07	0.4900	98	1.24E-02	2.49E-04	5.45E-02	1.09E-03
Chlorobenzene	108-90-7	112.56	0.2500	98	1.19E-02	2.38E-04	5.21E-02	1.04E-03
Chloroethane (ethyl chloride)	75-00-3	64.52	1.2500	98	3.41E-02	6.82E-04	1.49E-01	2.99E-03
Chloroform	67-66-3	119.39	0.0300	98	1.51E-03	3.03E-05	6.63E-03	1.33E-04
Chloromethane (methyl chloride)	74-87-3	50.49	1.2100	98	2.58E-02	5.17E-04	1.13E-01	2.26E-03
1,4 Dichlorobenzene (p-dichlorobenzene)	106-46-7	147.00	0.2130	98	1.32E-02	2.65E-04	5.80E-02	1.16E-03
Dichloromethane (methylene chloride)	75-09-2	84.94	14.3000	98	5.14E-01	1.03E-02	2.25E+00	4.50E-02
Ethylbenzene	100-41-4	106.16	4.6100	98	2.07E-01	4.14E-03	9.06E-01	1.81E-02
Ethylene dibromide (1,2 dibromoethane)	106-93-4	187.88	0.0010	98	7.94E-05	1.59E-06	3.48E-04	6.96E-06
Hexane	110-54-3	86.18	6.5700	98	2.39E-01	4.79E-03	1.05E+00	2.10E-02
Mercury (total)	7439-97-6	200.61	0.0003	0	2.48E-05	2.48E-05	1.08E-04	1.08E-04
Methyl isobutyl ketone	108-10-1	100.16	1.8700	98	7.92E-02	1.58E-03	3.47E-01	6.94E-03
Perchloroethylene (tetrachloroethylene)	127-18-4	165.83	3.7300	98	2.62E-01	5.23E-03	1.15E+00	2.29E-02
Toluene (no co-disposal)	108-88-3	92.14	39.3000	98	1.53E+00	3.06E-02	6.71E+00	1.34E-01
Trichloroethylene (trichloroethene)	79-01-6	131.40	2.8200	98	1.57E-01	3.13E-03	6.86E-01	1.37E-02
Vinyl chloride	75-01-4	62.50	7.3400	98	1.94E-01	3.88E-03	8.49E-01	1.70E-02
Xylenes	1330-20-7	106.16	12.1000	98	5.43E-01	1.09E-02	2.38E+00	4.76E-02
Hydrogen Chloride	7647-01-0	36.50	42.0000	0	6.48E-01	6.48E-01	2.84E+00	2.84E+00
							TOTAL HAPS (TPY)	3.21E+00
							Max Single HAPS (TPY)	2.84E+00

Table notes:

Emission factors taken from AP-42 Chapter 2.42, Tables 2.4.1 and 2.4.2.

Example Calculation:

Inlet Mass Flowrate,

(2675.5 scfm * 60) * 1 ATM / (0.7302 ATM ft³/lbmol oR * 519.67 oR) = 213.46 lb mol fuel/hr

Emission Rate,

Inlet Mass Flowrate (lbmol fuel/hr) * (1-Control Efficiency)

Flare control efficiency 98.0% used per AP-42 Chapter 2.4, Table 2.4-3

PRE-MODIFICATION PTE

Scenario 1 HAPs from Duct Burner

Source	Rate (scfm)
Duct Burner	1,212

HAPS Pollutant	CAS Number	Molecular Weight (lb/lb mol)	Default Concentration (ppmv)	Control Efficiency (%)	PTE Uncontrolled (lb/hr)	PTE Controlled (lb/hr)	PTE Uncontrolled (TPY)	PTE Controlled (TPY)
1,1,1-Trichloroethane (methyl chloroform)	71-55-6	133.41	0.4800	98	1.23E-02	2.45E-04	5.37E-02	1.07E-03
1,1,2,2-Tetrachloroethane	79-34-5	167.85	1.1100	98	3.57E-02	7.14E-04	1.56E-01	3.13E-03
1,1-Dichloroethane (ethylidene dichloride)	75-34-3	98.97	2.3500	98	4.45E-02	8.91E-04	1.95E-01	3.90E-03
1,1-Dichloroethene (vinylidene chloride)	75-35-4	96.94	0.2000	98	3.71E-03	7.43E-05	1.63E-02	3.25E-04
1,2-Dichloroethane (ethylene dichloride)	107-06-2	98.96	0.4100	98	7.77E-03	1.55E-04	3.40E-02	6.81E-04
1,2-Dichloropropane (propylene dichloride)	78-87-5	112.99	0.1800	98	3.90E-03	7.79E-05	1.71E-02	3.41E-04
Acrylonitrile	107-13-1	53.06	6.3300	98	6.43E-02	1.29E-03	2.82E-01	5.63E-03
Benzene (no co-disposal)	71-43-2	78.11	1.9100	98	2.86E-02	5.71E-04	1.25E-01	2.50E-03
Carbon disulfide	75-15-0	76.13	0.5800	98	8.46E-03	1.69E-04	3.70E-02	7.41E-04
Carbon tetrachloride	56-23-5	153.84	0.0040	98	1.18E-04	2.36E-06	5.16E-04	1.03E-05
Carbonyl sulfide	463-58-1	60.07	0.4900	98	5.64E-03	1.13E-04	2.47E-02	4.94E-04
Chlorobenzene	108-90-7	112.56	0.2500	98	5.39E-03	1.08E-04	2.36E-02	4.72E-04
Chloroethane (ethyl chloride)	75-00-3	64.52	1.2500	98	1.54E-02	3.09E-04	6.77E-02	1.35E-03
Chloroform	67-66-3	119.39	0.0300	98	6.86E-04	1.37E-05	3.00E-03	6.01E-05
Chloromethane (methyl chloride)	74-87-3	50.49	1.2100	98	1.17E-02	2.34E-04	5.12E-02	1.02E-03
1,4 Dichlorobenzene (p-dichlorobenzene)	106-46-7	147.00	0.2130	98	6.00E-03	1.20E-04	2.63E-02	5.25E-04
Dichloromethane (methylene chloride)	75-09-2	84.94	14.3000	98	2.33E-01	4.65E-03	1.02E+00	2.04E-02
Ethylbenzene	100-41-4	106.16	4.6100	98	9.37E-02	1.87E-03	4.11E-01	8.21E-03
Hexane	110-54-3	86.18	6.5700	98	1.08E-01	2.17E-03	4.75E-01	9.50E-03
Mercury (total)	7439-97-6	200.61	0.0003	0	1.12E-05	1.12E-05	4.91E-05	4.91E-05
Methyl isobutyl ketone	108-10-1	100.16	1.8700	98	3.59E-02	7.17E-04	1.57E-01	3.14E-03
Perchloroethylene (tetrachloroethylene)	127-18-4	165.83	3.7300	98	1.18E-01	2.37E-03	5.19E-01	1.04E-02
Toluene (no co-disposal)	108-88-3	92.14	39.3000	98	6.94E-01	1.39E-02	3.04E+00	6.08E-02
Trichloroethylene (trichloroethene)	79-01-6	131.40	2.8200	98	7.10E-02	1.42E-03	3.11E-01	6.22E-03
Vinyl chloride	75-01-4	62.50	7.3400	98	8.79E-02	1.76E-03	3.85E-01	7.70E-03
Xylenes	1330-20-7	106.16	12.1000	98	2.46E-01	4.92E-03	1.08E+00	2.16E-02
Hydrogen Chloride	7647-01-0	36.50	42.0000	0	2.94E-01	2.94E-01	1.29E+00	1.29E+00
							TOTAL HAPS (TPY)	1.46E+00
							Max Single HAPS (TPY)	1.29E+00

Table notes:

Emission factors taken from AP-42 Chapter 2.42, Tables 2.4.1 and 2.4.2.

Example Calculation:

Inlet Mass Flowrate,

$$(1212 \text{ scfm} \times 60) \times 1 \text{ ATM} / (0.7302 \text{ ATM ft}^3/\text{lbmol oR} \times 519.67 \text{ oR}) = 213.46 \text{ lb mol fuel/hr}$$

Emission Rate,

$$\text{Inlet Mass Flowrate (lbmol fuel/hr)} \times (1 - \text{Control Efficiency})$$

Flare control efficiency 98.0% used per AP-42 Chapter 2.4, Table 2.4-3

PRE-MODIFICATION PTE

Scenario 1 Turbine

Source	Rate (scfm)
Turbine Haps	3,862.5

HAPS Pollutant	CAS Number	Molecular Weight (lb/lb mol)	Default Concentration (ppmv)	Control Efficiency (%)	PTE Uncontrolled (lb/hr)	PTE Controlled (lb/hr)	PTE Uncontrolled (TPY)	PTE Controlled (TPY)
1,1,1-Trichloroethane (methyl chloroform)	71-55-6	133.41	0.4800	98	3.91E-02	7.82E-04	1.71E-01	3.42E-03
1,1,2,2-Tetrachloroethane	79-34-5	167.85	1.1100	98	1.14E-01	2.27E-03	4.98E-01	9.96E-03
1,1-Dichloroethane (ethylidene dichloride)	75-34-3	98.97	2.3500	98	1.42E-01	2.84E-03	6.22E-01	1.24E-02
1,1-Dichloroethene (vinylidene chloride)	75-35-4	96.94	0.2000	98	1.18E-02	2.37E-04	5.18E-02	1.04E-03
1,2-Dichloroethane (ethylene dichloride)	107-06-2	98.96	0.4100	98	2.48E-02	4.95E-04	1.08E-01	2.17E-03
1,2-Dichloropropane (propylene dichloride)	78-87-5	112.99	0.1800	98	1.24E-02	2.48E-04	5.44E-02	1.09E-03
Acrylonitrile	107-13-1	53.06	6.3300	98	2.05E-01	4.10E-03	8.98E-01	1.80E-02
Benzene (no co-disposal)	71-43-2	78.11	1.9100	98	9.11E-02	1.82E-03	3.99E-01	7.98E-03
Carbon disulfide	75-15-0	76.13	0.5800	98	2.69E-02	5.39E-04	1.18E-01	2.36E-03
Carbon tetrachloride	56-23-5	153.84	0.0040	98	3.76E-04	7.51E-06	1.65E-03	3.29E-05
Carbonyl sulfide	463-58-1	60.07	0.4900	98	1.80E-02	3.59E-04	7.87E-02	1.57E-03
Chlorobenzene	108-90-7	112.56	0.2500	98	1.72E-02	3.44E-04	7.52E-02	1.50E-03
Chloroethane (ethyl chloride)	75-00-3	64.52	1.2500	98	4.92E-02	9.84E-04	2.16E-01	4.31E-03
Chloroform	67-66-3	119.39	0.0300	98	2.19E-03	4.37E-05	9.57E-03	1.91E-04
Chloromethane (methyl chloride)	74-87-3	50.49	1.2100	98	3.73E-02	7.46E-04	1.63E-01	3.27E-03
1,4 Dichlorobenzene (p-dichlorobenzene)	106-46-7	147.00	0.2130	98	1.91E-02	3.82E-04	8.37E-02	1.67E-03
Dichloromethane (methylene chloride)	75-09-2	84.94	14.3000	98	7.41E-01	1.48E-02	3.25E+00	6.49E-02
Ethylbenzene	100-41-4	106.16	4.6100	98	2.99E-01	5.97E-03	1.31E+00	2.62E-02
Hexane	110-54-3	86.18	6.5700	98	3.46E-01	6.91E-03	1.51E+00	3.03E-02
Mercury (total)	7439-97-6	200.61	0.0003	0	3.58E-05	3.58E-05	1.57E-04	1.57E-04
Methyl isobutyl ketone	108-10-1	100.16	1.8700	98	1.14E-01	2.29E-03	5.01E-01	1.00E-02
Perchloroethylene (tetrachloroethylene)	127-18-4	165.83	3.7300	98	3.78E-01	7.55E-03	1.65E+00	3.31E-02
Toluene (no co-disposal)	108-88-3	92.14	39.3000	98	2.21E+00	4.42E-02	9.68E+00	1.94E-01
Trichloroethylene (trichloroethene)	79-01-6	131.40	2.8200	98	2.26E-01	4.52E-03	9.91E-01	1.98E-02
Vinyl chloride	75-01-4	62.50	7.3400	98	2.80E-01	5.60E-03	1.23E+00	2.45E-02
Xylenes	1330-20-7	106.16	12.1000	98	7.84E-01	1.57E-02	3.43E+00	6.87E-02
Hydrogen Chloride	7647-01-0	36.50	42.0000	0	9.36E-01	9.36E-01	4.10E+00	4.10E+00
							TOTAL HAPS (TPY)	4.64E+00
							Max Single HAPS (TPY)	4.10E+00

Table notes:

Emission factors taken from AP-42 Chapter 2.42, Tables 2.4.1 and 2.4.2.

Example Calculation:

Inlet Mass Flowrate,

$$(3862.5 \text{ scfm} \times 60) \times 1 \text{ ATM} / (0.7302 \text{ ATM ft}^3/\text{lbmol oR} \times 519.67 \text{ }^\circ\text{R}) = 213.46 \text{ lb mol fuel/hr}$$

Emission Rate,

$$\text{Inlet Mass Flowrate (lbmol fuel/hr)} \times (1 - \text{Control Efficiency})$$

Flare control efficiency 98.0% used per AP-42 Chapter 2.4, Table 2.4-3

PRE-MODIFICATION PTE

HAPS GENERATED FROM PRIMARY OPERATING CONDITION

HAPS Pollutant	CAS Number	HAP	Molecular Weight (lb/lb mol)	Default Concentration (ppmv)	Control Efficiency (%)	Turbine Controlled Limited HAPS (lb/hr)	Duct Burner Controlled Limited HAPS (lb/hr)	Enclosed Flare Controlled Limited HAPS (lb/hr)	Turbine Controlled HAPS. Limited HAPS (tpy)	Duct Burner Controlled Limited HAPS (tpy)	Enclosed Flare Controlled Limited HAPS (tpy)	Scenario 1 Controlled PTE Controlled PTE (lb/hr)	Scenario 1 Controlled PTE (TPY)
1,1,1-Trichloroethane (methyl chloroform)	71-55-6	x	133.41	0.4800	98	7.82E-04	2.45E-04	5.41E-04	3.42E-03	1.07E-03	2.37E-03	1.57E-03	6.87E-03
1,1,2,2-Tetrachloroethane	79-34-5	x	167.85	1.1100	98	2.27E-03	7.14E-04	1.58E-03	9.96E-03	3.13E-03	6.90E-03	4.56E-03	2.00E-02
1,1-Dichloroethane (ethylidene dichloride)	75-34-3	x	98.97	2.3500	98	2.84E-03	8.91E-04	1.97E-03	1.24E-02	3.90E-03	8.61E-03	5.70E-03	2.50E-02
1,1-Dichloroethene (vinylidene chloride)	75-35-4	x	96.94	0.2000	98	2.37E-04	7.43E-05	1.64E-04	1.04E-03	3.25E-04	7.18E-04	4.75E-04	2.08E-03
1,2-Dichloroethane (ethylene dichloride)	107-06-2	x	98.96	0.4100	98	4.95E-04	1.55E-04	3.43E-04	2.17E-03	6.81E-04	1.50E-03	9.94E-04	4.35E-03
1,2-Dichloropropane (propylene dichloride)	78-87-5	x	112.99	0.1800	98	2.48E-04	7.79E-05	1.72E-04	1.09E-03	3.41E-04	7.53E-04	4.98E-04	2.18E-03
Acrylonitrile	107-13-1	x	53.06	6.3300	98	4.10E-03	1.29E-03	2.84E-03	1.80E-02	5.63E-03	1.24E-02	8.23E-03	3.60E-02
Benzene (no co-disposal)	71-43-2	x	78.11	1.9100	98	1.82E-03	5.71E-04	1.26E-03	7.98E-03	2.50E-03	5.53E-03	3.65E-03	1.60E-02
Carbon disulfide	75-15-0	x	76.13	0.5800	98	5.39E-04	1.69E-04	3.73E-04	2.36E-03	7.41E-04	1.64E-03	1.08E-03	4.74E-03
Carbon tetrachloride	56-23-5	x	153.84	0.0040	98	7.51E-06	2.36E-06	5.20E-06	3.29E-05	1.03E-05	2.28E-05	1.51E-05	6.60E-05
Carbonyl sulfide	463-58-1	x	60.07	0.4900	98	3.59E-04	1.13E-04	2.49E-04	1.57E-03	4.94E-04	1.09E-03	7.21E-04	3.16E-03
Chlorobenzene	108-90-7	x	112.56	0.2500	98	3.44E-04	1.08E-04	2.38E-04	1.50E-03	4.72E-04	1.04E-03	6.89E-04	3.02E-03
Chloroethane (ethyl chloride)	75-00-3	x	64.52	1.2500	98	9.84E-04	3.09E-04	6.82E-04	4.31E-03	1.35E-03	2.99E-03	1.98E-03	8.65E-03
Chloroform	67-66-3	x	119.39	0.0300	98	4.37E-05	1.37E-05	3.03E-05	1.91E-04	6.01E-05	1.33E-04	8.77E-05	3.84E-04
Chloromethane (methyl chloride)	74-87-3	x	50.49	1.2100	98	7.46E-04	2.34E-04	5.17E-04	3.27E-03	1.02E-03	2.26E-03	1.50E-03	6.55E-03
1,4 Dichlorobenzene (p-dichlorobenzene)	106-46-7	x	147.00	0.2130	98	3.82E-04	1.20E-04	2.65E-04	1.67E-03	5.25E-04	1.16E-03	7.67E-04	3.36E-03
Dichloromethane (methylene chloride)	75-09-2	x	84.94	14.3000	98	1.48E-02	4.65E-03	1.03E-02	6.49E-02	2.04E-02	4.50E-02	2.97E-02	1.30E-01
Ethylbenzene	100-41-4	x	106.16	4.6100	98	5.97E-03	1.87E-03	4.14E-03	2.62E-02	8.21E-03	1.81E-02	1.20E-02	5.25E-02
Hexane	110-54-3	x	86.18	6.5700	98	6.91E-03	2.17E-03	1.59E-06	3.03E-02	9.50E-03	2.10E-02	9.08E-03	6.07E-02
Mercury (total)	7439-97-6	x	200.61	0.0003	0	3.58E-05	1.12E-05	4.79E-03	1.57E-04	4.91E-05	1.08E-04	4.83E-03	3.14E-04
Methyl isobutyl ketone	108-10-1	x	100.16	1.8700	98	2.29E-03	7.17E-04	2.48E-05	1.00E-02	3.14E-03	6.94E-03	3.03E-03	2.01E-02
Perchloroethylene (tetrachloroethylene)	127-18-4	x	165.83	3.7300	98	7.55E-03	2.37E-03	1.58E-03	3.31E-02	1.04E-02	2.29E-02	1.15E-02	6.64E-02
Toluene (no co-disposal)	108-88-3	x	92.14	39.3000	98	4.42E-02	1.39E-02	5.23E-03	1.94E-01	6.08E-02	1.34E-01	6.33E-02	3.88E-01
Trichloroethylene (trichloroethene)	79-01-6	x	131.40	2.8200	98	4.52E-03	1.42E-03	3.06E-02	1.98E-02	6.22E-03	1.37E-02	3.66E-02	3.98E-02
Vinyl chloride	75-01-4	x	62.50	7.3400	98	5.60E-03	1.76E-03	3.13E-03	2.45E-02	7.70E-03	1.70E-02	1.05E-02	4.92E-02
Xylenes	1330-20-7	x	106.16	12.1000	98	1.57E-02	4.92E-03	3.88E-03	6.87E-02	2.16E-02	4.76E-02	2.45E-02	1.38E-01
Hydrogen Chloride	7647-01-0	x	36.50	42.0000	0	9.36E-01	2.94E-01	1.09E-02	4.10E+00	1.29E+00	2.84E+00	1.24E+00	8.22E+00
TOTAL HAPS (TPY)						1.06E+00	3.32E-01	8.58E-02	4.64E+00	1.46E+00	3.21E+00	1.48E+00	9.31E+00
Max Single HAPS (TPY)						9.36E-01	2.94E-01	1.09E-02	4.10E+00	1.29E+00	2.84E+00	1.24E+00	8.22E+00

PRE-MODIFICATION PTE
PTE - Secondary Operating Condition (Scenario 2)

Scenario 2:

Emission Unit	Design Capacity	Units
EU-002 Turbine at Capacity	0	scfm
EU-003 Turbine at Capacity	0	scfm
Duct Burner	0	scfm
Enclosed Flare	7,750	scfm
Total LFG Burned	7,750	scfm

Emission Source	Regulated Pollutants	Maximum Gas Consumption		Hours of Operation	Emission Factors ⁽⁷⁾		Uncontrolled	Controlled	Uncontrolled	Controlled
							PTE	PTE	PTE	PTE
		cfm	MMCF/yr				(hrs/yr)	(lbs/hr)	(lbs/hr)	(TPY)
Enclosed Flare	VOCs ⁽¹⁾	7,750	4,073	8,760	24.4	lb/hr	24.4	0.49	107	2.14
	NMOC ⁽²⁾	7,750	4,073	8,760	62.7	lb/hr	62.7	1.25	274	5.49
	NO _x ⁽³⁾	7,750	4,073	8,760	0.06	lb/MMBTU	14.1	14.1	61.9	61.9
	SO ₂ ⁽⁴⁾	7,750	4,073	8,760	39.2	lb/hr	39.2	39.2	172	172
	CO ⁽⁵⁾	7,750	4,073	8,760	0.20	lb/MMBTU	47.1	47.1	206	206
	PM ₁₀ ⁽⁶⁾	7,750	4,073	8,760	1.7E-05	lb/scfm CH ₄	3.95	3.95	17.3	17.3
	PM _{2.5} ⁽⁶⁾	7,750	4,073	8,760	1.7E-05	lb/scfm CH ₄	3.95	3.95	17.3	17.3
	CO ₂ ⁽⁷⁾ Pass Through	7,750	4,073	8,760	52.07	kg/MMBtu	26942	26942	118006	118006
	CO ₂ ⁽⁷⁾ Combustion	7,750	4,073	8,760	52.07	kg/MMBtu	26980	26980	118173	118173
	CH ₄ ⁽⁷⁾	7,750	4,073	8,760	3.20E-03	kg/MMBtu	1.66	1.66	7.26	7.26
	N ₂ O ⁽⁷⁾	7,750	4,073	8,760	6.30E-04	kg/MMBtu	0.33	0.33	1.43	1.43
	CO _{2e} ⁽⁷⁾	7,750	4,073	8,760			54061	54061	236786	236786

Emission Factor Source

(1) According to AP-42, Table 2.4-2, Note C, VOC content at MSW sites with unknown concentrations equals 39% by weight of total NMOC concentration. (lb/hr = (scfm*ppmv*MW*0.000001)/(0.7302*520)*60 where the molecular weight (MW) of VOC is 86 lb/lb-mol and VOC concentration is 232 ppmv, which is 39% of the assumed NMOC concentration of 595 ppmv (from AP-42). Assume 98% VOC control.

(2) NMOC concentration as indicated by AP-42. Lb/hr = (86 lb/lb-mol*595 ppmv*scfm*0.000001)/(0.7302*520)*60, assume 98% control.

(3) John Zink Co. Letter dated December 21, 1993, where 0.06 lb/MMBtu*506.5 Btu/CF*7750 CF/min*60/1,000,000 = 14.1 lb/hr

(4) SO₂ based on AP-42 default standards with safety factor increase. Lb/hr = (MW*scfm*500 ppmv*64.1 lb/lb-mol *0.000001)/(0.7302*520*60) where MW is 64 lb/lb-mol and an SO₂ concentration of 500 ppmv was assumed as a conservative value.

(5) John Zink Co. Letter dated December 21, 1993, where 0.20 lb/MMBtu*506.5 Btu/CF*7750 CF/min*60/1,000,000 = 47.1 lb/hr

(6) Emission factor for Particulate Matter (in lb/hr/dscfm CH₄) is from AP-42, Table 2.4-5. PM and PM_{2.5} assumed to be the same as PM₁₀. 1.7E-05 lb/hr/dscfm CH₄*7750 scfm*0.5*60 = 3.95 lb/hr, where the gas flow is assumed to be 50% CH₄.

(7) Emissions based on 40 CFR 98, equipment assumed to operate at maximum capacity 24 hours/day 365 days/year for PTE purposes. 40 CFR 98, Subpart C, Tables C-1, C-2, Rev. September 10, 2010; factors are for landfill gas or biogas if landfill gas was unavailable. 2 GWP of CH₄ increased from 21 to 25, effective Jan. 1, 2014. GWP of N₂O decreased from 310 to 298, effective Jan. 1, 2014.

(7) CO₂ pass through = (scfm*ppmv*MW*0.000001)/(0.7302*520)*60 where ppmv is 500,000 and MW is 44 lb/lb-mol and CO₂ combustion = 52.0 kg/MMBtu*506.5 Btu/CF*7750 CF/min*0.000001*60

PRE-MODIFICATION PTE

Scenario 2 Enclosed Flares

Source	Rate (scfm)
Enclosed Flares	7,750

HAPS Pollutant	CAS Number	Molecular Weight (lb/lb mol)	Default Concentration (ppmv)	Control Efficiency (%)	PTE Uncontrolled (lb/hr)	PTE Controlled (lb/hr)	PTE Uncontrolled (TPY)	PTE Controlled (TPY)
1,1,1-Trichloroethane (methyl chloroform)	71-55-6	133.41	0.4800	98	7.85E-02	1.57E-03	3.44E-01	6.87E-03
1,1,2,2-Tetrachloroethane	79-34-5	167.85	1.1100	98	2.28E-01	4.57E-03	1.00E+00	2.00E-02
1,1-Dichloroethane (ethylidene dichloride)	75-34-3	98.97	2.3500	98	2.85E-01	5.70E-03	1.25E+00	2.50E-02
1,1-Dichloroethene (vinylidene chloride)	75-35-4	96.94	0.2000	98	2.38E-02	4.75E-04	1.04E-01	2.08E-03
1,2-Dichloroethane (ethylene dichloride)	107-06-2	98.96	0.4100	98	4.97E-02	9.94E-04	2.18E-01	4.36E-03
1,2-Dichloropropane (propylene dichloride)	78-87-5	112.99	0.1800	98	2.49E-02	4.98E-04	1.09E-01	2.18E-03
Acrylonitrile	107-13-1	53.06	6.3300	98	4.12E-01	8.23E-03	1.80E+00	3.61E-02
Benzene (no co-disposal)	71-43-2	78.11	1.9100	98	1.83E-01	3.66E-03	8.01E-01	1.60E-02
Carbon disulfide	75-15-0	76.13	0.5800	98	5.41E-02	1.08E-03	2.37E-01	4.74E-03
Carbon tetrachloride	56-23-5	153.84	0.0040	98	7.54E-04	1.51E-05	3.30E-03	6.61E-05
Carbonyl sulfide	463-58-1	60.07	0.4900	98	3.61E-02	7.21E-04	1.58E-01	3.16E-03
Chlorobenzene	108-90-7	112.56	0.2500	98	3.45E-02	6.90E-04	1.51E-01	3.02E-03
Chloroethane (ethyl chloride)	75-00-3	64.52	1.2500	98	9.88E-02	1.98E-03	4.33E-01	8.66E-03
Chloroform	67-66-3	119.39	0.0300	98	4.39E-03	8.78E-05	1.92E-02	3.84E-04
Chloromethane (methyl chloride)	74-87-3	50.49	1.2100	98	7.49E-02	1.50E-03	3.28E-01	6.56E-03
1,4 Dichlorobenzene (p-dichlorobenzene)	106-46-7	147.00	0.2130	98	3.84E-02	7.67E-04	1.68E-01	3.36E-03
Dichloromethane (methylene chloride)	75-09-2	84.94	14.3000	98	1.49E+00	2.98E-02	6.52E+00	1.30E-01
Ethylbenzene	100-41-4	106.16	4.6100	98	6.00E-01	1.20E-02	2.63E+00	5.25E-02
Hexane	110-54-3	86.18	6.5700	98	6.94E-01	1.39E-02	3.04E+00	6.08E-02
Mercury (total)	7439-97-6	200.61	0.0003	0	7.18E-05	7.18E-05	3.14E-04	3.14E-04
Methyl isobutyl ketone	108-10-1	100.16	1.8700	98	2.30E-01	4.59E-03	1.01E+00	2.01E-02
Perchloroethylene (tetrachloroethylene)	127-18-4	165.83	3.7300	98	7.58E-01	1.52E-02	3.32E+00	6.64E-02
Toluene (no co-disposal)	108-88-3	92.14	39.3000	98	4.44E+00	8.87E-02	1.94E+01	3.89E-01
Trichloroethylene (trichloroethene)	79-01-6	131.40	2.8200	98	4.54E-01	9.08E-03	1.99E+00	3.98E-02
Vinyl chloride	75-01-4	62.50	7.3400	98	5.62E-01	1.12E-02	2.46E+00	4.92E-02
Xylenes	1330-20-7	106.16	12.1000	98	1.57E+00	3.15E-02	6.89E+00	1.38E-01
Hydrogen Chloride	7647-01-0	36.50	42.0000	0	1.88E+00	1.88E+00	8.23E+00	8.23E+00
Table notes:						2.13E+00	TOTAL HAPS (TPY)	9.32E+00
Emission factors taken from AP-42 Chapter 2.42, Tables 2.4.1 and 2.4.2.						1.88E+00	Max Single HAPS (TPY)	8.23E+00
Example Calculation:								
Inlet Mass Flowrate,								
(7500 scfm * 60) * 1 ATM / (0.7302 ATM ft ³ /lbmol oR * 519.67 oR) = 213.46 lb mol fuel/hr								
Emission Rate,								
Inlet Mass Flowrate (lbmol fuel/hr) * (1-Control Efficiency)								
Flare control efficiency 98.0% used per AP-42 Chapter 2.4, Table 2.4-3								

FUGI 2 and EQUI 29 Landfill Emissions

Inputs									
MSW Max Design Capacity	29,800,000	Cubic Yards							
Landfill Gas Generation Rate ¹	2,102,400,000	scf/yr LFG							
	4,000	scfm							
Percent Fugitive Emissions ²	15%								
LFG Fugitive Flowrate	600	scfm							
Percent Landfill Emissions (captured) ²	85%								
LFG (captured) Flowrate	3,400	scfm							
				Total LF emissions		FUG 2		EQUI 29	
LFG Compound	CAS	MW	Concentration ³	Uncontrolled Landfill Emissions		Landfill Fugitive Emissions		Landfill Emissions	
		lb/lb-mol	ppmv	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
1,1,1 - Trichloroethane (methyl chloroform)	71-55-6	133.41	4.80E-01	4.05E-02	1.77E-01	6.07E-03	2.66E-02	3.44E-02	1.51E-01
1,1,2,2 - Tetrachloroethane	79-34-5	167.85	1.11E+00	1.18E-01	5.16E-01	1.77E-02	7.74E-02	1.00E-01	4.39E-01
1,1 - Dichloroethane (ethylidene dichloride)	75-34-3	98.96	2.35E+00	1.47E-01	6.44E-01	2.21E-02	9.66E-02	1.25E-01	5.47E-01
1,1 - Dichloroethene (vinylidene chloride)	75-35-4	96.94	2.01E-01	1.23E-02	5.40E-02	1.85E-03	8.09E-03	1.05E-02	4.59E-02
1,2 - Dichloroethane (ethylene dichloride)	107-06-2	98.96	4.07E-01	2.55E-02	1.12E-01	3.82E-03	1.67E-02	2.16E-02	9.48E-02
1,2 - Dichloropropane (propylene dichloride)	78-87-5	112.99	1.80E-01	1.29E-02	5.63E-02	1.93E-03	8.45E-03	1.09E-02	4.79E-02
Acrylonitrile (Propenenitrile)	107-13-1	53.06	6.33E+00	2.12E-01	9.30E-01	3.19E-02	1.40E-01	1.80E-01	7.91E-01
Benzene	71-43-2	78.12	1.91E+00	9.43E-02	4.13E-01	1.42E-02	6.20E-02	8.02E-02	3.51E-01
Carbon Disulfide	75-15-0	76.14	5.80E-01	2.79E-02	1.22E-01	4.19E-03	1.83E-02	2.37E-02	1.04E-01
Carbon Tetrachloride	56-23-5	153.84	4.00E-03	3.89E-04	1.70E-03	5.84E-05	2.56E-04	3.31E-04	1.45E-03
Carbonyl Sulfide	463-58-1	60.07	4.90E-01	1.86E-02	8.15E-02	2.79E-03	1.22E-02	1.58E-02	6.93E-02
Chlorobenzene (monochlorobenzene)	108-90-7	112.56	2.54E-01	1.81E-02	7.92E-02	2.71E-03	1.19E-02	1.54E-02	6.73E-02
Chloroethane (ethyl chloride)	75-00-3	64.52	1.25E+00	5.10E-02	2.23E-01	7.65E-03	3.35E-02	4.33E-02	1.90E-01
Chloroform	67-66-3	119.38	3.00E-02	2.26E-03	9.92E-03	3.40E-04	1.49E-03	1.92E-03	8.43E-03
Chloromethane (methyl chloride)	74-87-3	50.49	1.21E+00	3.86E-02	1.69E-01	5.79E-03	2.54E-02	3.28E-02	1.44E-01
1,4 Dichlorobenzene (p-dichlorobenzene)	106-46-7	147	2.13E-01	1.98E-02	8.67E-02	2.97E-03	1.30E-02	1.68E-02	7.37E-02
Dichloromethane (methylene chloride)	75-09-2	84.93	1.43E+01	7.68E-01	3.36E+00	1.15E-01	5.04E-01	6.53E-01	2.86E+00
Ethylbenzene	75-08-1	106.17	4.61E+00	3.09E-01	1.36E+00	4.64E-02	2.03E-01	2.63E-01	1.15E+00
Hexane	110-54-3	86.18	6.57E+00	3.58E-01	1.57E+00	5.37E-02	2.35E-01	3.04E-01	1.33E+00
Mercury (total)	7439-97-6	200.61	2.92E-04	3.70E-05	1.62E-04	5.56E-06	2.43E-05	3.15E-05	1.38E-04
Methyl Isobutyl Ketone (hexone)	108-10-1	100.16	1.87E+00	1.18E-01	5.19E-01	1.78E-02	7.78E-02	1.01E-01	4.41E-01
Tetrachloroethylene (perchloroethylene, -ethene)	127-18-4	165.83	3.73E+00	3.91E-01	1.71E+00	5.87E-02	2.57E-01	3.32E-01	1.46E+00
Toluene (methylbenzene)	108-88-3	92.14	3.93E+01	2.29E+00	1.00E+01	3.43E-01	1.50E+00	1.95E+00	8.52E+00
Trichloroethylene (trichloroethene)	79-01-6	131.38	2.82E+00	2.34E-01	1.03E+00	3.51E-02	1.54E-01	1.99E-01	8.72E-01
Vinyl Chloride (chloroethylene, VCM)	75-01-4	62.50	7.34E+00	2.90E-01	1.27E+00	4.35E-02	1.91E-01	2.47E-01	1.08E+00
Xylenes (m, o, p)	1330-20-7	106.17	1.21E+01	8.12E-01	3.56E+00	1.22E-01	5.34E-01	6.90E-01	3.02E+00
Total HAP				6.41	28.1	0.96	4.21	5.45	23.9
Maximum Single HAP (Toluene)				2.29	10.0	0.343	1.50	1.95	8.52
LFG Criteria & GHG Emissions									
LFG Compound	CAS	MW	Concentration ³	Uncontrolled Landfill Emissions		Landfill Fugitive Emissions (FUGI 2)		Landfill Emissions (EQUI 29)	
		lb/lb-mol	ppmv	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
VOCs	NA	86.18	235.0	12.8	56.1	1.92	8.41	10.9	47.7
NMOC			595.0	32.8	143.8	4.92	21.6	27.9	122.2
CO ₂	124-38-9	44.01	498,352	1.39E+04	6.07E+04	2.08E+03	9.11E+03	1.18E+04	5.16E+04
CH ₄	74-82-8	16.04	500,000	5.07E+03	2.22E+04	5.70E+02	2.50E+03	3.66E+03	1.60E+04
CO ₂ e	NA	NA	NA	1.41E+05	6.16E+05	1.63E+04	7.16E+04	1.03E+05	4.53E+05
H ₂ S ⁴		34.08	41.3	0.89	3.90	0.10	0.44	0.64	2.82

Notes:
¹ Landfill gas generation rate based on USEPA LandGEM model, Version 3.02

² MPCA believes that 85% of landfill gas at this facility can be captured and combusted at the flares or thermal oxidizer. This means the other 15% of emissions are released into the air. Per a Rolling Hills Applicability Determination from 2013, these uncaptured emissions are considered fugitive.

³ Concentrations from AP-42 CH 2.4 Tables 2.4-1 and 2.4-2

⁴ Lab tests give H₂S concentration of 41.3 ppmv

Fugitive PM

Unpaved Roads

$E = k * [(s/12)^a * (W/3)^b] * (1-(P/N))$ (AP-42 Chapter 13.2)

Factor	Description	PM2.5 value (lb/VMT)	PM10 value (lb/VMT)	PM value (lb/VMT)
E =	Emission factor (lb/VMT, vehicle miles traveled), AP-42, Section 13.2.2, Eqn 2	0.15	1.53	5.66
k (lb/VMT)=	Particle size multiplier, AP-42 Table 13.2.2-2, factors for industrial roads	0.15	1.50	4.90
s =	Surface material silt content (%), AP-42, Table 13.2.2-1, factor for municipal solid waste landfills	6.4	6.4	6.4
W =	Mean vehicle weight (ton), value provided by facility	24.4	24.4	24.4
a =	Constant from AP-42 Table 13.2.2-2, factor for industrial roads	0.9	0.9	0.7
b =	Constant from AP-42 Table 13.2.2-2, factor for industrial roads	0.45	0.45	0.45
P =	Number of wet days, AP-42, Figure 13.2.1-2	110	110	110
N =	Number of days in averaging period	365	365	365
CE	Control efficiency (50%)	50%		
Daily hours of operation		9		

Mean vehicle weight Miles Traveled/yr (VMT)

Total vehicle count = 230/day 23,908
 Unloaded weight = 18 tons
 Loaded weight = 31.2 tons 23908
 Mean weight = 24.4 tons
 Assume operation 9 hr/day

Unpaved Road Emissions

Pollutant	Vehicles/day	VMT	Emission factor (lb/VMT)	Uncontrolled PTE (lbs/hr)	Controlled PTE (lbs/hr)	PTE un-restricted (tpy)	PTE limited (tpy)
PM-2.5	230	23,908	0.153	1.11	0.56	1.83	0.914
PM-10	230	23,908	1.53	11.1	5.56	18.3	9.14
PM	230	23,908	5.66	41.2	20.6	67.7	33.8

From 2014 Emission Inventory, assume 9 hours/day of operation for 260 days/yr for actual emissions
 Assume 24 hr/day, 365 days/yr for PTE

Max HAPs analysis for Pre Modification

HAPS Pollutant	CAS Number	HAP	Molecular Weight (lb/lb mol)	Default Concentration (ppmv)	Control Efficiency (%)	Scenario 1 Controlled HAPS, TPY (lb/lb)	Scenario 2 Controlled HAPS, TPY	Max
1,1,1-Trichloroethane (methyl chloroform)	71-55-6	x	133.41	0.4800	98	6.87E-03	6.87E-03	6.87E-03
1,1,2,2-Tetrachloroethane	79-34-5	x	167.85	1.1100	98	2.00E-02	2.00E-02	2.00E-02
1,1-Dichloroethane (ethylidene dichloride)	75-34-3	x	98.97	2.3500	98	2.50E-02	2.50E-02	2.50E-02
1,1-Dichloroethene (vinylidene chloride)	75-35-4	x	96.94	0.2000	98	2.08E-03	2.08E-03	2.08E-03
1,2-Dichloroethane (ethylene dichloride)	107-06-2	x	98.96	0.4100	98	4.35E-03	4.36E-03	4.36E-03
1,2-Dichloropropane (propylene dichloride)	78-87-5	x	112.99	0.1800	98	2.18E-03	2.18E-03	2.18E-03
Acrylonitrile	107-13-1	x	53.06	6.3300	98	3.60E-02	3.61E-02	3.61E-02
Benzene (no co-disposal)	71-43-2	x	78.11	1.9100	98	1.60E-02	1.60E-02	1.60E-02
Carbon disulfide	75-15-0	x	76.13	0.5800	98	4.74E-03	4.74E-03	4.74E-03
Carbon tetrachloride	56-23-5	x	153.84	0.0040	98	6.60E-05	6.61E-05	6.61E-05
Carbonyl sulfide	463-58-1	x	60.07	0.4900	98	3.16E-03	3.16E-03	3.16E-03
Chlorobenzene	108-90-7	x	112.56	0.2500	98	3.02E-03	3.02E-03	3.02E-03
Chloroethane (ethyl chloride)	75-00-3	x	64.52	1.2500	98	8.65E-03	8.66E-03	8.66E-03
Chloroform	67-66-3	x	119.39	0.0300	98	3.84E-04	3.84E-04	3.84E-04
Chloromethane (methyl chloride)	74-87-3	x	50.49	1.2100	98	6.55E-03	6.56E-03	6.56E-03
1,4 Dichlorobenzene (p-dichlorobenzene)	106-46-7	x	147.00	0.2130	98	3.36E-03	3.36E-03	3.36E-03
Dichloromethane (methylene chloride)	75-09-2	x	84.94	14.3000	98	1.30E-01	1.30E-01	1.30E-01
Ethylbenzene	100-41-4	x	106.16	4.6100	98	5.25E-02	5.25E-02	5.25E-02
Hexane	110-54-3	x	86.18	6.5700	98	6.07E-02	6.08E-02	6.08E-02
Mercury (total)	7439-97-6	x	200.61	0.0003	0	3.14E-04	3.14E-04	3.14E-04
Methyl isobutyl ketone	108-10-1	x	100.16	1.8700	98	2.01E-02	2.01E-02	2.01E-02
Perchloroethylene (tetrachloroethylene)	127-18-4	x	165.83	3.7300	98	6.64E-02	6.64E-02	6.64E-02
Toluene (no co-disposal)	108-88-3	x	92.14	39.3000	98	3.88E-01	3.89E-01	3.89E-01
Trichloroethylene (trichloroethene)	79-01-6	x	131.40	2.8200	98	3.98E-02	3.98E-02	3.98E-02
Vinyl chloride	75-01-4	x	62.50	7.3400	98	4.92E-02	4.92E-02	4.92E-02
Xylenes	1330-20-7	x	106.16	12.1000	98	1.38E-01	1.38E-01	1.38E-01
Hydrogen Chloride	7647-01-0	X	36.50	42.0000	0	8.22E+00	8.23E+00	8.23E+00
Table notes:					TOTAL HAPS (TPY)	9.31E+00	9.32E+00	9.32E+00
					Max Single HAPS (TPY)	8.22E+00	8.23E+00	8.23E+00

Emission factors taken from AP-42 Chapter 2.42, Tables 2.4.1 and 2.4.2.

Example Calculation:

Inlet Mass Flowrate,

$(800 \text{ scfm} \times 60) \times 1 \text{ ATM} / (0.7302 \text{ ATM ft}^3/\text{lbmol oR} \times 519.67 \text{ oR}) = 213.46 \text{ lb mol fuel/hr}$

Emission Rate,

$\text{Inlet Mass Flowrate (lbmol fuel/hr)} \times (1 - \text{Control Efficiency})$

Flare control efficiency 98.0% used per AP-42 Chapter 2.4, Table 2.4-3

PRE MODIFICATION WORST CASE PTE

LIMITED EMISSIONS, LB/HR			
Pollutant	Scenario 1	Scenario 2	Max
VOCs	0.43	0.49	0.49
NMOC	1.12	1.25	1.25
NOx	25.3	14.1	25.3
SO ₂	39.2	39.2	39.2
CO	50.1	47.1	50.1
PM ₁₀	10.86	9.51	10.86
PM _{2.5}	5.86	4.51	5.86
CO ₂	53930	53922	53930
CH ₄	1.66	1.66	1.66
N ₂ O	0.321	0.33	0.33
CO _{2e}	54067	54061	54067
Total HAP	1.48	2.13	2.13
Max HAP	1.24	1.88	1.88

Landfill fugitives not included because they don't count in the comparison of pre-modification and post-modification totals

Worst case

LIMITED EMISSIONS, TONS PER YEAR			
Pollutant	Scenario 1	Scenario 2	Max
VOCs	1.88	2.14	2.14
NMOC	4.89	5.49	5.49
NOx	110.7	61.9	110.7
SO ₂	171.7	171.6	171.7
CO	219.5	206.3	219.5
PM ₁₀	32.4	26.4	32.4
PM _{2.5}	24.1	18.2	24.1
CO ₂	236213	236179	236213
CH ₄	7.26	7.26	7.26
N ₂ O	1.41	1.43	1.43
CO _{2e}	308387	236786	308387
Total HAP	9.31	9.32	9.32
Max HAP	8.22	8.23	8.23

Landfill fugitives not included because they don't count in the comparison of pre-modification and post-modification totals

Worst case

RNG Post Modification PTE Scenario 1

Landfill Gas Recovery			
Emission Unit	Design Capacity	Units	MMBtu/hr
TREA 7 - TOx burning waste gas	2,235	scfm	7.3
TREA 6 - Open Flare burning LFG	4,000	scfm	
Total Gas Combusted	6,235	scfm	
Emission Source			
Natural gas as supplemental gas to TOx	160.0	scfm	

Emission Source	Regulated Pollutants	Maximum Gas Consumption		Hours of Operation (hrs/yr)	Emission Factors		Uncontrolled	Controlled
							PTE	PTE
		cfm	MMCF/yr				(lbs/hr)	(lbs/hr)
TREA 7 - TOx burning waste gas	VOCS ⁽¹⁾	2,235	1,175	8,760	10.6	lb/hr	10.6	0.21
	NMOC ⁽²⁾	2,235	1,175	8,760	27.1	lb/hr	27.1	0.54
	NO _x ⁽³⁾	2,235	1,175	8,760	0.06	lb/MMBTU	0.44	0.44
	SO ₂ ⁽⁴⁾	2,235	1,175	8,760	0.45	lb/hr	0.45	0.45
	CO ⁽⁵⁾	2,235	1,175	8,760	0.2	lb/MMBTU	1.46	1.46
	PM ₁₀ ⁽⁶⁾	2,235	1,175	8,760	1.7E-05	lb/scfm CH ₄	0.12	0.12
	PM _{2.5} ⁽⁶⁾	2,235	1,175	8,760	1.7E-05	lb/scfm CH ₄	0.12	0.12
	CO ₂ ⁽⁷⁾ Pass Through	2,235	1,175	8,760	52.07	kg/MMBtu	12198	12198
	CO ₂ ⁽⁷⁾ Combustion	2,235	1,175	8,760	52.07	kg/MMBtu	836	836
	CH ₄ ⁽⁸⁾	2,235	1,175	8,760	0.0032	kg/MMBtu	0.051	0.051
	N ₂ O ⁽⁸⁾	2,235	1,175	8,760	0.0006	kg/MMBtu	0.010	0.010
	CO _{2e} ⁽⁸⁾	2,235	1,175	8,760			13039	13039

EMISSION FACTOR SOURCE:

- (1) VOC (lb/hr) = [(gas flow in cfm * conc (ppmv) * 0.000001 * MW)/(std temp in R * gas constant)] * 60 min/hr * (1-control efficiency) where conc = 39% of NMOC, or 348 ppmv and MW = 86 lb/lb-mol.
- (2) NMOC (lb/hr) = [(gas flow in cfm * conc (ppmv) * 0.000001 * MW)/(std temp in R * gas constant)] * 60 min/hr * (1-control efficiency) where concentration = 893 ppmv (AP-42 default conc of 595 ppmv mol. Control efficiency of 98% can be assumed.
- (3) Manufacturer Specifications, with an emission factor of 0.06 lb/MMBtu and a rating of 7.2 MMBtu/hr
- (4) SO₂ (lb/hr) = [(gas flow in cfm * conc (ppmv) * 0.000001 * MW)/(std temp in R * gas constant)] * 60 min/hr * 100% conversion of S to SO₂ where H₂S concentration = 20 ppmv (actual lab results show an H₂S conc of 41.3 ppmv in LFG), MW = 64 lb/lb-mol, and the RNG treatment system is designed to remove all sulfur from this stream, so a conc of 20 ppmv is conservative)
- (5) Manufacturer Specifications, with an emission factor of 0.2 lb/MMBtu and a rating of 7.2 MMBtu/hr
- (6) Emission factor for Particulate Matter (in lb/hr/dscfm CH₄) is from AP-42, Table 2.4-5. PM and PM_{2.5} assumed to be the same as PM₁₀. 1.7E-05 lb/hr/dscfm CH₄*2235 scfm*0.5*60 = 1.14 lb/hr, when (TOx design parameters).

(7) CO₂ pass through = (scfm*ppmv*MW*0.000001)/(0.7302*520)*60 where ppmv is 785,000 and MW is 44 lb/lb-mol and CO₂ combustion = 52.0 kg/MMBtu*2.2 lb/kg*7.3 MMBtu/hr

(8) Emissions based on 40 CFR 98, TOx assumed to operate at maximum capacity 24 hours/day 365 days/year for PTE purposes. 40 CFR 98, Subpart C, Tables C-1, C-2, Rev. September 10, 2010; fa was unavailable. 2 GWP of CH₄ increased from 21 to 25, effective Jan. 1, 2014. GWP of N₂O decreased from 310 to 298, effective Jan. 1, 2014.

Emission Source	Regulated Pollutants	Maximum Gas Consumption		Hours of Operation	Emission Factors		Uncontrolled	Controlled
		cfm	MMCF/yr				PTE	PTE
TREA 6 Emissions from landfill TREA 6 - Open Flare burning LFG	VOCS ⁽¹⁾	4,000	2,102	8,760	1.92	lb/hr	1.92	1.92
	NMOC ⁽²⁾	4,000	2,102	8,760	4.92	lb/hr	4.92	4.92
	VOCS ⁽³⁾	4,000	2,102	8,760	12.6	lb/hr	12.6	0.25
	NMOC ⁽⁴⁾	4,000	2,102	8,760	32.3	lb/hr	32.3	0.65
	NO _x ⁽⁵⁾	4,000	2,102	8,760	0.068	lb/MMBTU	7.43	7.43
	SO ₂ ⁽⁶⁾	4,000	2,102	8,760	20.2	lb/hr	20.2	20.2
	CO ⁽⁷⁾	4,000	2,102	8,760	0.31	lb/MMBTU	33.9	33.9
	PM ₁₀ ⁽⁸⁾	4,000	2,102	8,760	1.7E-05	lb/scfm CH ₄	2.04	2.04
	PM _{2.5} ⁽⁸⁾	4,000	2,102	8,760	1.7E-05	lb/scfm CH ₄	2.04	2.04
	CO ₂ ⁽⁹⁾ (Flare combustion)	4,000	2,102	8,760	52.07	kg/MMBtu	13957	13957
	CO ₂ ⁽⁹⁾ (LFG passing thru flare)	4,000	2,102	8,760	13906	lb/hr	13906	13906
	CH ₄ ⁽¹⁰⁾	4,000	2,102	8,760	0.0032	kg/MMBtu	0.86	0.86
	N ₂ O ⁽¹⁰⁾	4,000	2,102	8,760	0.00060	kg/MMBtu	0.160	0.160
	CO _{2e} ⁽¹⁰⁾	4,000	2,102	8,760			27932	27932

EMISSION FACTOR SOURCE:

(1) VOC (lb/hr) = [(gas flow in cfm * conc (ppmv) * 0.000001 * MW)/(std temp in R * gas constant)] * 60 min/hr * (1-control efficiency) where MW = 86 lb/lb-mol and conc is 232 ppmv, or 39% of NMOC c

(2) NMOC (lb/hr) = [(gas flow in cfm * conc (ppmv) * 0.000001 * MW)/(std temp in R * gas constant)] * 60 min/hr * (1-control efficiency) where MW is 86 lb/lb-mol and NMOC conc is 595 ppmv (AP-42 ch

(3) VOC concentration derived from 39% of NMOC concentration as indicated by AP-42. Lb/hr = (86 lb/lb-mol*232 ppmv*scfm*0.000001)/(0.7302*520)*60 where molecular weight is 86 lb/lb-mol and VC Assume 98% control efficiency.

(4) NMOC concentration as indicated by AP-42. Lb/hr = (86 lb/lb-mol*595 ppmv*scfm*0.000001)/(0.7302*520)*60 = 32.3 lb/hr where molecular weight is 86 lb/lb-mol and NMOC conc of 595 ppmv is from

(5) Manufacturer Specifications, with an emission factor of 0.068 lb/MMBtu and a rating of 109.2 MMBtu/hr

(6) Sulfur concentration of 500 ppmv based on AP-42 5th Ed., Section 2.4.4.2, November 1998 with an increased safety factor. Lb/hr = (flow*ppmv*lb/lb mole*0.000001)/(0.7302*520)*60 = 20.2 lb/hr, v

(7) Manufacturer Specifications, with an emission factor of 0.31 lb/MMBtu and a rating of 109.2 MMBtu/hr

(8) Emission factor for Particulate Matter (in lb/hr/dscfm CH₄) is from AP-42, Table 2.4-5. PM and PM_{2.5} assumed to be the same as PM₁₀. 1.7E-05 lb/hr/dscfm CH₄*4000 scfm*0.5*60 = 2.04 lb/hr, when

(9) CO₂ pass through = (scfm*ppmv*MW*0.000001)/(0.7302*520)*60 where ppmv is 500,000 and MW is 44 lb/lb-mol and CO₂ combustion = 52.0 kg/MMBtu*2.2 lb/kg*506.5 Btu/CF*4000 CF/min*0.0001

(10) Emissions based on 40 CFR 98, TOx assumed to operate at maximum capacity 24 hours/day 365 days/year for PTE purposes. 40 CFR 98, Subpart C, Tables C-1, C-2, Rev. September 10, 2010; fa was unavailable. 2 GWP of CH₄ increased from 21 to 25, effective Jan. 1, 2014. GWP of N₂O decreased from 310 to 298, effective Jan. 1, 2014.

Emission Source	Regulated Pollutants	Maximum Gas Consumption		Hours of Operation	Emission Factors ⁽⁷⁾		Uncontrolled	Controlled
		cfm	MMCF/yr				PTE	PTE
Natural gas as supplemental gas to TOx				(hrs/yr)			(lbs/hr)	(lbs/hr)
	VOCS ⁽¹⁾	160	84	8,760	5.5	lb/10 ⁶ scf	0.053	0.053
	NO _x ⁽²⁾	160	84	8,760	0.15	lb/MMBTU	1.46	1.46
	SO ₂ ⁽³⁾	160	84	8,760	0.6	lb/10 ⁶ scf	0.0058	0.0058
	CO ⁽⁴⁾	160	84	8,760	0.20	lb/MMBTU	1.94	1.94
	PM ₁₀ ⁽⁵⁾	160	84	8,760	7.60	lb/10 ⁶ scf	0.073	0.073
	PM _{2.5} ⁽⁵⁾	160	84	8,760	7.60	lb/10 ⁶ scf	0.073	0.073
	CO ₂ ⁽⁶⁾	160	84	8,760	53.06	kg/MMBtu	1132	1132
	CH ₄ ⁽⁷⁾	160	84	8,760	1.00E-03	kg/MMBtu	0.021	0.021
	N ₂ O ⁽⁷⁾	160	84	8,760	1.00E-04	kg/MMBtu	0.0021	0.0021
	CO _{2e} ⁽⁷⁾	160	84	8,760			1133	1133

EMISSION FACTOR SOURCE:

(1) AP-42 5th Ed., "Compilation of Air Pollutant Emissions Factors, Vol. 1: Stationary Point and Area Sources," 1998 Table 1.4-2.

(2) Manufacturer Specifications, with an emission factor of 0.15 lb/MMBtu and a rating of 9.7 MMBtu/hr

(3) AP-42 5th Ed., "Compilation of Air Pollutant Emissions Factors, Vol. 1: Stationary Point and Area Sources," 1998 Table 1.4-2.

(4) Manufacturer Specifications, with an emission factor of 0.20 lb/MMBtu and a rating of 9.7 MMBtu/hr

(5) AP-42 Table 1.4-2. PM and PM_{2.5} assumed to be the same as PM₁₀

(6) CFR Part 98 Table C-1, factor for natural gas, use mfr rating of 9.7 MMBtu/hr

(7) Emissions based on 40 CFR 98, TOx assumed to operate at maximum capacity 24 hours/day 365 days/year for PTE purposes. 40 CFR 98, Subpart C, Tables C-1, C-2, Rev. September 10, 2010; factor was unavailable. 2 GWP of CH₄ increased from 21 to 25, effective Jan. 1, 2014. GWP of N₂O decreased from 310 to 298, effective Jan. 1, 2014.

Scenario 1 Totals

LFG Recovery + Waste Gas Combustion ¹					NG as supplemental gas to TOx			
Regulated Pollutants	Uncontrolled	Controlled	Uncontrolled	Limited	Uncontrolled	Controlled	Uncontrolled	Limited
	PTE	PTE	PTE	PTE	PTE	PTE	PTE	PTE
	(lbs/hr)	(lbs/hr)	(TPY)	(TPY)	(lbs/hr)	(lbs/hr)	(TPY)	(TPY)
VOCS	23.2	0.46	101.5	2.03	0.053	0.053	0.231	0.231
NMOC	59.5	1.19	260.5	5.21	N/A	N/A	N/A	N/A
NOx	7.86	7.86	34.4	34.4	1.46	1.46	6.37	6.37
SO ₂	20.7	20.7	90.6	90.6	0.0058	0.0058	0.025	0.025
CO	35.3	35.3	154.7	154.7	1.94	1.94	8.50	8.50
PM ₁₀	2.16	2.16	9.47	9.47	0.073	0.073	0.32	0.32

PM _{2.5}	2.16	2.16	9.47	9.47	0.073	0.073	0.32	0.32
CO ₂	40897	40897	179129	179129	1132	1132	4959	4959
CH ₄	0.91	0.91	3.97	3.97	0.021	0.021	0.093	0.093
N ₂ O	0.17	0.17	0.75	0.75	0.0021	0.0021	0.0093	0.0093
CO _{2e}	40970	40970	179451	179451	1133	1133	4965	4965

Scenario 1 HAPs from TREA 7 (Thermal oxidizer) burning waste gas

Assume 8760 hr/yr of operation

2235 scfm

Compound	Halogenated	HAP	VOC	CAS	MW (lb/lb-mol)	Conc in Inlet Gas (adjusted) (ppmv) ¹	Conc in Inlet Gas (ppmv) ¹	Control Efficiency ⁴ (%)	PTE	PTE	PTE	PTE
									Uncontrolled	Controlled	Uncontrolled	Limited
									lb/hr	lb/hr	ton/yr	ton/yr
1,1,1 - Trichloroethane (methyl chloroform)	x	x	--	71-55-6	133.41	0.72	0.48	98%	3.39E-02	6.78E-04	1.49E-01	2.97E-03
1,1,2,2 - Tetrachloroethane	x	x	x	79-34-5	167.85	1.67	1.11	98%	9.87E-02	1.97E-03	4.32E-01	8.65E-03
1,1 - Dichloroethane (ethylidene dichloride)	x	x	x	75-34-3	98.96	3.53	2.35	98%	1.23E-01	2.46E-03	5.40E-01	1.08E-02
1,1 - Dichloroethene (vinylidene chloride)	x	x	x	75-35-4	96.94	0.30	0.201	98%	1.03E-02	2.06E-04	4.52E-02	9.04E-04
1,2 - Dichloroethane (ethylene dichloride)	x	x	x	107-06-2	98.96	0.61	0.407	98%	2.13E-02	4.27E-04	9.35E-02	1.87E-03
1,2 - Dichloropropane (propylene dichloride)	x	x	x	78-87-5	112.99	0.27	0.18	98%	1.08E-02	2.15E-04	4.72E-02	9.44E-04
Acrylonitrile (Propenenitrile)	--	x	x	107-13-1	53.06	9.50	6.33	91%	1.78E-01	1.60E-02	7.79E-01	7.01E-02
Benzene	--	x	x	71-43-2	78.12	2.87	1.91	98%	7.90E-02	1.58E-03	3.46E-01	6.92E-03
Carbon Disulfide	--	x	x	75-15-0	76.14	0.87	0.58	99.7%	2.34E-02	7.02E-05	1.02E-01	3.07E-04
Carbon Tetrachloride	x	x	x	56-23-5	153.84	0.01	0.004	98%	3.26E-04	6.52E-06	1.43E-03	2.86E-05
Carbonyl Sulfide	--	x	x	463-58-1	60.07	0.74	0.49	99.7%	1.56E-02	4.68E-05	6.83E-02	2.05E-04
Chlorobenzene (monochlorobenzene)	x	x	x	108-90-7	112.56	0.38	0.254	98%	1.51E-02	3.03E-04	6.63E-02	1.33E-03
Chloroethane (ethyl chloride)	x	x	x	75-00-3	64.52	1.88	1.25	98%	4.27E-02	8.54E-04	1.87E-01	3.74E-03
Chloroform (trichloromethane)	x	x	x	67-66-3	119.38	0.05	0.03	98%	1.90E-03	3.79E-05	8.31E-03	1.66E-04
Chloromethane (methyl chloride)	x	x	x	74-87-3	50.49	1.82	1.21	98%	3.24E-02	6.47E-04	1.42E-01	2.84E-03
1,4 Dichlorobenzene (p-dichlorobenzene)	x	x	x	106-46-7	147	0.32	0.213	98%	1.66E-02	3.32E-04	7.27E-02	1.45E-03
Dichloromethane (methylene chloride)	x	x	--	75-09-2	84.93	21.45	14.3	98%	6.43E-01	1.29E-02	2.82E+00	5.64E-02
Ethylbenzene	--	x	x	100-41-4	106.17	6.92	4.61	98%	2.59E-01	5.19E-03	1.14E+00	2.27E-02
Ethylene dibromide (1,2 dibromoethane)	x	x	x	106-93-4	187.88	0.00	0.001	98%	9.95E-05	1.99E-06	4.36E-04	8.72E-06
Hexane	--	x	x	110-54-3	86.18	9.86	6.57	98%	3.00E-01	6.00E-03	1.31E+00	2.63E-02
Mercury (total)	--	x	--	7439-97-6	200.61	0.00	0.000292	0%	3.10E-05	3.10E-05	1.36E-04	1.36E-04
Methyl Isobutyl Ketone (hexone)	--	x	x	108-10-1	100.16	2.81	1.87	98%	9.92E-02	1.98E-03	4.35E-01	8.69E-03
Tetrachloroethylene (perchloroethylene, -ethene)	x	x	--	127-18-4	165.83	5.60	3.73	98%	3.28E-01	6.55E-03	1.44E+00	2.87E-02
Toluene (methylbenzene)	--	x	x	108-88-3	92.14	58.95	39.3	98%	1.92E+00	3.84E-02	8.40E+00	1.68E-01
Trichloroethylene (trichloroethene)	x	x	x	79-01-6	131.38	4.23	2.82	98%	1.96E-01	3.93E-03	8.60E-01	1.72E-02
Vinyl Chloride (chloroethylene, VCM)	x	x	x	75-01-4	62.50	11.01	7.34	98%	2.43E-01	4.86E-03	1.06E+00	2.13E-02
Xylenes (m, o, p)	--	x	x	1330-20-7	106.17	18.15	12.1	91%	6.81E-01	6.12E-02	2.98E+00	2.68E-01
Hydrogen Chloride ^{2,3}		x	--	7647-01-0	36.5	63.00	42	0%	8.11E-01	8.11E-01	3.55E+00	3.55E+00
VOC									4.37E+00	1.47E-01	1.91E+01	6.43E-01
Total HAP									6.18E+00	9.78E-01	2.71E+01	4.28E+00
Maximum Single HAP									1.92E+00	8.11E-01	8.40E+00	3.55E+00

Notes:

¹AP-42 5th Ed., "Compilation of Air Pollutant Emissions Factors, Vol. 1: Stationary Point and Area Sources," Table 2.4-1, Nov. 1998. These concentrations were increased by a safety factor of 1.5 to account for the treatment process of the LFG prior to sending to TREA 7. Sulfur containing compounds are non-halogenated. H2S concentration taken from "Pine Bend - Narrative to Support Air Permit and Air Emission Calculations" prepared by SCS Energy.

²Product of combustion

³Because HCl is a production of combustion, a default ionic Cl LFG concentration of 42 ppmv is listed; AP-42, Section 2.4.4.

⁴ Control efficiencies provided by manufacturer.

Scenario 1 HAPs from TREA 7 (Thermal oxidizer) burning natural gas

Emissions are from natural gas burned for firing of the thermal oxidizer

NG inlet flow 160 scfm

9600 scf/hr

NG Compound	CAS	Emission Factor (lb/10 ⁶ scf) ¹	PTE Uncontrolled	PTE Controlled	PTE Uncontrolled	PTE Limited
			lb/hr	lb/hr	ton/yr	ton/yr
2-Methylnaphthalene	91-57-6	2.40E-05	2.30E-07	2.30E-07	1.01E-06	1.01E-06
3-Methylcholanthrene	56-49-5	1.80E-06	1.73E-08	1.73E-08	7.57E-08	7.57E-08
7, 12-Dimethylbenz(a)anthracene		1.60E-05	1.54E-07	1.54E-07	6.73E-07	6.73E-07
Acenaphthene	83-32-9	1.80E-06	1.73E-08	1.73E-08	7.57E-08	7.57E-08
Acenaphthylene	203-96-8	1.80E-06	1.73E-08	1.73E-08	7.57E-08	7.57E-08
Anthracene	120-12-7	2.40E-06	2.30E-08	2.30E-08	1.01E-07	1.01E-07
Benz(a)anthracene	56-55-3	1.80E-06	1.73E-08	1.73E-08	7.57E-08	7.57E-08
Benzene	71-43-2	2.10E-03	2.02E-05	2.02E-05	8.83E-05	8.83E-05
Benzo(a)pyrene	50-32-8	1.20E-06	1.15E-08	1.15E-08	5.05E-08	5.05E-08
Benzo(b)fluoranthene	205-99-2	1.80E-06	1.73E-08	1.73E-08	7.57E-08	7.57E-08
Benzo(g,h,i)perylene	191-24-2	1.20E-06	1.15E-08	1.15E-08	5.05E-08	5.05E-08
Benzo(k)fluoranthene	207-08-9	1.80E-06	1.73E-08	1.73E-08	7.57E-08	7.57E-08
Chrysene	218-01-9	1.80E-06	1.73E-08	1.73E-08	7.57E-08	7.57E-08
Dibenzo(a,h)anthracene	53-70-3	1.20E-06	1.15E-08	1.15E-08	5.05E-08	5.05E-08
Dichlorobenzene	25321-22-6	1.20E-03	1.15E-05	1.15E-05	5.05E-05	5.05E-05
Fluoranthene	206-44-0	3.00E-06	2.88E-08	2.88E-08	1.26E-07	1.26E-07
Fluorene	86-73-7	2.80E-06	2.69E-08	2.69E-08	1.18E-07	1.18E-07
Formaldehyde	50-00-0	7.50E-02	7.20E-04	7.20E-04	3.15E-03	3.15E-03
Hexane	110-54-3	1.80E+00	1.73E-02	1.73E-02	7.57E-02	7.57E-02
Indeno(1,2,3-cd)pyrene	193-39-5	1.80E-06	1.73E-08	1.73E-08	7.57E-08	7.57E-08
Naphthalene	91-20-3	6.10E-04	5.86E-06	5.86E-06	2.56E-05	2.56E-05
Phenanthrene	85-01-8	1.70E-05	1.63E-07	1.63E-07	7.15E-07	7.15E-07
Pyrene	129-00-0	5.00E-06	4.80E-08	4.80E-08	2.10E-07	2.10E-07
Toluene	108-88-3	3.40E-03	3.26E-05	3.26E-05	1.43E-04	1.43E-04
Arsenic	7440-38-2	2.00E-04	1.92E-06	1.92E-06	8.41E-06	8.41E-06
Beryllium	7440-41-7	1.20E-05	1.15E-07	1.15E-07	5.05E-07	5.05E-07
Cadmium	7440-43-9	1.10E-03	1.06E-05	1.06E-05	4.63E-05	4.63E-05
Chromium	7440-47-3	1.40E-03	1.34E-05	1.34E-05	5.89E-05	5.89E-05
Cobalt	7440-48-4	8.40E-05	8.06E-07	8.06E-07	3.53E-06	3.53E-06
Manganese	7439-96-5	3.80E-04	3.65E-06	3.65E-06	1.60E-05	1.60E-05
Mercury	7439-97-6	2.60E-04	2.50E-06	2.50E-06	1.09E-05	1.09E-05
Nickel	7440-02-0	2.10E-03	2.02E-05	2.02E-05	8.83E-05	8.83E-05
Selenium	7782-49-2	2.40E-05	2.30E-07	2.30E-07	1.01E-06	1.01E-06
Total HAP			1.81E-02	1.81E-02	7.94E-02	7.94E-02
Maximum Single HAP			1.73E-02	1.73E-02	7.57E-02	7.57E-02

¹ AP-42 5th Ed., "Compilation of Air Pollutant Emissions Factors, Vol. 1: Stationary Point and Area Sources," Tables 1.4-3 and 1.4-4.

Scenario 1 HAPs from TREA 6 (Open Flare) burning Landfill gas

Source	Rate (scfm)
Open Flare TREA 6	4,000

HAPS Pollutant	CAS Number	HAP	Molecular	Default	Control Efficiency (%)	PTE Uncontrolled	PTE Controlled	PTE Uncontrolled	PTE Limited
1,1,1-Trichloroethane (methyl chloroform)	71-55-6	x	133.41	0.4800	98	4.05E-02	8.10E-04	1.77E-01	3.55E-03
1,1,2,2-Tetrachloroethane	79-34-5	x	167.85	1.1100	98	1.18E-01	2.36E-03	5.16E-01	1.03E-02
1,1-Dichloroethane (ethylidene dichloride)	75-34-3	x	98.97	2.3500	98	1.47E-01	2.94E-03	6.44E-01	1.29E-02
1,1-Dichloroethene (vinylidene chloride)	75-35-4	x	96.94	0.2000	98	1.23E-02	2.45E-04	5.37E-02	1.07E-03
1,2-Dichloroethane (ethylene dichloride)	107-06-2	x	98.96	0.4100	98	2.57E-02	5.13E-04	1.12E-01	2.25E-03
1,2-Dichloropropane (propylene dichloride)	78-87-5	x	112.99	0.1800	98	1.29E-02	2.57E-04	5.63E-02	1.13E-03
Acrylonitrile	107-13-1	x	53.06	6.3300	98	2.12E-01	4.25E-03	9.30E-01	1.86E-02
Benzene (no co-disposal)	71-43-2	x	78.11	1.9100	98	9.44E-02	1.89E-03	4.13E-01	8.27E-03
Carbon disulfide	75-15-0	x	76.13	0.5800	98	2.79E-02	5.59E-04	1.22E-01	2.45E-03
Carbon tetrachloride	56-23-5	x	153.84	0.0040	98	3.89E-04	7.78E-06	1.70E-03	3.41E-05
Carbonyl sulfide	463-58-1	x	60.07	0.4900	98	1.86E-02	3.72E-04	8.15E-02	1.63E-03
Chlorobenzene	108-90-7	x	112.56	0.2500	98	1.78E-02	3.56E-04	7.80E-02	1.56E-03
Chloroethane (ethyl chloride)	75-00-3	x	64.52	1.2500	98	5.10E-02	1.02E-03	2.23E-01	4.47E-03
Chloroform	67-66-3	x	119.39	0.0300	98	2.27E-03	4.53E-05	9.92E-03	1.98E-04
Chloromethane (methyl chloride)	74-87-3	x	50.49	1.2100	98	3.86E-02	7.73E-04	1.69E-01	3.38E-03
1,4 Dichlorobenzene (p-dichlorobenzene)	106-46-7	x	147.00	0.2130	98	1.98E-02	3.96E-04	8.67E-02	1.73E-03
Dichloromethane (methylene chloride)	75-09-2	x	84.94	14.3000	98	7.68E-01	1.54E-02	3.36E+00	6.73E-02
Ethylbenzene	100-41-4	x	106.16	4.6100	98	3.10E-01	6.19E-03	1.36E+00	2.71E-02
Ethylene dibromide (1,2 dibromoethane)	106-93-4	x	187.88	0.0010	98	1.19E-04	2.38E-06	5.20E-04	1.04E-05
Hexane	110-54-3	x	86.18	6.5700	98	3.58E-01	7.16E-03	1.57E+00	3.14E-02
Mercury (total)	7439-97-6	x	200.61	0.0003	0	3.70E-05	3.70E-05	1.62E-04	1.62E-04
Methyl isobutyl ketone	108-10-1	x	100.16	1.8700	98	1.18E-01	2.37E-03	5.19E-01	1.04E-02
Perchloroethylene (tetrachloroethylene)	127-18-4	x	165.83	3.7300	98	3.91E-01	7.82E-03	1.71E+00	3.43E-02
Toluene (no co-disposal)	108-88-3	x	92.14	39.3000	98	2.29E+00	4.58E-02	1.00E+01	2.01E-01
Trichloroethylene (trichloroethene)	79-01-6	x	131.40	2.8200	98	2.34E-01	4.69E-03	1.03E+00	2.05E-02
Vinyl chloride	75-01-4	x	62.50	7.3400	98	2.90E-01	5.80E-03	1.27E+00	2.54E-02
Xylenes	1330-20-7	x	106.16	12.1000	98	8.12E-01	1.62E-02	3.56E+00	7.12E-02
Hydrogen Chloride	7647-01-0	x	36.50	42.0000	0	9.70E-01	9.70E-01	4.25E+00	4.25E+00

Table notes:

Emission factors taken from AP-42 Chapter 2.42, Tables 2.4.1 and 2.4.2.

Example Calculation:

Inlet Mass Flowrate,

$(800 \text{ scfm} \times 60) \times 1 \text{ ATM} / (0.7302 \text{ ATM ft}^3/\text{lbmol oR} \times 519.67 \text{ oR}) = 213.46 \text{ lb mol fuel/hr}$

Emission Rate,

$\text{Inlet Mass Flowrate (lbmol fuel/hr)} \times (1 - \text{Control Efficiency})$

Flare control efficiency 98.0% used per AP-42 Chapter 2.4, Table 2.4-3

TOTAL HAPS (TPY)	4.81E+00
Max Single HAPS (TPY)	4.25E+00

Scenario 1 -Air Toxics

Assume 8760 hr/yr of operation

Compound	Conc in Inlet Gas (adjusted) (ppmv) ¹	Conc in Inlet Gas (ppmv) ¹	Control Efficiency ⁴ (%)	PTE		PTE	
				Uncontrolled	Controlled	Uncontrolled	Limited
				lb/hr	lb/hr	ton/yr	ton/yr
1,1,1 - Trichloroethane (methyl chloroform)	0.72	0.48	98%	7.44E-02	1.49E-03	3.26E-01	6.52E-03
1,1,2,2 - Tetrachloroethane	1.67	1.11	98%	2.17E-01	4.33E-03	9.48E-01	1.90E-02
1,1 - Dichloroethane (ethylidene dichloride)	3.53	2.35	98%	2.70E-01	5.41E-03	1.18E+00	2.37E-02
1,1 - Dichloroethene (vinylidene chloride)	0.30	0.201	98%	2.26E-02	4.52E-04	9.89E-02	1.98E-03
1,2 - Dichloroethane (ethylene dichloride)	0.61	0.407	98%	4.70E-02	9.40E-04	2.06E-01	4.12E-03
1,2 - Dichloropropane (propylene dichloride)	0.27	0.18	98%	2.36E-02	4.73E-04	1.04E-01	2.07E-03
Acrylonitrile (Propenenitrile)	9.50	6.33	91%	3.90E-01	2.03E-02	1.71E+00	8.87E-02
Benzene	2.87	1.91	98%	1.73E-01	3.49E-03	7.60E-01	1.53E-02
Carbon Disulfide	0.87	0.58	99.7%	5.13E-02	6.29E-04	2.25E-01	2.75E-03
Carbon Tetrachloride	0.01	0.004	98%	7.15E-04	1.43E-05	3.13E-03	6.27E-05
Carbonyl Sulfide	0.74	0.49	99.7%	3.42E-02	4.19E-04	1.50E-01	1.84E-03
Chlorobenzene (monochlorobenzene)	0.38	0.254	98%	3.29E-02	6.59E-04	1.44E-01	2.89E-03
Chloroethane (ethyl chloride)	1.88	1.25	98%	9.37E-02	1.87E-03	4.11E-01	8.21E-03
Chloroform (trichloromethane)	0.05	0.03	98%	4.16E-03	8.33E-05	1.82E-02	3.65E-04
Chloromethane (methyl chloride)	1.82	1.21	98%	7.10E-02	1.42E-03	3.11E-01	6.22E-03
1,4 Dichlorobenzene (p-dichlorobenzene)	0.32	0.213	98%	3.64E-02	7.39E-04	1.59E-01	3.24E-03
Dichloromethane (methylene chloride)	21.45	14.3	98%	1.41E+00	2.82E-02	6.18E+00	1.24E-01
Ethylbenzene	6.92	4.61	98%	5.69E-01	1.14E-02	2.49E+00	4.98E-02
Ethylene dibromide (1,2 dibromoethane)	0.00	0.001	98%	2.18E-04	4.37E-06	9.56E-04	1.91E-05
Hexane	9.86	6.57	98%	6.75E-01	3.04E-02	2.96E+00	1.33E-01
Mercury (total)	0.00	#####	0%	7.06E-05	7.06E-05	3.09E-04	3.09E-04
Methyl Isobutyl Ketone (hexone)	2.81	1.87	98%	2.18E-01	4.35E-03	9.53E-01	1.91E-02
Tetrachloroethylene (perchloroethylene, -ethene)	5.60	3.73	98%	7.19E-01	1.44E-02	3.15E+00	6.30E-02
Toluene (methylbenzene)	58.95	39.3	98%	4.21E+00	8.42E-02	1.84E+01	3.69E-01
Trichloroethylene (trichloroethene)	4.23	2.82	98%	4.31E-01	8.61E-03	1.89E+00	3.77E-02
Vinyl Chloride (chloroethylene, VCM)	11.01	7.34	98%	5.33E-01	1.07E-02	2.34E+00	4.67E-02
Xylenes (m, o, p)	18.15	12.1	91%	1.49E+00	7.75E-02	6.54E+00	3.39E-01
Hydrogen Chloride ^{2,3}	63.00	42	0%	1.78E+00	1.78E+00	7.80E+00	7.80E+00
2-Methylnaphthalene				2.30E-07	2.30E-07	1.01E-06	1.01E-06
3-Methylcholanthrene				1.73E-08	1.73E-08	7.57E-08	7.57E-08
7, 12-Dimethylbenz(a)anthracene				1.54E-07	1.54E-07	6.73E-07	6.73E-07
Acenaphthene				1.73E-08	1.73E-08	7.57E-08	7.57E-08
Acenaphthylene				1.73E-08	1.73E-08	7.57E-08	7.57E-08
Anthracene				2.30E-08	2.30E-08	1.01E-07	1.01E-07
Benz(a)anthracene				1.73E-08	1.73E-08	7.57E-08	7.57E-08
Benzo(a)pyrene				1.15E-08	1.15E-08	5.05E-08	5.05E-08
Benzo(b)fluoranthene				1.73E-08	1.73E-08	7.57E-08	7.57E-08
Benzo(g,h,i)perylene				1.15E-08	1.15E-08	5.05E-08	5.05E-08
Benzo(k)fluoranthene				1.73E-08	1.73E-08	7.57E-08	7.57E-08
Chrysene				1.73E-08	1.73E-08	7.57E-08	7.57E-08
Dibenzo(a,h)anthracene				1.15E-08	1.15E-08	5.05E-08	5.05E-08
Fluoranthene				2.88E-08	2.88E-08	1.26E-07	1.26E-07
Fluorene				2.69E-08	2.69E-08	1.18E-07	1.18E-07
Formaldehyde				7.20E-04	7.20E-04	3.15E-03	3.15E-03
Indeno(1,2,3-cd)pyrene				1.73E-08	1.73E-08	7.57E-08	7.57E-08
Naphthalene				5.86E-06	5.86E-06	2.56E-05	2.56E-05
Phenanthrene				1.63E-07	1.63E-07	7.15E-07	7.15E-07
Pyrene				4.80E-08	4.80E-08	2.10E-07	2.10E-07
Arsenic				1.92E-06	1.92E-06	8.41E-06	8.41E-06
Beryllium				1.15E-07	1.15E-07	5.05E-07	5.05E-07
Cadmium				1.06E-05	1.06E-05	4.63E-05	4.63E-05
Chromium				1.34E-05	1.34E-05	5.89E-05	5.89E-05
Cobalt				8.06E-07	8.06E-07	3.53E-06	3.53E-06
Manganese				3.65E-06	3.65E-06	1.60E-05	1.60E-05
Nickel				2.02E-05	2.02E-05	8.83E-05	8.83E-05
Selenium				2.30E-07	2.30E-07	1.01E-06	1.01E-06
Total HAP				2.09E+00	2.09E+00	5.95E+01	9.17E+00
Maximum Single HAP				4.21E+00	1.78E+00	1.84E+01	7.80E+00

Notes:

See emission information noted on actual emission calculations

Scenario 2 - Open Flare - LFG Recovery

Landfill Gas Recovery			
Emission Unit	Design Capacity	Operating Flow	Units
TREA 6 - Open Flare burning LFG	4,000	4,000	scfm
Total Collected Flow	4,000	4,000	scfm

EMISSION FACTOR SOURCE:

Emission Source	Regulated Pollutants	Maximum Gas Consumption		Hours of Operation	Emission Factors⁽⁷⁾		Uncontrolled	Controlled
							PTE	PTE
		cfm	MMCF/yr	(hrs/yr)			(lbs/hr)	(lbs/hr)
FUGI 2 Emissions from landfill	VOCs ⁽¹⁾	4,000	2,102	8,760	1.92	lb/hr	1.92	1.92
	NMOC ⁽²⁾	4,000	2,102	8,760	4.92	lb/hr	4.92	4.92
TREA 6 - Open Flare burning LFG	VOCs ⁽³⁾	4,000	2,102	8,760	12.6	lb/hr	12.6	0.25
	NMOC ⁽⁴⁾	4,000	2,102	8,760	32.3	lb/hr	32.3	0.65
	NO _x ⁽⁵⁾	4,000	2,102	8,760	0.068	lb/MMBTU	7.43	7.43
	SO ₂ ⁽⁶⁾	4,000	2,102	8,760	20.2	lb/hr	20.2	20.2
	CO ⁽⁷⁾	4,000	2,102	8,760	0.31	lb/MMBTU	33.9	33.9
	PM ₁₀ ⁽⁸⁾	4,000	2,102	8,760	1.7E-05	lb/scfm CH ₄	2.04	2.04
	PM _{2.5} ⁽⁸⁾	4,000	2,102	8,760	1.7E-05	lb/scfm CH ₄	2.04	2.04
	CO ₂ ⁽⁹⁾ (Combustion)	4,000	2,102	8,760	52.07	kg/MMBtu	13957	13957
	CO ₂ ⁽⁹⁾ (LFG passing thru flare)	4,000	2,102	8,760	13906	lb/hr	13906	13906
	CH ₄ ⁽¹⁰⁾	4,000	2,102	8,760	0.0032	kg/MMBtu	0.86	0.86
	N ₂ O ⁽¹⁰⁾	4,000	2,102	8,760	0.00060	kg/MMBtu	0.16	0.16
	CO _{2e} ⁽¹⁰⁾	4,000	2,102	8,760			27932	27932

EMISSION FACTOR SOURCE:

- (1) VOC (lb/hr) = [(gas flow in cfm * conc (ppmv) * 0.000001 * MW)/(std temp in R * gas constant)] * 60 min/hr * (1-control efficiency) where MW = 86 lb/lb-mol and conc is 232 ppmv, or 39% of NMOC conc, a
- (2) NMOC (lb/hr) = [(gas flow in cfm * conc (ppmv) * 0.000001 * MW)/(std temp in R * gas constant)] * 60 min/hr * (1-control efficiency) where MW is 86 lb/lb-mol and NMOC conc is 595 ppmv (AP-42 ch. 2), as
- (3) VOC concentration derived from 39% of NMOC concentration as indicated by AP-42. Lb/hr = (86 lb/lb-mol*232 ppmv*scfm*0.000001)/(0.7302*520)*60. Control efficiency of 98% can be assumed.
- (4) NMOC (lb/hr) = [(gas flow in cfm * conc (ppmv) * 0.000001 * MW)/(std temp in R * gas constant)] * 60 min/hr where concentration = 595 ppmv and MW = 86 lb/lb-mol. Control efficiency of 98% can be assumed.
- (5) Manufacturer Specifications, with an emission factor of 0.068 lb/MMBtu and a rating of 109.2 MMBtu/hr
- (6) Sulfur concentration of 500 ppmv based on AP-42 5th Ed., Section 2.4.4.2, November 1998 with an increased safety factor. Lb/hr = (flow *ppmv*lb/lb mole*0.000001)/(0.7302*520)*60 = 20.2 lb/hr, where n
- (7) Manufacturer Specifications, with an emission factor of 0.31 lb/MMBtu and a rating of 109.2 MMBtu/hr
- (8) Emission factor for Particulate Matter (in lb/hr/dscfm CH₄) is from AP-42, Table 2.4-5. PM and PM_{2.5} assumed to be the same as PM₁₀. 1.7E-05 lb/hr/dscfm CH₄*4000 scfm*0.5*60 = 2.04 lb/hr, where the g
- (9) CO₂ pass through = (scfm*ppmv*MW*0.000001)/(0.7302*520)*60 where ppmv is 500,000 and MW is 44 lb/lb-mol and CO₂ combustion = 52.0 kg/MMBtu*2.2 lb/kg*506.5 Btu/CF*4000 CF/min*0.000001*60
- (10) Emissions based on 40 CFR 98, TOx assumed to operate at maximum capacity 24 hours/day 365 days/year for PTE purposes. 40 CFR 98, Subpart C, Tables C-1, C-2, Rev. September 10, 2010; factors was unavailable. 2 GWP of CH₄ increased from 21 to 25, effective Jan. 1, 2014. GWP of N₂O decreased from 310 to 298, effective Jan. 1, 2014.

Scenario 2 HAPs from TREA 6 (Open Flare) burning Landfill gas

Source	Rate (scfm)
Open Flare TREA 6	4,000

HAPS Pollutant	CAS Number	HAP	Molecular Weight (lb/lb mol)	Default Concentration (ppmv)	Control Efficiency (%)	PTE Uncontrolled (lb/hr)	PTE Controlled (lb/hr)	PTE Uncontrolled (TPY)	PTE Limited (TPY)
1,1,1-Trichloroethane (methyl chloroform)	71-55-6	x	133.41	0.4800	98	4.05E-02	8.10E-04	1.77E-01	3.55E-03
1,1,2,2-Tetrachloroethane	79-34-5	x	167.85	1.1100	98	1.18E-01	2.36E-03	5.16E-01	1.03E-02
1,1-Dichloroethane (ethylidene dichloride)	75-34-3	x	98.97	2.3500	98	1.47E-01	2.94E-03	6.44E-01	1.29E-02
1,1-Dichloroethene (vinylidene chloride)	75-35-4	x	96.94	0.2000	98	1.23E-02	2.45E-04	5.37E-02	1.07E-03
1,2-Dichloroethane (ethylene dichloride)	107-06-2	x	98.96	0.4100	98	2.57E-02	5.13E-04	1.12E-01	2.25E-03
1,2-Dichloropropane (propylene dichloride)	78-87-5	x	112.99	0.1800	98	1.29E-02	2.57E-04	5.63E-02	1.13E-03
Acrylonitrile	107-13-1	x	53.06	6.3300	98	2.12E-01	4.25E-03	9.30E-01	1.86E-02
Benzene	71-43-2	x	78.11	1.9100	98	9.44E-02	1.89E-03	4.13E-01	8.27E-03
Carbon disulfide	75-15-0	x	76.13	0.5800	98	2.79E-02	5.59E-04	1.22E-01	2.45E-03
Carbon tetrachloride	56-23-5	x	153.84	0.0040	98	3.89E-04	7.78E-06	1.70E-03	3.41E-05
Carbonyl sulfide	463-58-1	x	60.07	0.4900	98	1.86E-02	3.72E-04	8.15E-02	1.63E-03
Chlorobenzene	108-90-7	x	112.56	0.2500	98	1.78E-02	3.56E-04	7.80E-02	1.56E-03
Chloroethane (ethyl chloride)	75-00-3	x	64.52	1.2500	98	5.10E-02	1.02E-03	2.23E-01	4.47E-03
Chloroform	67-66-3	x	119.39	0.0300	98	2.27E-03	4.53E-05	9.92E-03	1.98E-04
Chloromethane (methyl chloride)	74-87-3	x	50.49	1.2100	98	3.86E-02	7.73E-04	1.69E-01	3.38E-03
1,4 Dichlorobenzene (p-dichlorobenzene)	106-46-7	x	147.00	0.2130	98	1.98E-02	3.96E-04	8.67E-02	1.73E-03
Dichloromethane (methylene chloride)	75-09-2	x	84.94	14.3000	98	7.68E-01	1.54E-02	3.36E+00	6.73E-02
Ethylbenzene	100-41-4	x	106.16	4.6100	98	3.10E-01	6.19E-03	1.36E+00	2.71E-02
Ethylene dibromide (1,2 dibromoethane)	106-93-4	x	187.88	0.0010	98	1.19E-04	2.38E-06	5.20E-04	1.04E-05
Hexane	110-54-3	x	86.18	6.5700	98	3.58E-01	7.16E-03	1.57E+00	3.14E-02
Mercury (total)	7439-97-6	x	200.61	0.0003	0	3.70E-05	3.70E-05	1.62E-04	1.62E-04
Methyl isobutyl ketone	108-10-1	x	100.16	1.8700	98	1.18E-01	2.37E-03	5.19E-01	1.04E-02
Perchloroethylene (tetrachloroethylene)	127-18-4	x	165.83	3.7300	98	3.91E-01	7.82E-03	1.71E+00	3.43E-02
Toluene (no co-disposal)	108-88-3	x	92.14	39.3000	98	2.29E+00	4.58E-02	1.00E+01	2.01E-01
Trichloroethylene (trichloroethene)	79-01-6	x	131.40	2.8200	98	2.34E-01	4.69E-03	1.03E+00	2.05E-02
Vinyl chloride	75-01-4	x	62.50	7.3400	98	2.90E-01	5.80E-03	1.27E+00	2.54E-02
Xylenes	1330-20-7	x	106.16	12.1000	98	8.12E-01	1.62E-02	3.56E+00	7.12E-02
Hydrogen Chloride	7647-01-0	x	36.50	42.0000	0	9.70E-01	9.70E-01	4.25E+00	4.25E+00
TOTAL HAPS (TPY)								3.23E+01	4.81E+00
Max Single HAPS (TPY)								1.00E+01	4.25E+00

Table notes:

Emission factors taken from AP-42 Chapter 2.42, Tables 2.4.1 and 2.4.2.

Example Calculation:
Inlet Mass Flowrate,
(800 scfm * 60) * 1 ATM / (0.7302 ATM ft³/lbmol oR * 519.67 oR) = 213.46 lb mol fuel/hr
Emission Rate,
Inlet Mass Flowrate (lbmol fuel/hr) * (1-Control Efficiency)
Flare control efficiency 98.0% used per AP-42 Chapter 2.4, Table 2.4-3

Fugitive PM from unpaved roads

$$E = k * [(s/12)^a * (W/3)^b] * (1-(P/N)) \quad (\text{AP-42 Chapter 13.2})$$

Factor	Description	PM2.5 value (lb/VMT)	PM10 value (lb/VMT)	PM value (lb/VMT)
E =	Emission factor (lb/VMT, vehicle miles traveled), AP-42, Section 13.2.2, Eqn 2	0.153	1.53	5.66
k (lb/VMT)=	Particle size multiplier, AP-42 Table 13.2.2-2, factors for industrial roads	0.15	1.50	4.90
s =	Surface material silt content (%), AP-42, Table 13.2.2-1, factor for municipal solid waste landfills	6.4	6.4	6.4
W =	Mean vehicle weight (ton), value provided by facility	24.4	24.4	24.4
a =	Constant from AP-42 Table 13.2.2-2, factor for industrial roads	0.9	0.9	0.7
b =	Constant from AP-42 Table 13.2.2-2, factor for industrial roads	0.45	0.45	0.45
P =	Number of wet days, AP-42, Figure 13.2.1-2	110	110	110
N =	Number of days in averaging period	365	365	365
CE	Control efficiency (%)	50%		
Daily hours of operation		9		

Mean vehicle weight	Total Miles Traveled/yr (VMT)
Total vehicle count = 131/day	47,815
Unloaded weight = 18 tons	
Loaded weight = 31.2 tons	47,815
Mean weight = 24.4 tons	

Pollutant	Vehicles/day	VMT	Emission factor (lb/VMT)	Uncontrolled PTE (lbs/hr)	Controlled PTE (lbs/hr)	PTE un-restricted (tpy)	PTE limited (tpy)	Insignificant Activity Threshold (lb/yr)
PM-2.5	131	47,815	0.153	2.22	1.11	3.65	1.83	
PM-10	131	47,815	1.53	22.2	11.1	36.5	18.3	2000
PM	131	47,815	5.66	82.4	41.2	135.4	67.7	2000

From 2014 Emission Inventory, assume 9 hours/day of operation for 260 days/yr for actual emissions
Assume 24 hr/day, 365 days/yr for PTE

FUGI 2 and EQUI 29 Landfill Emissions

Inputs			
MSW Max Design Capacity	29,800,000	Cubic Yards	
Landfill Gas Generation Rate ¹	2,102,400,000	scf/yr LFG	
	4,000	scfm	
Percent Fugitive Emissions ²	15%		
LFG Fugitive Flowrate	600	scfm	
Percent Landfill Emissions (captured) ²	85%		
LFG (captured) Flowrate	3,400	scfm	

LFG Compound	CAS	MW	Concentration ³	Total LF emissions		FUGI 2		EQUI 29	
				Uncontrolled Landfill Emissions		Landfill Fugitive Emissions		Landfill Emissions	
				lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
1,1,1 - Trichloroethane (methyl chloroform)	71-55-6	133.41	4.80E-01	4.05E-02	1.77E-01	6.07E-03	2.66E-02	3.44E-02	1.51E-01
1,1,2,2 - Tetrachloroethane	79-34-5	167.85	1.11E+00	1.18E-01	5.16E-01	1.77E-02	7.74E-02	1.00E-01	4.39E-01
1,1 - Dichloroethane (ethylidene dichloride)	75-34-3	98.96	2.35E+00	1.47E-01	6.44E-01	2.21E-02	9.66E-02	1.25E-01	5.47E-01
1,1 - Dichloroethene (vinylidene chloride)	75-35-4	96.94	2.01E-01	1.23E-02	5.40E-02	1.85E-03	8.09E-03	1.05E-02	4.59E-02
1,2 - Dichloroethane (ethylene dichloride)	107-06-2	98.96	4.07E-01	2.55E-02	1.12E-01	3.82E-03	1.67E-02	2.16E-02	9.48E-02
1,2 - Dichloropropane (propylene dichloride)	78-87-5	112.99	1.80E-01	1.29E-02	5.63E-02	1.93E-03	8.45E-03	1.09E-02	4.79E-02
Acrylonitrile (Propenenitrile)	107-13-1	53.06	6.33E+00	2.12E-01	9.30E-01	3.19E-02	1.40E-01	1.80E-01	7.91E-01
Benzene	71-43-2	78.12	1.91E+00	9.43E-02	4.13E-01	1.42E-02	6.20E-02	8.02E-02	3.51E-01
Carbon Disulfide	75-15-0	76.14	5.80E-01	2.79E-02	1.22E-01	4.19E-03	1.83E-02	2.37E-02	1.04E-01
Carbon Tetrachloride	56-23-5	153.84	4.00E-03	3.89E-04	1.70E-03	5.84E-05	2.56E-04	3.31E-04	1.45E-03
Carbonyl Sulfide	463-58-1	60.07	4.90E-01	1.86E-02	8.15E-02	2.79E-03	1.22E-02	1.58E-02	6.93E-02
Chlorobenzene (monochlorobenzene)	108-90-7	112.56	2.54E-01	1.81E-02	7.92E-02	2.71E-03	1.19E-02	1.54E-02	6.73E-02
Chloroethane (ethyl chloride)	75-00-3	64.52	1.25E+00	5.10E-02	2.23E-01	7.65E-03	3.35E-02	4.33E-02	1.90E-01
Chloroform	67-66-3	119.38	3.00E-02	2.26E-03	9.92E-03	3.40E-04	1.49E-03	1.92E-03	8.43E-03
Chloromethane (methyl chloride)	74-87-3	50.49	1.21E+00	3.86E-02	1.69E-01	5.79E-03	2.54E-02	3.28E-02	1.44E-01
1,4 Dichlorobenzene (p-dichlorobenzene)	106-46-7	147	2.13E-01	1.98E-02	8.67E-02	2.97E-03	1.30E-02	1.68E-02	7.37E-02
Dichloromethane (methylene chloride)	75-09-2	84.93	1.43E+01	7.68E-01	3.36E+00	1.15E-01	5.04E-01	6.53E-01	2.86E+00
Ethylbenzene	75-08-1	106.17	4.61E+00	3.09E-01	1.36E+00	4.64E-02	2.03E-01	2.63E-01	1.15E+00
Ethylene dibromide (1,2 dibromoethane)	106-93-4	187.88	1.00E-03	1.19E-04	5.20E-04	1.78E-05	7.80E-05	1.01E-04	4.42E-04
Hexane	110-54-3	86.18	6.57E+00	3.58E-01	1.57E+00	5.37E-02	2.35E-01	3.04E-01	1.33E+00
Mercury (total)	7439-97-6	200.61	2.92E-04	3.70E-05	1.62E-04	5.56E-06	2.43E-05	3.15E-05	1.38E-04
Methyl Isobutyl Ketone (hexone)	108-10-1	100.16	1.87E+00	1.18E-01	5.19E-01	1.78E-02	7.78E-02	1.01E-01	4.41E-01
Tetrachloroethylene (perchloroethylene, -ethene)	127-18-4	165.83	3.73E+00	3.91E-01	1.71E+00	5.87E-02	2.57E-01	3.32E-01	1.46E+00
Toluene (methylbenzene)	108-88-3	92.14	3.93E+01	2.29E+00	1.00E+01	3.43E-01	1.50E+00	1.95E+00	8.52E+00
Trichloroethylene (trichloroethene)	79-01-6	131.38	2.82E+00	2.34E-01	1.03E+00	3.51E-02	1.54E-01	1.99E-01	8.72E-01
Vinyl Chloride (chloroethylene, VCM)	75-01-4	62.50	7.34E+00	2.90E-01	1.27E+00	4.35E-02	1.91E-01	2.47E-01	1.08E+00
Xylenes (m, o, p)	1330-20-7	106.17	1.21E+01	8.12E-01	3.56E+00	1.22E-01	5.34E-01	6.90E-01	3.02E+00
Total HAP				6.41	28.1	0.96	4.21	5.45	23.9
Maximum Single HAP (Toluene)				2.29	10.0	0.343	1.50	1.95	8.52

LFG Criteria & GHG Emissions

LFG Compound	CAS	MW	Concentration ³	Uncontrolled Landfill Emissions		Landfill Fugitive Emissions (FUGI 2)		Captured Landfill Emissions (EQUI 29)	
				lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
VOCs	NA	86.18	235.0	12.8	56.1	1.92	8.41	10.9	47.7
NMOC			595.0	32.8	143.8	4.92	21.6	27.9	122.2
CO ₂	124-38-9	44.01	498,352	1.39E+04	6.07E+04	2.08E+03	9.11E+03	1.18E+04	5.16E+04
CH ₄	74-82-8	16.04	500,000	5.07E+03	2.22E+04	5.70E+02	2.50E+03	3.66E+03	1.60E+04
CO ₂ e	NA	NA	NA	1.41E+05	6.16E+05	1.63E+04	7.16E+04	1.03E+05	4.53E+05
H ₂ S ⁴		34.08	41.3	0.89	3.90	0.10	0.44	0.64	2.82

Notes:
¹Landfill gas generation rate based on USEPA LandGEM model, Version 3.02

²MPCA believes that 85% of landfill gas at this facility can be captured and combusted at the flares or thermal oxidizer. This means the other 15% of emissions are released into the air. Per a Rolling Hills Applicability Determination from 2013, these uncaptured emissions are considered fugitive.

³Concentrations from AP-42 CH 2.4 Tables 2.4-1 and 2.4-2

⁴Lab tests give H₂S concentration of 41.3 ppmv

PTE Scenario 3

Emission Unit	Design Capacity	Units
TREA 7 - TOx burning waste gas	2,235	scfm
TREA 6 - Open Flare burning off spec gas	1,520	scfm
Total Gas Combusted	3,755	scfm
Emission Source		
NG as supplemental gas to TOx	160	scfm

Emission Source	Regulated Pollutants	Maximum Gas Consumption		Hours of Operation	Emission Factors		Uncontrolled	Controlled	Uncontrolled	Limited	
		cfm	MMCF/yr		(hrs/yr)			PTE	PTE	PTE	PTE
								(lbs/hr)	(lbs/hr)	(TPY)	(TPY)
TREA 7 - Tox burning waste gas	VOCs ⁽¹⁾	2,235	1,175	8,760	10.6	lb/hr	10.6	0.21	46.3	0.926	
	NMOC ⁽²⁾	2,235	1,175	8,760	27.1	lb/hr	27.1	0.54	118.8	2.376	
	NO _x ⁽³⁾	2,235	1,175	8,760	0.06	lb/MMBTU	0.44	0.44	1.92	1.92	
	SO ₂ ⁽⁴⁾	2,235	1,175	8,760	0.45	lb/hr	0.45	0.45	1.98	1.98	
	CO ⁽⁵⁾	2,235	1,175	8,760	0.2	lb/MMBTU	1.46	1.46	6.39	6.39	
	PM ₁₀ ⁽⁶⁾	2,235	1,175	8,760	1.7E-05	lb/scfm CH ₄	0.12	0.12	0.53	0.53	
	PM _{2.5} ⁽⁶⁾	2,235	1,175	8,760	1.7E-05	lb/scfm CH ₄	0.12	0.12	0.53	0.53	
	CO ₂ ⁽⁷⁾ Pass Through	2,235	1,175	8,760	52.07	kg/MMBtu	12198	12198	53429	53429	
	CO ₂ ⁽⁷⁾ Combustion	2,235	1,175	8,760	52.07	kg/MMBtu	836	836	3663	3663	
	CH ₄ ⁽⁷⁾	2,235	1,175	8,760	0.0032	kg/MMBtu	0.051	0.05	0.23	0.23	
	N ₂ O ⁽⁷⁾	2,235	1,175	8,760	0.0006	kg/MMBtu	0.010	0.010	0.042	0.042	
	CO _{2e} ⁽⁷⁾	2,235	1,175	8,760			13039	13039	57110	57110	

EMISSION FACTOR SOURCE:

(1) VOC (lb/hr) = [(gas flow in cfm * conc (ppmv) * 0.000001 * MW)/(std temp in R * gas constant)] * 60 min/hr * (1-control efficiency) where conc = 39% of NMOC, or 348 ppmv and MW = 86 lb/lb-mol. Control efficiency of 98% can be assumed.

(2) AP-42 gives a default NMOC concentration of 595 ppmv. The facility has applied a safety factor of 1.5, for a concentration of 893 ppmv and MW = 86 lb/lb-mol so NMOC = scfm*ppmv*MW*0.000001*60/0.730*520 = 27.1 lb/hr

(3) Manufacturer Specifications, with an emission factor of 0.06 lb/MMBtu and a rating of 7.2 MMBtu/hr

(4) SO₂ (lb/hr) = [(gas flow in cfm * conc (ppmv) * 0.000001 * MW)/(std temp in R * gas constant)] * 60 min/hr * 100% conversion of S to SO₂ where H₂S concentration = 20 ppmv (actual lab results show an H₂S conc of 41.3 ppmv in LFG), MW = 64 lb/lb-mol, and the RNG treatment system is designed to remove all sulfur from this stream)

(5) Manufacturer Specifications, with an emission factor of 0.2 lb/MMBtu and a rating of 7.3 MMBtu/hr

(6) AP-42 Table 2.4-5. PM and PM2.5 assumed to be the same as PM₁₀. Assume 5.34% of LFG is methane (TOx design), so PM = scfm*0.000001*0.0534*60 = 0.12 lb/hr

(7) Emissions based on 40 CFR 98, TOx assumed to operate at maximum capacity 24 hours/day 365 days/year for PTE purposes. 40 CFR 98, Subpart C, Tables C-1, C-2, Rev. September 10, 2010; factors are for landfill gas or biogas if landfill gas was unavailable. 2 GWP of CH₄ increased from 21 to 25, effective Jan. 1, 2014. GWP of N₂O decreased from 310 to 298, effective Jan. 1, 2014.

CO₂ pass through = (scfm*ppmv*MW*0.000001)/(0.7302*520)*60 where ppmv is 785,000 and MW is 44 lb/lb-mol and CO₂ combustion = 52.0 kg/MMBtu*2.2 lb/kg*7.2 MMBtu/hr

Emission Source	Regulated Pollutants	Maximum Gas Consumption		Hours of Operation (hrs/yr)	Emission Factors		Uncontrolled	Controlled	Uncontrolled	Limited
		cfm	MMCF/yr				PTE	PTE	PTE	PTE
							(lbs/hr)	(lbs/hr)	(TPY)	(TPY)
TREA 6 - Open Flare burning off spec gas	VOCs ⁽¹⁾	1,520	799	8,760	5.5	lb/10 ⁶ scf	0.502	0.502	2.20	2.20
	NO _x ⁽²⁾	1,520	799	8,760	0.068	lb/MMBTU	5.95	5.95	26.06	26.06
	SO ₂ ⁽³⁾	1,520	799	8,760	0.6	lb/10 ⁶ scf	0.055	0.055	0.2397	0.2397
	CO ⁽⁴⁾	1,520	799	8,760	0.37	lb/MMBTU	32.4	32.4	141.8	141.8
	PM ₁₀ ⁽⁵⁾	1,520	799	8,760	7.60	lb/10 ⁶ scf	0.69	0.69	3.04	3.04
	PM _{2.5} ⁽⁵⁾	1,520	799	8,760	7.60	lb/10 ⁶ scf	0.69	0.69	3.04	3.04
	CO ₂ ⁽⁶⁾	1,520	799	8,760	53.06	kg/MMBtu	10214	10214	44738	44738
	CH ₄ ⁽⁶⁾	1,520	799	8,760	1.00E-03	kg/MMBtu	0.19	0.19	0.84	0.84
	N ₂ O ⁽⁶⁾	1,520	799	8,760	1.00E-04	kg/MMBtu	0.019	0.019	0.084	0.084
	CO _{2e} ⁽⁶⁾	1,520	799	8,760			10225	10225	44784	44784

EMISSION FACTOR SOURCE:

Off-spec gas can be assumed to have the same characteristics of natural gas. This is because the RNG system only releases off-spec gas if the pipeline cannot accept it. This release can be conducted when the gas is close to natural gas in quality and characteristics. This requirement will be made into a permit condition.

(1) AP-42 Table 1.4-2

(2) Manufacturer Specifications, with an emission factor of 0.068 lb/MMBtu and a rating of 87.5 MMBtu/hr (provided by facility)

(3) Sulfur concentration of 500 ppmv based on AP-42 5th Ed., Table 1.4-2

(4) AP-42 Table 13.5-1, with an emission factor of 0.37 lb/MMBtu and a rating of 87.5 MMBtu/hr (provided by facility)

(5) AP-42 Table 1.4-2. PM and PM_{2.5} assumed to be the same as PM₁₀

(6) Emissions based on 40 CFR 98, flare assumed to operate at maximum capacity 24 hours/day 365 days/year for PTE purposes. 40 CFR 98, Subpart C, Tables C-1, C-2, Rev. September 10, 2010; factors are for landfill gas or biogas if landfill gas was unavailable. 2 GWP of CH₄ increased from 21 to 25, effective Jan. 1, 2014. GWP of N₂O decreased from 310 to 298, effective Jan. 1, 2014.

Emission Source	Regulated Pollutants	Maximum Gas Consumption		Hours of Operation (hrs/yr)	Emission Factors		Uncontrolled	Controlled	Uncontrolled	Limited
		cfm	MMCF/yr				PTE	PTE	PTE	PTE
							(lbs/hr)	(lbs/hr)	(TPY)	(TPY)
NG as supplemental gas to TOx	VOCs ⁽¹⁾	160	17	1,760	5.5	lb/10 ⁶ scf	0.053	0.053	0.046	0.046
	NO _x ⁽²⁾	160	17	1,760	0.15	lb/MMBTU	1.46	1.46	1.28	1.28
	SO ₂ ⁽³⁾	160	17	1,760	0.2	lb/10 ⁶ scf	0.0019	0.0019	0.0017	0.0017
	CO ⁽⁴⁾	160	17	1,760	0.20	lb/MMBTU	1.94	1.94	1.71	1.71
	PM ₁₀ ⁽⁵⁾	160	17	1,760	7.60	lb/10 ⁶ scf	0.073	0.073	0.064	0.064
	PM _{2.5} ⁽⁵⁾	160	17	1,760	7.60	lb/10 ⁶ scf	0.073	0.073	0.064	0.064
	CO ₂ ⁽⁶⁾	160	17	8,760	53.06	kg/MMBtu	1132	1132	4959	4959
	CH ₄ ⁽⁶⁾	160	17	8,760	1.00E-03	kg/MMBtu	0.021	0.021	0.019	0.019
	N ₂ O ⁽⁶⁾	160	17	8,760	1.00E-04	kg/MMBtu	0.0021	0.0021	0.0019	0.0019
CO _{2e} ⁽⁶⁾	160	17	8,760			1133	1133	997	997	

EMISSION FACTOR SOURCE:

(1) AP-42 5th Ed., "Compilation of Air Pollutant Emissions Factors, Vol. 1: Stationary Point and Area Sources," 1998 Table 1.4-2.

(2) Manufacturer Specifications, with an emission factor of 0.15 lb/MMBtu and a rating of 9.7 MMBtu/hr

(3) AP-42 5th Ed., "Compilation of Air Pollutant Emissions Factors, Vol. 1: Stationary Point and Area Sources," 1998 Table 1.4-2.

(4) Manufacturer Specifications, with an emission factor of 0.20 lb/MMBtu and a rating of 9.7 MMBtu/hr

(5) AP-42 Table 1.4-2. PM and PM_{2.5} assumed to be the same as PM₁₀

(6) CFR Part 98 Table C-1, factor for natural gas, use mfr rating of 9.7 MMBtu/hr

Scenario 3 Totals

	TOX and Open Flare Combined				NG as supplemental gas to TOX				Total			
Regulated Pollutants	Uncontrolled PTE	Controlled PTE	Uncontrolled PTE	Limited PTE	Uncontrolled PTE	Controlled PTE	Uncontrolled PTE	Limited PTE	Uncontrolled PTE	Controlled PTE	Uncontrolled PTE	Limited PTE
	(lbs/hr)	(lbs/hr)	(TPY)	(TPY)	(lbs/hr)	(lbs/hr)	(TPY)	(TPY)	(lbs/hr)	(lbs/hr)	(TPY)	(TPY)
VOCs	11.1	0.713	48.49	3.123	0.053	0.053	0.046	0.046	11.1	0.77	48.54	3.17
NOx	6.39	6.49	144.9	28.44	1.46	1.46	1.28	1.28	7.84	7.95	146.1	29.72
SO ₂	0.51	0.51	2.22	2.22	0.0019	0.0019	0.0017	0.0017	0.51	0.51	2.22	2.22
CO	33.8	33.8	148.2	148.2	1.94	1.94	1.71	1.71	35.8	35.8	149.9	149.9
PM ₁₀	0.81	0.81	3.57	3.57	0.073	0.073	0.064	0.064	0.89	0.89	3.63	3.63
PM _{2.5}	0.81	0.81	3.57	3.57	0.073	0.073	0.064	0.064	0.89	0.89	3.63	3.63
CO ₂	23249	23249	101830	101830	1132	1132	4959	4959	24381	24381	106789	106789
CH ₄	0.24	0.24	1.07	1.07	0.021	0.021	0.019	0.019	0.27	0.27	1.09	1.09
N ₂ O	0.029	0.029	0.127	0.127	0.0021	0.0021	0.0019	0.0019	0.031	0.031	0.128	0.128
CO _{2e}	23263	23263	101894	101894	1133	1133	997	997	24397	24397	102892	102892

POST MODIFICATION PTE

Scenario 3 HAPs from TREA 6 (Open Flare) burning off-spec gas

Off-spec gas flow = 1520 scfm
91200 scf/hr

NG Compound	CAS	Emission Factor (lb/10 ⁶ scf) ¹	PTE Uncontrolled	PTE Controlled	PTE Uncontrolled	PTE Limited
			lb/hr	lb/hr	ton/yr	ton/yr
2-Methylnaphthalene	91-57-6	2.40E-05	2.19E-06	2.19E-06	9.59E-06	9.59E-06
3-Methylcholanthrene	56-49-5	1.80E-06	1.64E-07	1.64E-07	7.19E-07	7.19E-07
7, 12-Dimethylbenz(a)anthracene		1.60E-05	1.46E-06	1.46E-06	6.39E-06	6.39E-06
Acenaphthene	83-32-9	1.80E-06	1.64E-07	1.64E-07	7.19E-07	7.19E-07
Acenaphthylene	203-96-8	1.80E-06	1.64E-07	1.64E-07	7.19E-07	7.19E-07
Anthracene	120-12-7	2.40E-06	2.19E-07	2.19E-07	9.59E-07	9.59E-07
Benz(a)anthracene	56-55-3	1.80E-06	1.64E-07	1.64E-07	7.19E-07	7.19E-07
Benzene	71-43-2	2.10E-03	1.92E-04	1.92E-04	8.39E-04	8.39E-04
Benzo(a)pyrene	50-32-8	1.20E-06	1.09E-07	1.09E-07	4.79E-07	4.79E-07
Benzo(b)fluoranthene	205-99-2	1.80E-06	1.64E-07	1.64E-07	7.19E-07	7.19E-07
Benzo(g,h,i)perylene	191-24-2	1.20E-06	1.09E-07	1.09E-07	4.79E-07	4.79E-07
Benzo(k)fluoranthene	207-08-9	1.80E-06	1.64E-07	1.64E-07	7.19E-07	7.19E-07
Chrysene	218-01-9	1.80E-06	1.64E-07	1.64E-07	7.19E-07	7.19E-07
Dibenzo(a,h)anthracene	53-70-3	1.20E-06	1.09E-07	1.09E-07	4.79E-07	4.79E-07
Dichlorobenzene	25321-22-6	1.20E-03	1.09E-04	1.09E-04	4.79E-04	4.79E-04
Fluoranthene	206-44-0	3.00E-06	2.74E-07	2.74E-07	1.20E-06	1.20E-06
Fluorene	86-73-7	2.80E-06	2.55E-07	2.55E-07	1.12E-06	1.12E-06
Formaldehyde	50-00-0	7.50E-02	6.84E-03	6.84E-03	3.00E-02	3.00E-02
Hexane	110-54-3	1.80E+00	1.64E-01	1.64E-01	7.19E-01	7.19E-01
Indeno(1,2,3-cd)pyrene	193-39-5	1.80E-06	1.64E-07	1.64E-07	7.19E-07	7.19E-07
Naphthalene	91-20-3	6.10E-04	5.56E-05	5.56E-05	2.44E-04	2.44E-04
Phenanthrene	85-01-8	1.70E-05	1.55E-06	1.55E-06	6.79E-06	6.79E-06
Pyrene	129-00-0	5.00E-06	4.56E-07	4.56E-07	2.00E-06	2.00E-06
Toluene	108-88-3	3.40E-03	3.10E-04	3.10E-04	1.36E-03	1.36E-03
Arsenic	7440-38-2	2.00E-04	1.82E-05	1.82E-05	7.99E-05	7.99E-05
Beryllium	7440-41-7	1.20E-05	1.09E-06	1.09E-06	4.79E-06	4.79E-06
Cadmium	7440-43-9	1.10E-03	1.00E-04	1.00E-04	4.39E-04	4.39E-04
Chromium	7440-47-3	1.40E-03	1.28E-04	1.28E-04	5.59E-04	5.59E-04
Cobalt	7440-48-4	8.40E-05	7.66E-06	7.66E-06	3.36E-05	3.36E-05
Manganese	7439-96-5	3.80E-04	3.47E-05	3.47E-05	1.52E-04	1.52E-04
Mercury	7439-97-6	2.60E-04	2.37E-05	2.37E-05	1.04E-04	1.04E-04
Nickel	7440-02-0	2.10E-03	1.92E-04	1.92E-04	8.39E-04	8.39E-04
Selenium	7782-49-2	2.40E-05	2.19E-06	2.19E-06	9.59E-06	9.59E-06
Total HAP			1.72E-01	1.72E-01	7.54E-01	7.54E-01
Maximum Single HAP			1.64E-01	1.64E-01	7.19E-01	7.19E-01

¹ AP-42 5th Ed., "Compilation of Air Pollutant Emissions Factors, Vol. 1: Stationary Point and Area Sources," Tables 1.4-3 and 1.4-4.

No control efficiency is provided in this AP-42 table.

Scenario 3 HAPs from TREA 7 (Thermal oxidizer) burning natural gas

Emissions are from natural gas burned for firing of the thermal oxidizer

NG 160 scfm

9600 scf/hr

NG Compound	CAS	Emission Factor (lb/10 ⁶ scf) ¹	PTE Uncontrolled	PTE Controlled	PTE Uncontrolled	PTE Limited
			lb/hr	lb/hr	ton/yr	ton/yr
2-Methylnaphthalene	91-57-6	2.40E-05	2.30E-07	2.30E-07	2.03E-07	2.03E-07
3-Methylcholanthrene	56-49-5	1.80E-06	1.73E-08	1.73E-08	1.52E-08	1.52E-08
7, 12-Dimethylbenz(a)anthracene		1.60E-05	1.54E-07	1.54E-07	1.35E-07	1.35E-07
Acenaphthene	83-32-9	1.80E-06	1.73E-08	1.73E-08	1.52E-08	1.52E-08
Acenaphthylene	203-96-8	1.80E-06	1.73E-08	1.73E-08	1.52E-08	1.52E-08
Anthracene	120-12-7	2.40E-06	2.30E-08	2.30E-08	2.03E-08	2.03E-08
Benz(a)anthracene	56-55-3	1.80E-06	1.73E-08	1.73E-08	1.52E-08	1.52E-08
Benzone	71-43-2	2.10E-03	2.02E-05	2.02E-05	1.77E-05	1.77E-05
Benzo(a)pyrene	50-32-8	1.20E-06	1.15E-08	1.15E-08	1.01E-08	1.01E-08
Benzo(b)fluoranthene	205-99-2	1.80E-06	1.73E-08	1.73E-08	1.52E-08	1.52E-08
Benzo(g,h,i)perylene	191-24-2	1.20E-06	1.15E-08	1.15E-08	1.01E-08	1.01E-08
Benzo(k)fluoranthene	207-08-9	1.80E-06	1.73E-08	1.73E-08	1.52E-08	1.52E-08
Chrysene	218-01-9	1.80E-06	1.73E-08	1.73E-08	1.52E-08	1.52E-08
Dibenzo(a,h)anthracene	53-70-3	1.20E-06	1.15E-08	1.15E-08	1.01E-08	1.01E-08
Dichlorobenzene	25321-22-6	1.20E-03	1.15E-05	1.15E-05	1.01E-05	1.01E-05
Fluoranthene	206-44-0	3.00E-06	2.88E-08	2.88E-08	2.53E-08	2.53E-08
Fluorene	86-73-7	2.80E-06	2.69E-08	2.69E-08	2.37E-08	2.37E-08
Formaldehyde	50-00-0	7.50E-02	7.20E-04	7.20E-04	6.34E-04	6.34E-04
Hexane	110-54-3	1.80E+00	1.73E-02	1.73E-02	1.52E-02	1.52E-02
Indeno(1,2,3-cd)pyrene	193-39-5	1.80E-06	1.73E-08	1.73E-08	1.52E-08	1.52E-08
Naphthalene	91-20-3	6.10E-04	5.86E-06	5.86E-06	5.15E-06	5.15E-06
Phenanthrene	85-01-8	1.70E-05	1.63E-07	1.63E-07	1.44E-07	1.44E-07
Pyrene	129-00-0	5.00E-06	4.80E-08	4.80E-08	4.22E-08	4.22E-08
Toluene	108-88-3	3.40E-03	3.26E-05	3.26E-05	2.87E-05	2.87E-05
Arsenic	7440-38-2	2.00E-04	1.92E-06	1.92E-06	1.69E-06	1.69E-06
Beryllium	7440-41-7	1.20E-05	1.15E-07	1.15E-07	1.01E-07	1.01E-07
Cadmium	7440-43-9	1.10E-03	1.06E-05	1.06E-05	9.29E-06	9.29E-06
Chromium	7440-47-3	1.40E-03	1.34E-05	1.34E-05	1.18E-05	1.18E-05
Cobalt	7440-48-4	8.40E-05	8.06E-07	8.06E-07	7.10E-07	7.10E-07
Manganese	7439-96-5	3.80E-04	3.65E-06	3.65E-06	3.21E-06	3.21E-06
Mercury	7439-97-6	2.60E-04	2.50E-06	2.50E-06	2.20E-06	2.20E-06
Nickel	7440-02-0	2.10E-03	2.02E-05	2.02E-05	1.77E-05	1.77E-05
Selenium	7782-49-2	2.40E-05	2.30E-07	2.30E-07	2.03E-07	2.03E-07
Total HAP			1.81E-02	1.81E-02	1.59E-02	1.59E-02
Maximum Single HAP			1.73E-02	1.73E-02	1.52E-02	1.52E-02

¹ AP-42 5th Ed., "Compilation of Air Pollutant Emissions Factors, Vol. 1: Stationary Point and Area Sources," Tables 1.4-3 and 1.4-4.

Scenario 3 HAPs from TREA 7 (Thermal oxidizer) burning waste gas

2235 scfm

Compound	Halogenated	HAP	VOC	CAS	MW (lb/lb-mol)	Conc in Inlet Gas (adjusted) (ppmv) ¹	Conc in Inlet Gas (ppmv) ¹	Control Efficiency ⁴ (%)	PTE	PTE	PTE	PTE
									Uncontrolled	Controlled	Uncontrolled	Limited
									lb/hr	lb/hr	ton/yr	ton/yr
1,1,1 - Trichloroethane (methyl chloroform)	x	x	--	71-55-6	133.41	0.72	0.48	98%	3.39E-02	6.78E-04	1.49E-01	2.97E-03
1,1,2,2 - Tetrachloroethane	x	x	x	79-34-5	167.85	1.67	1.11	98%	9.87E-02	1.97E-03	4.32E-01	8.65E-03
1,1 - Dichloroethane (ethylidene dichloride)	x	x	x	75-34-3	98.96	3.53	2.35	98%	1.23E-01	2.46E-03	5.40E-01	1.08E-02
1,1 - Dichloroethene (vinylidene chloride)	x	x	x	75-35-4	96.94	0.30	0.201	98%	1.03E-02	2.06E-04	4.52E-02	9.04E-04
1,2 - Dichloroethane (ethylene dichloride)	x	x	x	107-06-2	98.96	0.61	0.407	98%	2.13E-02	4.27E-04	9.35E-02	1.87E-03
1,2 - Dichloropropane (propylene dichloride)	x	x	x	78-87-5	112.99	0.27	0.18	98%	1.08E-02	2.15E-04	4.72E-02	9.44E-04
Acrylonitrile (Propenenitrile)	--	x	x	107-13-1	53.06	9.50	6.33	91%	1.78E-01	1.60E-02	7.79E-01	7.01E-02
Benzene	--	x	x	71-43-2	78.12	2.87	1.91	98%	7.90E-02	1.58E-03	3.46E-01	6.92E-03
Carbon Disulfide	--	x	x	75-15-0	76.14	0.87	0.58	99.7%	2.34E-02	7.02E-05	1.02E-01	3.07E-04
Carbon Tetrachloride	x	x	x	56-23-5	153.84	0.01	0.004	98%	3.26E-04	6.52E-06	1.43E-03	2.86E-05
Carbonyl Sulfide	--	x	x	463-58-1	60.07	0.74	0.49	99.7%	1.56E-02	4.68E-05	6.83E-02	2.05E-04
Chlorobenzene (monochlorobenzene)	x	x	x	108-90-7	112.56	0.38	0.254	98%	1.51E-02	3.03E-04	6.63E-02	1.33E-03
Chloroethane (ethyl chloride)	x	x	x	75-00-3	64.52	1.88	1.25	98%	4.27E-02	8.54E-04	1.87E-01	3.74E-03
Chloroform (trichloromethane)	x	x	x	67-66-3	119.38	0.05	0.03	98%	1.90E-03	3.79E-05	8.31E-03	1.66E-04
Chloromethane (methyl chloride)	x	x	x	74-87-3	50.49	1.82	1.21	98%	3.24E-02	6.47E-04	1.42E-01	2.84E-03
1,4 Dichlorobenzene (p-dichlorobenzene)	x	x	x	106-46-7	147	0.32	0.213	98%	1.66E-02	3.32E-04	7.27E-02	1.45E-03
Dichloromethane (methylene chloride)	x	x	--	75-09-2	84.93	21.45	14.3	98%	6.43E-01	1.29E-02	2.82E+00	5.64E-02
Ethylbenzene	--	x	x	100-41-4	106.17	6.92	4.61	98%	2.59E-01	5.19E-03	1.14E+00	2.27E-02
Ethylene dibromide (1,2 dibromoethane)	x	x	x	106-93-4	187.88	0.00	0.001	98%	9.95E-05	1.99E-06	4.36E-04	8.72E-06
Hexane	--	x	x	110-54-3	86.18	9.86	6.57	98%	3.00E-01	6.00E-03	1.31E+00	2.63E-02
Mercury (total)	--	x	--	7439-97-6	200.61	0.00	2.92E-04	0%	3.10E-05	3.10E-05	1.36E-04	1.36E-04
Methyl Isobutyl Ketone (hexone)	--	x	x	108-10-1	100.16	2.81	1.87	98%	9.92E-02	1.98E-03	4.35E-01	8.69E-03
Tetrachloroethylene (perchloroethylene, -ethene)	x	x	--	127-18-4	165.83	5.60	3.73	98%	3.28E-01	6.55E-03	1.44E+00	2.87E-02
Toluene (methylbenzene)	--	x	x	108-88-3	92.14	58.95	39.3	98%	1.92E+00	3.84E-02	8.40E+00	1.68E-01
Trichloroethylene (trichloroethene)	x	x	x	79-01-6	131.38	4.23	2.82	98%	1.96E-01	3.93E-03	8.60E-01	1.72E-02
Vinyl Chloride (chloroethylene, VCM)	x	x	x	75-01-4	62.50	11.01	7.34	98%	2.43E-01	4.86E-03	1.06E+00	2.13E-02
Xylenes (m, o, p)	--	x	x	1330-20-7	106.17	18.15	12.1	91%	6.81E-01	6.12E-02	2.98E+00	2.68E-01
Hydrogen Chloride ^{2,3}		x	--	7647-01-0	36.5	63.00	42	0%	8.11E-01	8.11E-01	3.55E+00	3.55E+00
VOC									4.37E+00	1.47E-01	1.91E+01	6.43E-01
Total HAP									9.78E-01	9.78E-01	2.71E+01	4.28E+00
Maximum Single HAP									1.92E+00	8.11E-01	8.40E+00	3.55E+00

Notes:

¹AP-42 5th Ed., "Compilation of Air Pollutant Emissions Factors, Vol. 1: Stationary Point and Area Sources," Table 2.4-1, Nov. 1998. These concentrations were increased by a safety factor of 1.5 to account for the treatment process of the LFG prior to sending to TREA 7. Sulfur containing compounds are non-halogenated. H2S concentration taken from "Pine Bend - Narrative to Support Air Permit and Air Emission Calculations" prepared by SCS Energy.

²Product of combustion

³Because HCl is a production of combustion, a default ionic Cl LFG concentration of 42 ppmv is listed; AP-42, Section 2.4.4.

⁴Control efficiencies provided by manufacturer.

Scenario 3 - Air Toxics

Compound	HAP	VOC	CAS	MW (lb/lb-mol)	Conc in Inlet Gas (adjusted) (ppmv) ¹	Conc in Inlet Gas (ppmv) ¹	Control Efficiency ⁴ (%)	PTE	PTE	PTE	PTE
								Uncontrolled lb/hr	Controlled lb/hr	Uncontrolled ton/yr	Limited ton/yr
1,1,1 - Trichloroethane (methyl chloroform)	x	--	71-55-6	133.41	0.72	0.48	98%	3.39E-02	6.78E-04	1.49E-01	2.97E-03
1,1,2,2 - Tetrachloroethane	x	x	79-34-5	167.85	1.67	1.11	98%	9.87E-02	1.97E-03	4.32E-01	8.65E-03
1,1 - Dichloroethane (ethylidene dichloride)	x	x	75-34-3	98.96	3.53	2.35	98%	1.23E-01	2.46E-03	5.40E-01	1.08E-02
1,1 - Dichloroethene (vinylidene chloride)	x	x	75-35-4	96.94	0.30	0.201	98%	1.03E-02	2.06E-04	4.52E-02	9.04E-04
1,2 - Dichloroethane (ethylene dichloride)	x	x	107-06-2	98.96	0.61	0.407	98%	2.13E-02	4.27E-04	9.35E-02	1.87E-03
1,2 - Dichloropropane (propylene dichloride)	x	x	78-87-5	112.99	0.27	0.18	98%	1.08E-02	2.15E-04	4.72E-02	9.44E-04
Acrylonitrile (Propenenitrile)	x	x	107-13-1	53.06	9.50	6.33	91%	1.78E-01	1.60E-02	7.79E-01	7.01E-02
Benzene	x	x	71-43-2	78.12	2.87	1.91	98%	7.93E-02	1.79E-03	3.47E-01	7.78E-03
Carbon Disulfide	x	x	75-15-0	76.14	0.87	0.58	99.7%	2.34E-02	7.02E-05	1.02E-01	3.07E-04
Carbon Tetrachloride	x	x	56-23-5	153.84	0.01	0.004	98%	3.26E-04	6.52E-06	1.43E-03	2.86E-05
Carbonyl Sulfide	x	x	463-58-1	60.07	0.74	0.49	99.7%	1.56E-02	4.68E-05	6.83E-02	2.05E-04
Chlorobenzene (monochlorobenzene)	x	x	108-90-7	112.56	0.38	0.254	98%	1.51E-02	3.03E-04	6.63E-02	1.33E-03
Chloroethane (ethyl chloride)	x	x	75-00-3	64.52	1.88	1.25	98%	4.27E-02	8.54E-04	1.87E-01	3.74E-03
Chloroform (trichloromethane)	x	x	67-66-3	119.38	0.05	0.03	98%	1.90E-03	3.79E-05	8.31E-03	1.66E-04
Chloromethane (methyl chloride)	x	x	74-87-3	50.49	1.82	1.21	98%	3.24E-02	6.47E-04	1.42E-01	2.84E-03
1,4 Dichlorobenzene (p-dichlorobenzene)	x	x	106-46-7	147	0.32	0.213	98%	1.67E-02	4.53E-04	7.31E-02	1.94E-03
Dichloromethane (methylene chloride)	x	--	75-09-2	84.93	21.45	14.3	98%	6.43E-01	1.29E-02	2.82E+00	5.64E-02
Ethylbenzene	x	x	100-41-4	106.17	6.92	4.61	98%	2.59E-01	5.19E-03	1.14E+00	2.27E-02
Ethylene dibromide (1,2 dibromoethane)	x	x	106-93-4	187.88	0.00	0.001	98%	9.95E-05	1.99E-06	4.36E-04	8.72E-06
Hexane	x	x	110-54-3	86.18	9.86	6.57	98%	4.81E-01	1.87E-01	2.05E+00	7.61E-01
Mercury (total)	x	--	7439-97-6	200.61	0.00	#####	0%	5.72E-05	5.72E-05	2.42E-04	2.42E-04
Methyl Isobutyl Ketone (hexone)	x	x	108-10-1	100.16	2.81	1.87	98%	9.92E-02	1.98E-03	4.35E-01	8.69E-03
Tetrachloroethylene (perchloroethylene, -ethene)	x	--	127-18-4	165.83	5.60	3.73	98%	3.28E-01	6.55E-03	1.44E+00	2.87E-02
Toluene (methylbenzene)	x	x	108-88-3	92.14	58.95	39.3	98%	1.92E+00	3.87E-02	8.40E+00	1.69E-01
Trichloroethylene (trichloroethene)	x	x	79-01-6	131.38	4.23	2.82	98%	1.96E-01	3.93E-03	6.60E-01	1.72E-02
Vinyl Chloride (chloroethylene, VCM)	x	x	75-01-4	62.50	11.01	7.34	98%	2.43E-01	4.86E-03	1.06E+00	2.13E-02
Xylenes (m, o, p)	x	x	1330-20-7	106.17	18.15	12.1	91%	6.81E-01	6.12E-02	2.98E+00	2.68E-01
Hydrogen Chloride ^{2,3}	x	--	7647-01-0	36.5	63.00	42	0%	8.11E-01	8.11E-01	3.55E+00	3.55E+00
2-Methylnaphthalene	x	--						2.42E-06	2.42E-06	9.79E-06	9.79E-06
3-Methylanthracene	x	--						1.81E-07	1.81E-07	7.34E-07	7.34E-07
7, 12-Dimethylbenz(a)anthracene	x	--						1.61E-06	1.61E-06	6.53E-06	6.53E-06
Acenaphthene	x	--						1.81E-07	1.81E-07	7.34E-07	7.34E-07
Acenaphthylene	x	--						1.81E-07	1.81E-07	7.34E-07	7.34E-07
Anthracene	x	--						2.42E-07	2.42E-07	9.79E-07	9.79E-07
Benz(a)anthracene	x	--						1.81E-07	1.81E-07	7.34E-07	7.34E-07
Benzo(a)pyrene	x	--						1.21E-07	1.21E-07	4.89E-07	4.89E-07
Benzo(b)fluoranthene	x	--						1.81E-07	1.81E-07	7.34E-07	7.34E-07
Benzo(g,h,i)perylene	x	--						1.21E-07	1.21E-07	4.89E-07	4.89E-07
Benzo(k)fluoranthene	x	--						1.81E-07	1.81E-07	7.34E-07	7.34E-07
Chrysene	x	--						1.81E-07	1.81E-07	7.34E-07	7.34E-07
Dibenzo(a,h)anthracene	x	--						1.21E-07	1.21E-07	4.89E-07	4.89E-07
Fluoranthene	x	--						3.02E-07	3.02E-07	1.22E-06	1.22E-06
Fluorene	x	--						2.82E-07	2.82E-07	1.14E-06	1.14E-06
Formaldehyde	x	--						7.56E-03	7.56E-03	3.06E-02	3.06E-02
Indeno(1,2,3-cd)pyrene	x	--						1.81E-07	1.81E-07	7.34E-07	7.34E-07
Naphthalene	x	--						6.15E-05	6.15E-05	2.49E-04	2.49E-04
Phenanthrene	x	--						1.71E-06	1.71E-06	6.93E-06	6.93E-06
Pyrene	x	--						5.04E-07	5.04E-07	2.04E-06	2.04E-06
Arsenic	x	--						2.02E-05	2.02E-05	8.16E-05	8.16E-05
Beryllium	x	--						1.21E-06	1.21E-06	4.89E-06	4.89E-06
Cadmium	x	--						1.11E-04	1.11E-04	4.49E-04	4.49E-04
Chromium	x	--						1.41E-04	1.41E-04	5.71E-04	5.71E-04
Cobalt	x	--						8.47E-06	8.47E-06	3.43E-05	3.43E-05
Manganese	x	--						3.83E-05	3.83E-05	1.55E-04	1.55E-04
Nickel	x	--						2.12E-04	2.12E-04	8.57E-04	8.57E-04
Selenium	x	--						2.42E-06	2.42E-06	9.79E-06	9.79E-06
Total HAP								6.37E+00	1.16E+00	2.78E+01	5.05E+00
Maximum Single HAP								1.92E+00	8.11E-01	8.40E+00	3.55E+00

Compound	Halogenated	HAP	VOC	CAS	MW (lb/lb-mol)	Conc in Inlet Gas (adjusted) (ppmv) ¹	Conc in Inlet Gas (ppmv) ¹	Control Efficiency ⁴ (%)	PTE	Scenario 1 PTE	Scenario 2 PTE	Scenario 3 PTE	Scenario 1 PTE	Scenario 2 PTE	Scenario 3 PTE
									Uncontrolled	Unlimited	Unlimited	Unlimited	Limited	Limited	Limited
									lb/hr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr	ton/yr
1,1,1 - Trichloroethane (methyl chloroform)	x	x	--	71-55-6	133.41	0.72	0.48	98%	0.00E+00	3.26E-01	1.77E-01	1.49E-01	6.52E-03	3.55E-03	2.97E-03
1,1,2,2 - Tetrachloroethane	x	x	x	79-34-5	167.85	1.67	1.11	98%	0.00E+00	9.48E-01	5.16E-01	4.32E-01	1.90E-02	1.03E-02	8.65E-03
1,1 - Dichloroethane (ethylidene dichloride)	x	x	x	75-34-3	98.96	3.53	2.35	98%	0.00E+00	1.18E+00	6.44E-01	5.40E-01	2.37E-02	1.29E-02	1.08E-02
1,1 - Dichloroethene (vinylidene chloride)	x	x	x	75-35-4	96.94	0.30	0.201	98%	0.00E+00	9.89E-02	5.37E-02	4.52E-02	1.98E-03	1.07E-03	9.04E-04
1,2 - Dichloroethane (ethylene dichloride)	x	x	x	107-06-2	98.96	0.61	0.407	98%	0.00E+00	2.06E-01	1.12E-01	9.35E-02	4.12E-03	2.25E-03	1.87E-03
1,2 - Dichloropropane (propylene dichloride)	x	x	x	78-87-5	112.99	0.27	0.18	98%	0.00E+00	1.04E-01	5.63E-02	4.72E-02	2.07E-03	1.13E-03	9.44E-04
Acrylonitrile (Propenenitrile)	--	x	x	107-13-1	53.06	9.50	6.33	91%	0.00E+00	1.71E+00	9.30E-01	7.79E-01	8.87E-02	1.86E-02	7.01E-02
Benzene	--	x	x	71-43-2	78.12	2.87	1.91	98%	0.00E+00	7.60E-01	4.13E-01	3.47E-01	1.53E-02	8.27E-03	7.78E-03
Carbon Disulfide	--	x	x	75-15-0	76.14	0.87	0.58	99.7%	0.00E+00	2.25E-01	1.22E-01	1.02E-01	2.75E-03	2.45E-03	3.07E-04
Carbon Tetrachloride	x	x	x	56-23-5	153.84	0.01	0.004	98%	0.00E+00	3.13E-03	1.70E-03	1.43E-03	6.27E-05	3.41E-05	2.86E-05
Carbonyl Sulfide	--	x	x	463-58-1	60.07	0.74	0.49	99.7%	0.00E+00	1.50E-01	8.15E-02	6.83E-02	1.84E-03	1.63E-03	2.05E-04
Chlorobenzene (monochlorobenzene)	x	x	x	108-90-7	112.56	0.38	0.254	98%	0.00E+00	1.44E-01	7.80E-02	6.63E-02	2.89E-03	1.56E-03	1.33E-03
Chloroethane (ethyl chloride)	x	x	x	75-00-3	64.52	1.88	1.25	98%	0.00E+00	4.11E-01	2.23E-01	1.87E-01	8.21E-03	4.47E-03	3.74E-03
Chloroform (trichloromethane)	x	x	x	67-66-3	119.38	0.05	0.03	98%	0.00E+00	1.82E-02	9.92E-03	8.31E-03	3.65E-04	1.98E-04	1.66E-04
Chloromethane (methyl chloride)	x	x	x	74-87-3	50.49	1.82	1.21	98%	0.00E+00	3.11E-01	1.69E-01	1.42E-01	6.22E-03	3.38E-03	2.84E-03
1,4 Dichlorobenzene (p-dichlorobenzene)	x	x	x	106-46-7	147	0.32	0.213	98%	0.00E+00	1.59E-01	8.67E-02	7.31E-02	3.24E-03	1.73E-03	1.94E-03
Dichloromethane (methylene chloride)	x	x	--	75-09-2	84.93	21.45	14.3	98%	0.00E+00	6.18E+00	3.36E+00	2.82E+00	1.24E-01	6.73E-02	5.64E-02
Ethylbenzene	--	x	x	100-41-4	106.17	6.92	4.61	98%	0.00E+00	2.49E+00	1.36E+00	1.14E+00	4.98E-02	2.71E-02	2.27E-02
Ethylene dibromide (1,2 dibromoethane)	x	x	x	106-93-4	187.88	0.00	0.001	98%	0.00E+00	9.56E-04	5.20E-04	4.36E-04	1.91E-05	1.04E-05	8.72E-06
Hexane	--	x	x	110-54-3	86.18	9.86	6.57	98%	0.00E+00	2.96E+00	1.57E+00	2.05E+00	1.33E-01	3.14E-02	7.61E-01
Mercury (total)	--	x	--	7439-97-6	200.61	0.00	#####	0%	0.00E+00	3.09E-04	1.62E-04	2.42E-04	3.09E-04	1.62E-04	2.42E-04
Methyl Isobutyl Ketone (hexone)	--	x	x	108-10-1	100.16	2.81	1.87	98%	0.00E+00	9.53E-01	5.19E-01	4.35E-01	1.91E-02	1.04E-02	8.69E-03
Tetrachloroethylene (perchloroethylene, -ethene)	x	x	--	127-18-4	165.83	5.60	3.73	98%	0.00E+00	3.15E+00	1.71E+00	1.44E+00	6.30E-02	3.43E-02	2.87E-02
Toluene (methylbenzene)	--	x	x	108-88-3	92.14	58.95	39.3	98%	0.00E+00	1.84E+01	1.00E+01	8.40E+00	3.69E-01	2.01E-01	1.69E-01
Trichloroethylene (trichloroethene)	x	x	x	79-01-6	131.38	4.23	2.82	98%	0.00E+00	1.89E+00	1.03E+00	8.60E-01	3.77E-02	2.05E-02	1.72E-02
Vinyl Chloride (chloroethylene, VCM)	x	x	x	75-01-4	62.50	11.01	7.34	98%	0.00E+00	2.34E+00	1.27E+00	1.06E+00	4.67E-02	2.54E-02	2.13E-02
Xylenes (m, o, p)	--	x	x	1330-20-7	106.17	18.15	12.1	91%	0.00E+00	6.54E+00	3.56E+00	2.98E+00	3.39E-01	7.12E-02	2.68E-01
Hydrogen Chloride ^{2,3}		x	--	7647-01-0	36.5	63.00	42	0%	0.00E+00	7.80E+00	4.25E+00	3.55E+00	7.80E+00	4.25E+00	3.55E+00
2-Methylnaphthalene		x	--							1.01E-06	-	9.79E-06	1.01E-06	-	9.79E-06
3-Methylcholanthrene		x	--							7.57E-08	-	7.34E-07	7.57E-08	-	7.34E-07
7, 12-Dimethylbenz(a)anthracene		x	--							6.73E-07	-	6.53E-06	6.73E-07	-	6.53E-06
Acenaphthene		x	--							7.57E-08	-	7.34E-07	7.57E-08	-	7.34E-07
Acenaphthylene		x	--							7.57E-08	-	7.34E-07	7.57E-08	-	7.34E-07
Anthracene		x	--							1.01E-07	-	9.79E-07	1.01E-07	-	9.79E-07
Benz(a)anthracene		x	--							7.57E-08	-	7.34E-07	7.57E-08	-	7.34E-07
Benzo(a)pyrene		x	--							5.05E-08	-	4.89E-07	5.05E-08	-	4.89E-07
Benzo(b)fluoranthene		x	--							7.57E-08	-	7.34E-07	7.57E-08	-	7.34E-07
Benzo(g,h,i)perylene		x	--							5.05E-08	-	4.89E-07	5.05E-08	-	4.89E-07
Benzo(k)fluoranthene		x	--							7.57E-08	-	7.34E-07	7.57E-08	-	7.34E-07
Chrysene		x	--							7.57E-08	-	7.34E-07	7.57E-08	-	7.34E-07
Dibenzo(a,h)anthracene		x	--							5.05E-08	-	4.89E-07	5.05E-08	-	4.89E-07
Fluoranthene		x	--							1.26E-07	-	1.22E-06	1.26E-07	-	1.22E-06
Fluorene		x	--							1.18E-07	-	1.14E-06	1.18E-07	-	1.14E-06
Formaldehyde		x	--							3.15E-03	-	3.06E-02	3.15E-03	-	3.06E-02
Indeno(1,2,3-cd)pyrene		x	--							7.57E-08	-	7.34E-07	7.57E-08	-	7.34E-07
Naphthalene		x	--							2.56E-05	-	2.49E-04	2.56E-05	-	2.49E-04
Phenanthrene		x	--							7.15E-07	-	6.93E-06	7.15E-07	-	6.93E-06
Pyrene		x	--							2.10E-07	-	2.04E-06	2.10E-07	-	2.04E-06
Arsenic		x	--							8.41E-06	-	8.16E-05	8.41E-06	-	8.16E-05
Beryllium		x	--							5.05E-07	-	4.89E-06	5.05E-07	-	4.89E-06
Cadmium		x	--							4.63E-05	-	4.49E-04	4.63E-05	-	4.49E-04
Chromium		x	--							5.89E-05	-	5.71E-04	5.89E-05	-	5.71E-04
Cobalt		x	--							3.53E-06	-	3.43E-05	3.53E-06	-	3.43E-05
Manganese		x	--							1.60E-05	-	1.55E-04	1.60E-05	-	1.55E-04
Nickel		x	--							8.83E-05	-	8.57E-04	8.83E-05	-	8.57E-04
Selenium		x	--							1.01E-06	-	9.79E-06	1.01E-06	-	9.79E-06

					MW	Conc in Inlet Gas (adjusted)	Conc in Inlet Gas	Control Efficiency ⁴	PTE	Scenario 1 PTE	Scenario 2 PTE	Scenario 3 PTE	Scenario 1 PTE	Scenario 2 PTE	Scenario 3 PTE
									Uncontrolled	Unlimited	Unlimited	Unlimited	Limited	Limited	Limited
Total HAP									9.17E+00	9.17E+00	4.81E+00	5.02E+00	9.17E+00	4.81E+00	5.02E+00
Maximum Single HAP									0.00E+00	1.84E+01	1.00E+01	8.40E+00	7.80E+00	4.25E+00	3.55E+00

LIMITED EMISSIONS, LB/HR

Pollutant	Scenario 1	Scenario 2	Scenario 3	Max
VOCs	0.52	2.17	0.77	2.17
NOx	9.32	7.43	7.95	9.32
SO ₂	20.7	20.2	0.51	20.7
CO	37.3	33.9	35.8	37.3
PM ₁₀	13.4	13.2	12.0	13.4
PM _{2.5}	3.35	3.15	2.00	3.35
CO ₂	42029	27862	24381	42029
CH ₄	0.93	0.86	0.27	0.93
N ₂ O	0.17	0.16	0.031	0.17
CO _{2e}	42104	27932	24397	42104

Landfill fugitives not included because they don't count
in the comparison of pre-modification and post-modification totals

Worst case

UNLIMITED EMISSIONS, TONS PER YEAR

Pollutant	Scenario 1	Scenario 2	Scenario 3	Max
VOCs	110.2	72.1	57.0	110.2
NOx	40.8	32.5	146.1	146.1
SO ₂	90.6	88.6	2.22	90.6
CO	163.2	148.3	149.9	163.2
PM ₁₀	46.3	45.5	40.2	46.3
PM _{2.5}	13.4	12.6	7.29	13.4
CO ₂	193199	131148	115900	193199
CH ₄	2503	2502	2500	2503
N ₂ O	0.75	0.70	0.128	0.75
CO _{2e}	255989	193914	174465	255989
Total HAP	59.5	32.3	27.8	59.5
Max HAP	18.4	10.0	8.40	18.4

LIMITED EMISSIONS, TONS PER YEAR

Pollutant	Scenario 1	Scenario 2	Scenario 3	Max
VOCs	2.26	9.52	3.17	9.52
NOx	40.8	32.5	29.72	40.8
SO ₂	90.6	88.6	2.22	90.6
CO	163.2	148.3	149.9	163.2
PM ₁₀	28.1	27.2	21.9	28.1
PM _{2.5}	11.6	10.8	5.46	11.6
CO ₂	184089	122037	106789	184089
CH ₄	4.07	3.75	1.09	4.07
N ₂ O	0.75	0.70	0.128	0.75
CO _{2e}	184415	122340	102892	184415
Total HAP	9.17	4.81	5.02	9.17
Max HAP	7.80	4.25	3.55	7.80

Landfill fugitives not included because they don't count
in the comparison of pre-modification and post-modification totals

Worst case

Change In Emissions

Pollutant	Pre-Modification PTE Limited (lb/hr)	Post Modification PTE Limited (lb/hr)	Emission Change, lb/hr	<u>Threshold for Minor Amendment</u> (lb/hr)	<u>Minor?</u>
VOCs	0.49	2.17	1.68	9.13	Yes
NOx	25.3	9.32	-15.9	9.13	Yes
SO ₂	39.2	20.7	-18.5	9.13	Yes
CO	50.1	37.3	-12.9	22.8	Yes
PM ₁₀	10.9	13.4	2.50	3.42	Yes

Pollutant	Pre-Modification PTE Limited (tpy)	Post Modification PTE Limited (tpy)	Emission Change, tpy	<u>Threshold for Minor Amendment</u> (tpy)	<u>Minor?</u>
VOCs	2.14	9.52	7.38	250	Yes
NOx	110.7	40.8	-69.85	250	Yes
SO ₂	171.7	90.6	-81.07	250	Yes
CO	219.5	163.2	-56.29	250	Yes
PM ₁₀	32.4	28.1	-4.30	250	Yes
PM _{2.5}	24.1	11.6	-12.52	250	Yes
CO _{2e}	236213	184089	-52123.73	100,000	Yes
Total HAP	9.32	9.17	-0.15	25	Yes
Max HAP	8.23	7.80	-0.43	10	Yes

FUGI 2 and EQUI 29 Landfill Emissions

Inputs			
MSW Max Design Capacity	29,800,000	Cubic Yards	
Landfill Gas Generation Rate ¹	2,102,400,000	scf/yr LFG	
	4,000	scfm	
Percent Fugitive Emissions ²	15%		
LFG Fugitive Flowrate	600	scfm	
Percent Landfill Emissions (captured) ³	85%		
LFG (captured) Flowrate	3,400	scfm	

LFG Compound	CAS	MW	Concentration ³	Total LF emissions		FUGI 2		EQUI 29	
				Uncontrolled Landfill Emissions		Landfill Fugitive Emissions		Landfill Emissions	
				lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
1,1,1 - Trichloroethane (methyl chloroform)	71-55-6	133.41	4.80E-01	4.05E-02	1.77E-01	6.07E-03	2.66E-02	3.44E-02	1.51E-01
1,1,2,2 - Tetrachloroethane	79-34-5	167.85	1.11E+00	1.18E-01	5.16E-01	1.77E-02	7.74E-02	1.00E-01	4.39E-01
1,1 - Dichloroethane (ethylidene dichloride)	75-34-3	98.96	2.35E+00	1.47E-01	6.44E-01	2.21E-02	9.66E-02	1.25E-01	5.47E-01
1,1 - Dichloroethene (vinylidene chloride)	75-35-4	96.94	2.01E-01	1.23E-02	5.40E-02	1.85E-03	8.09E-03	1.05E-02	4.59E-02
1,2 - Dichloroethane (ethylene dichloride)	107-06-2	98.96	4.07E-01	2.55E-02	1.12E-01	3.82E-03	1.67E-02	2.16E-02	9.48E-02
1,2 - Dichloropropane (propylene dichloride)	78-87-5	112.99	1.80E-01	1.29E-02	5.63E-02	1.93E-03	8.45E-03	1.09E-02	4.79E-02
2-Propanol (isopropyl alcohol)	67-63-0	60.11	5.01E+01	1.90E+00	8.34E+00	2.86E-01	1.25E+00	1.62E+00	7.09E+00
Acetone (2-propanone)	67-64-1	58.08	7.01E+00	2.57E-01	1.13E+00	3.86E-02	1.69E-01	2.19E-01	9.58E-01
Acrylonitrile (Propenenitrile)	107-13-1	53.06	6.33E+00	2.12E-01	9.30E-01	3.19E-02	1.40E-01	1.80E-01	7.91E-01
Benzene	71-43-2	78.12	1.91E+00	9.43E-02	4.13E-01	1.42E-02	6.20E-02	8.02E-02	3.51E-01
Bromodichloromethane	75-27-4	163.83	3.13E+00	3.24E-01	1.42E+00	4.86E-02	2.13E-01	2.76E-01	1.21E+00
Butane	106-97-8	58.12	5.03E+00	1.85E-01	8.10E-01	2.77E-02	1.21E-01	1.57E-01	6.88E-01
Carbon Disulfide	75-15-0	76.14	5.80E-01	2.79E-02	1.22E-01	4.19E-03	1.83E-02	2.37E-02	1.04E-01
Carbon Tetrachloride	56-23-5	153.84	4.00E-03	3.89E-04	1.70E-03	5.84E-05	2.56E-04	3.31E-04	1.45E-03
Carbonyl Sulfide	463-58-1	60.07	4.90E-01	1.86E-02	8.15E-02	2.79E-03	1.22E-02	1.58E-02	6.93E-02
Chlorobenzene (monochlorobenzene)	108-90-7	112.56	2.54E-01	1.81E-02	7.92E-02	2.71E-03	1.19E-02	1.54E-02	6.73E-02
Chlorodifluoromethane (CFC-22, freon-22)	75-45-6	86.47	1.30E+00	7.11E-02	3.11E-01	1.07E-02	4.67E-02	6.04E-02	2.65E-01
Chloroethane (ethyl chloride)	75-00-3	64.52	1.25E+00	5.10E-02	2.23E-01	7.65E-03	3.35E-02	4.33E-02	1.90E-01
Chloroform	67-66-3	119.38	3.00E-02	2.26E-03	9.92E-03	3.40E-04	1.49E-03	1.92E-03	8.43E-03
Chloromethane (methyl chloride)	74-87-3	50.49	1.21E+00	3.86E-02	1.69E-01	5.79E-03	2.54E-02	3.28E-02	1.44E-01
1,4 Dichlorobenzene (p-dichlorobenzene)	106-46-7	147	2.13E-01	1.98E-02	8.67E-02	2.97E-03	1.30E-02	1.68E-02	7.37E-02
Dichlorodifluoromethane (CFC-12, freon-12)	75-71-8	120.91	1.57E+01	1.20E+00	5.26E+00	1.80E-01	7.89E-01	1.02E+00	4.47E+00
Dichlorofluoromethane (freon-21)	75-43-4	102.92	2.62E+00	1.70E-01	7.47E-01	2.56E-02	1.12E-01	1.45E-01	6.35E-01
Dichloromethane (methylene chloride)	75-09-2	84.93	1.43E+01	7.68E-01	3.36E+00	1.15E-01	5.04E-01	6.53E-01	2.86E+00
Dimethyl Sulfide (methyl sulfide)	75-18-3	62.13	7.82E+00	3.07E-01	1.35E+00	4.61E-02	2.02E-01	2.61E-01	1.14E+00
Ethane	74-84-0	30.07	8.89E+02	1.69E+01	7.40E+01	2.54E+00	1.11E+01	1.44E+01	6.29E+01
Ethanol (ethyl alcohol)	64-17-5	46.08	2.72E+01	7.92E-01	3.47E+00	1.19E-01	5.21E-01	6.74E-01	2.95E+00
Ethylbenzene	75-08-1	106.17	4.61E+00	3.09E-01	1.36E+00	4.64E-02	2.03E-01	2.63E-01	1.15E+00
Ethyl Mercaptan (ethanethiol)	100-41-4	62.13	2.28E+00	8.96E-02	3.92E-01	1.34E-02	5.88E-02	7.61E-02	3.33E-01
Ethylene dibromide (1,2 dibromoethane)	106-93-4	187.88	1.00E-03	1.19E-04	5.20E-04	1.78E-05	7.80E-05	1.01E-04	4.42E-04
Fluorotrichloromethane (CFC-11, freon-11)	75-69-4	137.37	7.60E-01	6.60E-02	2.89E-01	9.90E-03	4.34E-02	5.61E-02	2.46E-01
Hexane	110-54-3	86.18	6.57E+00	3.58E-01	1.57E+00	5.37E-02	2.35E-01	3.04E-01	1.33E+00
Mercury (total)	7439-97-6	200.61	2.92E-04	3.70E-05	1.62E-04	5.56E-06	2.43E-05	3.15E-05	1.38E-04
Methyl Ethyl Ketone (2-butanone)	78-93-3	72.11	7.09E+00	3.23E-01	1.42E+00	4.85E-02	2.12E-01	2.75E-01	1.20E+00
Methyl Isobutyl Ketone (hexone)	108-10-1	100.16	1.87E+00	1.18E-01	5.19E-01	1.78E-02	7.78E-02	1.01E-01	4.41E-01
Methyl Mercaptan	74-93-1	48.11	2.49E+00	7.57E-02	3.32E-01	1.14E-02	4.98E-02	6.44E-02	2.82E-01
Pentane	109-66-0	72.15	3.29E+00	1.50E-01	6.57E-01	2.25E-02	9.86E-02	1.28E-01	5.59E-01
Tetrachloroethylene (perchloroethylene, PCE)	127-18-4	165.83	3.73E+00	3.91E-01	1.71E+00	5.87E-02	2.57E-01	3.32E-01	1.46E+00
Propane	74-98-6	44.1	1.11E+01	3.09E-01	1.36E+00	4.64E-02	2.03E-01	2.63E-01	1.15E+00
Toluene (methylbenzene)	108-88-3	92.14	3.93E+01	2.29E+00	1.00E+01	3.43E-01	1.50E+00	1.95E+00	8.52E+00
Trichloroethylene (trichloroethene)	79-01-6	131.38	2.82E+00	2.34E-01	1.03E+00	3.51E-02	1.54E-01	1.99E-01	8.72E-01
1,1,2 - Dichloroethene (1,2 dichloroethylene)	156-60-5	96.94	2.84E+00	1.74E-01	7.62E-01	2.61E-02	1.14E-01	1.48E-01	6.48E-01
Vinyl Chloride (chloroethylene, VCM)	75-01-4	62.50	7.34E+00	2.90E-01	1.27E+00	4.35E-02	1.91E-01	2.47E-01	1.08E+00
Xylenes (m, o, p)	1330-20-7	106.17	1.21E+01	8.12E-01	3.56E+00	1.22E-01	5.34E-01	6.90E-01	3.02E+00
Hydrogen Chloride	7647-01-0	36.5	4.20E+01	9.68E-01	4.24E+00	1.45E-01	6.36E-01	8.23E-01	3.60E+00
Total HAP				30.7	134.4	4.60	20.2	26.1	114.2
Maximum Single HAP (Toluene)				16.9	74.0	2.535	11.1	14.4	62.9

LFG Criteria & GHG Emissions

LFG Compound	CAS	MW	Concentration ³	Uncontrolled Landfill Emissions		Landfill Fugitive Emissions (FUGI 2)		Landfill Emissions (EQUI 29)	
				lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
				lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
VOCs	NA	86.18	235.0	12.8	56.1	1.92	8.41	10.9	47.7
CO ₂	124-38-9	44.01	498,352	1.39E+04	6.07E+04	2.08E+03	9.11E+03	1.18E+04	5.16E+04
CH ₄	74-82-8	16.04	500,000	5.07E+03	2.22E+04	5.70E+02	2.50E+03	3.66E+03	1.60E+04
CO ₂ e	NA	NA	NA	1.41E+05	6.16E+05	1.63E+04	7.16E+04	1.03E+05	4.53E+05
H ₂ S ⁴		34.08	41.3	0.89	3.90	0.10	0.44	0.64	2.82

Notes:

¹ Landfill gas generation rate based on USEPA LandGEM model, Version 3.02

² MPCA believes that 85% of landfill gas at this facility can be captured and combusted at the flares or thermal oxidizer. This means the other 15% of emissions are released into the air. Per a Rolling Hills Applicability Determination from 2013, these uncaptured emissions are considered fugitive.

³ Concentrations from AP-42 CH 2.4 Tables 2.4-1 and 2.4-2

⁴ Lab tests give total sulfur molar concentration of 48.6 ppmv

FUGI 2 and EQUI 29 Landfill Emissions

Inputs			
MSW Max Design Capacity	29,800,000	Cubic Yards	
Landfill Gas Generation Rate ¹	2,165,472,000	scf/yr LFG	
	4,120	scfm	
Percent Fugitive Emissions ²	15%		
LFG Fugitive Flowrate	618	scfm	
Percent Landfill Emissions (captured) ³	85%		
LFG (captured) Flowrate	3,502	scfm	

LFG Compound	CAS	MW	Concentration ³	Total LF emissions		FUGI 2		EQUI 29	
				Uncontrolled Landfill Emissions		Landfill Fugitive Emissions		Landfill Emissions	
				lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
1,1,1 - Trichloroethane (methyl chloroform)	71-55-6	133.41	4.80E-01	4.17E-02	1.83E-01	6.26E-03	2.74E-02	3.54E-02	1.55E-01
1,1,2,2 - Tetrachloroethane	79-34-5	167.85	1.11E+00	1.21E-01	5.31E-01	1.82E-02	7.97E-02	1.03E-01	4.52E-01
1,1 - Dichloroethane (ethylidene dichloride)	75-34-3	98.96	2.35E+00	1.51E-01	6.63E-01	2.27E-02	9.95E-02	1.29E-01	5.64E-01
1,1 - Dichloroethene (vinylidene chloride)	75-35-4	96.94	2.01E-01	1.27E-02	5.56E-02	1.90E-03	8.34E-03	1.08E-02	4.72E-02
1,2 - Dichloroethane (ethylene dichloride)	107-06-2	98.96	4.07E-01	2.62E-02	1.15E-01	3.93E-03	1.72E-02	2.23E-02	9.76E-02
1,2 - Dichloropropane (propylene dichloride)	78-87-5	112.99	1.80E-01	1.32E-02	5.80E-02	1.99E-03	8.70E-03	1.13E-02	4.93E-02
2-Propanol (isopropyl alcohol)	67-63-0	60.11	5.01E+01	1.96E+00	8.59E+00	2.94E-01	1.29E+00	1.67E+00	7.30E+00
Acetone (2-propanone)	67-64-1	58.08	7.01E+00	2.65E-01	1.16E+00	3.98E-02	1.74E-01	2.25E-01	9.87E-01
Acrylonitrile (Propenenitrile)	107-13-1	53.06	6.33E+00	2.19E-01	9.58E-01	3.28E-02	1.44E-01	1.86E-01	8.14E-01
Benzene	71-43-2	78.12	1.91E+00	9.72E-02	4.26E-01	1.46E-02	6.38E-02	8.26E-02	3.62E-01
Bromodichloromethane	75-27-4	163.83	3.13E+00	3.34E-01	1.46E+00	5.01E-02	2.19E-01	2.84E-01	1.24E+00
Butane	106-97-8	58.12	5.03E+00	1.90E-01	8.34E-01	2.86E-02	1.25E-01	1.62E-01	7.09E-01
Carbon Disulfide	75-15-0	76.14	5.80E-01	2.88E-02	1.26E-01	4.31E-03	1.89E-02	2.44E-02	1.07E-01
Carbon Tetrachloride	56-23-5	153.84	4.00E-03	4.01E-04	1.76E-03	6.01E-05	2.63E-04	3.41E-04	1.49E-03
Carbonyl Sulfide	463-58-1	60.07	4.90E-01	1.92E-02	8.40E-02	2.88E-03	1.26E-02	1.63E-02	7.14E-02
Chlorobenzene (monochlorobenzene)	108-90-7	112.56	2.54E-01	1.86E-02	8.15E-02	2.79E-03	1.22E-02	1.58E-02	6.93E-02
Chlorodifluoromethane (CFC-22, freon-22)	75-45-6	86.47	1.30E+00	7.32E-02	3.21E-01	1.10E-02	4.81E-02	6.22E-02	2.73E-01
Chloroethane (ethyl chloride)	75-00-3	64.52	1.25E+00	5.25E-02	2.30E-01	7.88E-03	3.45E-02	4.46E-02	1.96E-01
Chloroform	67-66-3	119.38	3.00E-02	2.33E-03	1.02E-02	3.50E-04	1.53E-03	1.98E-03	8.68E-03
Chloromethane (methyl chloride)	74-87-3	50.49	1.21E+00	3.98E-02	1.74E-01	5.97E-03	2.61E-02	3.38E-02	1.48E-01
1,4 Dichlorobenzene (p-dichlorobenzene)	106-46-7	147	2.13E-01	2.04E-02	8.93E-02	3.06E-03	1.34E-02	1.73E-02	7.59E-02
Dichlorodifluoromethane (CFC-12, freon-12)	75-71-8	120.91	1.57E+01	1.24E+00	5.41E+00	1.85E-01	8.12E-01	1.05E+00	4.60E+00
Dichlorofluoromethane (freon-21)	75-43-4	102.92	2.62E+00	1.76E-01	7.69E-01	2.63E-02	1.15E-01	1.49E-01	6.54E-01
Dichloromethane (methylene chloride)	75-09-2	84.93	1.43E+01	7.91E-01	3.46E+00	1.19E-01	5.20E-01	6.72E-01	2.94E+00
Dimethyl Sulfide (methyl sulfide)	75-18-3	62.13	7.82E+00	3.16E-01	1.39E+00	4.75E-02	2.08E-01	2.69E-01	1.18E+00
Ethane	74-84-0	30.07	8.89E+02	1.74E+01	7.62E+01	2.61E+00	1.14E+01	1.48E+01	6.48E+01
Ethanol (ethyl alcohol)	64-17-5	46.08	2.72E+01	8.16E-01	3.58E+00	1.22E-01	5.36E-01	6.94E-01	3.04E+00
Ethylbenzene	75-08-1	106.17	4.61E+00	3.19E-01	1.40E+00	4.78E-02	2.09E-01	2.71E-01	1.19E+00
Ethyl Mercaptan (ethanethiol)	100-41-4	62.13	2.28E+00	9.22E-02	4.04E-01	1.38E-02	6.06E-02	7.84E-02	3.43E-01
Ethylene dibromide (1,2 dibromoethane)	106-93-4	187.88	1.00E-03	1.22E-04	5.36E-04	1.84E-05	8.04E-05	1.04E-04	4.56E-04
Fluorotrichloromethane (CFC-11, freon-11)	75-69-4	137.37	7.60E-01	6.80E-02	2.98E-01	1.02E-02	4.47E-02	5.78E-02	2.53E-01
Hexane	110-54-3	86.18	6.57E+00	3.69E-01	1.61E+00	5.53E-02	2.42E-01	3.13E-01	1.37E+00
Mercury (total)	7439-97-6	200.61	2.92E-04	3.81E-05	1.67E-04	5.72E-06	2.51E-05	3.24E-05	1.42E-04
Methyl Ethyl Ketone (2-butanone)	78-93-3	72.11	7.09E+00	3.33E-01	1.46E+00	4.99E-02	2.19E-01	2.83E-01	1.24E+00
Methyl Isobutyl Ketone (hexone)	108-10-1	100.16	1.87E+00	1.22E-01	5.34E-01	1.83E-02	8.01E-02	1.04E-01	4.54E-01
Methyl Mercaptan	74-93-1	48.11	2.49E+00	7.80E-02	3.42E-01	1.17E-02	5.13E-02	6.63E-02	2.90E-01
Pentane	109-66-0	72.15	3.29E+00	1.55E-01	6.77E-01	2.32E-02	1.02E-01	1.31E-01	5.76E-01
Tetrachloroethylene (perchloroethylene, -ethene)	127-18-4	165.83	3.73E+00	4.03E-01	1.76E+00	6.04E-02	2.65E-01	3.42E-01	1.50E+00
Propane	74-98-6	44.1	1.11E+01	3.19E-01	1.40E+00	4.78E-02	2.09E-01	2.71E-01	1.19E+00
Toluene (methylbenzene)	108-88-3	92.14	3.93E+01	2.36E+00	1.03E+01	3.54E-01	1.55E+00	2.00E+00	8.78E+00
Trichloroethylene (trichloroethene)	79-01-6	131.38	2.82E+00	2.41E-01	1.06E+00	3.62E-02	1.59E-01	2.05E-01	8.98E-01
1,1,2 - Dichloroethene (1,2 dichloroethylene)	156-60-5	96.94	2.84E+00	1.79E-01	7.85E-01	2.69E-02	1.18E-01	1.52E-01	6.67E-01
Vinyl Chloride (chloroethylene, VCM)	75-01-4	62.50	7.34E+00	2.99E-01	1.31E+00	4.48E-02	1.96E-01	2.54E-01	1.11E+00
Xylenes (m, o, p)	1330-20-7	106.17	1.21E+01	8.37E-01	3.66E+00	1.25E-01	5.50E-01	7.11E-01	3.11E+00
Hydrogen Chloride	7647-01-0	36.5	4.20E+01	9.97E-01	4.37E+00	1.50E-01	6.55E-01	8.48E-01	3.71E+00
Total HAP				31.6	138.4	4.74	20.8	26.9	117.6
Maximum Single HAP (Toluene)				17.4	76.2	2.611	11.4	14.8	64.8

LFG Criteria & GHG Emissions

LFG Compound	CAS	MW	Concentration ³	Uncontrolled Landfill Emissions		Landfill Fugitive Emissions		Landfill Emissions (EQUI 29)	
				lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
		lb/lb-mol	ppmv	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
VOCs	NA	86.18	235.0	13.2	57.8	1.98	8.66	11.2	49.1
CO ₂	124-38-9	44.01	498,352	1.43E+04	6.26E+04	2.14E+03	9.38E+03	1.21E+04	5.32E+04
CH ₄	74-82-8	16.04	500,000	5.22E+03	2.29E+04	5.88E+02	2.57E+03	3.77E+03	1.65E+04
CO ₂ e	NA	NA	NA	1.45E+05	6.34E+05	1.68E+04	7.37E+04	1.06E+05	4.66E+05
H ₂ S ⁴		34.08	41.3	0.92	4.01	0.10	0.45	0.66	2.90

Notes:

¹ Landfill gas generation rate based on USEPA LandGEM model, Version 3.02

² MPCA believes that 85% of landfill gas at this facility can be captured and combusted at the flares or thermal oxidizer. This means the other 15% of emissions are released into the air. Per a Rolling Hills Applicability Determination from 2013, these uncaptured emissions are considered fugitive.

³ Concentrations from AP-42 CH 2.4 Tables 2.4-1 and 2.4-2

⁴ Lab tests give total sulfur molar concentration of 48.6 ppmv

POST MODIFICATION WORST CASE PTE

UNLIMITED EMISSIONS,
LB/HR

Pollutant	
VOCs	1.98
CO ₂	2142
CH ₄	588
CO _{2e}	16831

UNLIMITED EMISSIONS, TONS
PER YEAR

Pollutant	
VOCs	8.66
CO ₂	9384
CH ₄	2573
CO _{2e}	73721

LIMITED EMISSIONS, TONS
PER YEAR

Pollutant	
VOCs	8.66
CO ₂	9384
CH ₄	2573
CO _{2e}	73721

Change In Emissions

Pollutant	Pre-Modification	Post Modification	Emission	Threshold for Minor Amendment	
	PTE Unlimited (lb/hr)	PTE Unlimited (lb/hr)	Change, lb/hr	(lb/hr)	Minor?
VOCs	1.92	1.98	0.058	9.13	Yes
CO ₂	2080	2142	62.4		
CH ₄	570	588	17.1		
CO _{2e}	16341	16831	490		

Pollutant	Pre-Modification	Post Modification	Emission	Threshold for Minor Amendment	
	PTE Unlimited (tpy)	PTE Unlimited (tpy)	Change, tpy	(tpy)	Minor?
VOCs	8.41	8.66	0.252	250	Yes
CO ₂	9110	9384	273.3		
CH ₄	2499	2573	75.0		
CO _{2e}	71574	73721	2147		
Total HAPs	20.2	20.8	0.60	25	Yes
Max HAP	11.1	11.4	0.33	10	Yes

Pollutant	Pre-Modification	Post Modification	Emission	Threshold for Minor Amendment	
	PTE Limited (tpy)	PTE Limited (tpy)	Change, tpy	(tpy)	Minor?
VOCs	8.41	8.66	0.252	250	Yes
CO ₂	9110	9384	273.3		
CH ₄	2499	2573	75.0		
CO _{2e}	71574	73721	2147		

Title 5 Calculations

Emissions from this facility are limited by the production of landfill gas, which is a function of the landfill itself. The thermal oxidizer and open flare do not necessarily operate at their capacity, but operate according to the amount of landfill gas that is being produced and sent to each unit. The calculations have been performed on the worst case scenario (operation of the open flare or the thermal oxidizer) for each pollutant at the maximum rate of landfill gas production anticipated.

1a) AQ Facility ID No.:

2) Facility Name:

PBE RNG, LLC

1b) Agency Interest ID No.:

1546

You may use and submit this spreadsheet in place of the emissions tables on Form GI-07-R. Follow the instructions for Form GI-07-R to complete this spreadsheet. This spreadsheet can be copied into a tab for your emissions spreadsheet and must be submitted on a CD with your application. If you need to provide emissions information for more emissions units, add more sets of columns (a through e) to the right as needed in the Emissions by Source table. If you need to provide information for more pollutants, add rows as needed.

Emissions By Source Table

		Open Flare						Tox				Landfill				
a) Delta ID No.: b) Tempo SI ID No.:		TREA 6			a) Delta ID No.: b) Tempo SI ID No.:			TREA 7		a) Delta ID No.: b) Tempo SI ID No.:		EQUI 29			a) Delta ID No.: b) Tempo SI ID No.:	
c) Pollutant Name	d) CAS #	e) Potential			c) Pollutant Name	d) CAS #	e) Potential			c) Pollutant Name	d) CAS #	e) Potential			c) Pollutant Name	d) CAS #
		Lbs per Hr	Unc tpy	Limited tpy			Lbs per Hr	Unc tpy	Limited tpy			Lbs per Hr	Unc tpy	Limited tpy		
NOx	NA	7.43	32.5	32.5	NOx	NA	1.89	8.27	8.27	NOx	NA				NOx	NA
CO	NA	33.85	148.27	148.27	CO	NA	3.40	14.9	14.9	CO	NA				CO	NA
VOC	NA	0.0	0	0.0	VOC	NA	0.264	46.5	1.16	VOC	NA	0.22	47.7	0.95	VOC	NA
PM	NA	2.04	8.94	8.94	PM	NA	0.195	0.853	0.853	PM	NA				PM	NA
PM10	NA	2.04	8.94	8.94	PM10	NA	0.195	0.853	0.853	PM10	NA				PM10	NA
PM2.5	NA	2.04	8.94	8.94	PM2.5	NA	0.195	0.853	0.853	PM2.5	NA				PM2.5	NA
SO2	NA	20.23	88.6	88.6	SO2	NA	0.458	2.01	2.01	SO2	NA				SO2	NA
CO2	NA	13906	60906	60906	CO2	NA	13331	58389	58389	CO2	NA	11,783	51,612	51,612	CO2	NA
CH4	NA	0.86	3.75	3.75	CH4	NA	0.021	0.093	0.093	CH4	NA	73	16,042	321	CH4	NA
N2O	NA	0.16	0.70	0.70	N2O	NA	0.0021	0.0093	0.0093	N2O	NA		0.00		N2O	NA
CO2e	NA	13975	61210	61210	CO2e	NA	13332	58394	58394	CO2e	NA	13,615	452,656	59,632	CO2e	NA
1,1,2,2-Tetrachloroethane	71556				1,1,2,2-Tetrachloroethane	71556	1.97E-03	4.32E-01	8.65E-03	1,1,2,2-Tetrachloroethane	71556	2.00E-03	4.39E-01	8.77E-03	1,1,2,2-Tetrachloroethane	71556
1,1,2-Trichloroethane	79345				1,1,2-Trichloroethane	79345	6.78E-04	1.49E-01	2.97E-03	1,1,2-Trichloroethane	79345	2.50E-03	1.51E-01	3.01E-03	1,1,2-Trichloroethane	79345
1,1-Dichloroethane (ethylidene dichloride)	75-34-3				1,1-Dichloroethane (ethylidene dichloride)	75-34-3	2.46E-03	5.40E-01	1.08E-02	1,1-Dichloroethane (ethylidene dichloride)	75-34-3	2.09E-04	5.47E-01	1.09E-02	1,1-Dichloroethane (ethylidene dichloride)	75-34-3
1,1-Dichloroethene (vinylidene chloride)	75-35-4				1,1-Dichloroethene (vinylidene chloride)	75-35-4	2.06E-04	4.52E-02	9.04E-04	1,1-Dichloroethene (vinylidene chloride)	75-35-4	4.33E-04	4.59E-02	9.17E-04	1,1-Dichloroethene (vinylidene chloride)	75-35-4
1,2-Dichloroethane (ethylene dichloride)	107-06-2				1,2-Dichloroethane (ethylene dichloride)	107-06-2	4.27E-04	9.35E-02	1.87E-03	1,2-Dichloroethane (ethylene dichloride)	107-06-2	2.19E-04	9.48E-02	1.90E-03	1,2-Dichloroethane (ethylene dichloride)	107-06-2
1,2-Dichloropropane (propylene dichloride)					1,2-Dichloropropane (propylene dichloride)					1,2-Dichloropropane (propylene dichloride)					1,2-Dichloropropane (propylene dichloride)	
Acrylonitrile	107-13-1				Acrylonitrile	107-13-1	1.60E-02	7.79E-01	7.01E-02	Acrylonitrile	107-13-1	1.60E-03	7.91E-01	1.58E-02	Acrylonitrile	107-13-1
Benzene	71-43-2				Benzene	71-43-2	1.60E-03	3.46E-01	7.01E-03	Benzene	71-43-2	4.75E-04	3.51E-01	7.02E-03	Benzene	71-43-2
Carbon disulfide	75-15-0				Carbon disulfide	75-15-0	0.00E+00		0.00E+00	Carbon disulfide	75-15-0	6.61E-06	1.04E-01	2.08E-03	Carbon disulfide	75-15-0
Carbon Tetrachloride	56235				Carbon Tetrachloride	56235	6.52E-06	1.43E-03	2.86E-05	Carbon Tetrachloride	56235	3.16E-04	1.4E-03	2.90E-05	Carbon Tetrachloride	56235
Carbonyl sulfide	463-58-1				Carbonyl sulfide	463-58-1	0.00E+00		0.00E+00	Carbonyl sulfide	463-58-1	3.07E-04	6.93E-02	1.39E-03	Carbonyl sulfide	463-58-1
Chlorobenzene	108907				Chlorobenzene	108907	3.03E-04	6.63E-02	1.33E-03	Chlorobenzene	108907	8.67E-04	6.73E-02	1.35E-03	Chlorobenzene	108907
Chloroethane (ethyl chloride)	75-00-3				Chloroethane (ethyl chloride)	75-00-3	8.54E-04	1.87E-01	3.74E-03	Chloroethane (ethyl chloride)	75-00-3	3.85E-05	1.90E-01	3.80E-03	Chloroethane (ethyl chloride)	75-00-3
Chloroform	67663				Chloroform	67663	3.79E-05	8.31E-03	1.66E-04	Chloroform	67663	6.57E-04	8.43E-03	1.69E-04	Chloroform	67663
Chloromethane (methyl chloride)	74-87-3				Chloromethane (methyl chloride)	74-87-3	6.47E-04	1.42E-01	2.84E-03	Chloromethane (methyl chloride)	74-87-3	3.37E-04	1.44E-01	2.88E-03	Chloromethane (methyl chloride)	74-87-3
Dichlorobenzene	106467				Dichlorobenzene	106467	3.43E-04	7.27E-02	1.50E-03	Dichlorobenzene	106467	1.31E-02	7.37E-02	1.47E-03	Dichlorobenzene	106467
Dichloromethane (methylene chloride)	75-09-2				Dichloromethane (methylene chloride)	75-09-2	1.29E-02	2.82E+00	5.64E-02	Dichloromethane (methylene chloride)	75-09-2	5.26E-03	2.86E+00	5.72E-02	Dichloromethane (methylene chloride)	75-09-2
Ethylbenzene	100414				Ethylbenzene	100414	5.19E-03	1.14E+00	2.27E-02	Ethylbenzene	100414	2.02E-06	1.15E+00	2.30E-02	Ethylbenzene	100414
Ethylene Dibromide	106934				Ethylene Dibromide	106934	1.99E-06	4.36E-04	8.72E-06	Ethylene Dibromide	106934	6.09E-03	4.42E-04	8.84E-06	Ethylene Dibromide	106934
n-Hexane	110543				n-Hexane	110543	6.00E-03	1.31E+00	2.63E-02	n-Hexane	110543	3.15E-05	1.33E+00	2.67E-02	n-Hexane	110543
Mercury	NA				Mercury	NA	3.10E-05	1.36E-04	1.36E-04	Mercury	NA	2.01E-03	1.38E-04	1.38E-04	Mercury	NA
Methyl Isobutyl Ketone (hexone)	108-10-1				Methyl Isobutyl Ketone (hexone)	108-10-1	1.98E-03	4.35E-01	8.69E-03	Methyl Isobutyl Ketone (hexone)	108-10-1	6.65E-03	4.41E-01	8.82E-03	Methyl Isobutyl Ketone (hexone)	108-10-1
Tetrachloroethylene	127-18-4				Tetrachloroethylene	127-18-4	6.55E-03	1.44E+00	2.87E-02	Tetrachloroethylene	127-18-4	3.89E-02	1.46E+00	2.91E-02	Tetrachloroethylene	127-18-4
Toluene (methylbenzene)	108-88-3				Toluene (methylbenzene)	108-88-3	3.84E-02	8.40E+00	1.68E-01	Toluene (methylbenzene)	108-88-3	3.98E-03	8.52E+00	1.70E-01	Toluene (methylbenzene)	108-88-3
Trichloroethylene (trichloroethene)	79-01-6				Trichloroethylene (trichloroethene)	79-01-6	3.93E-03	8.60E-01	1.72E-02	Trichloroethylene (trichloroethene)	79-01-6	4.93E-03	8.72E-01	1.74E-02	Trichloroethylene (trichloroethene)	79-01-6
Vinyl Chloride (chloroethylene, VCM)	75-01-4				Vinyl Chloride (chloroethylene, VCM)	75-01-4	4.86E-03	1.06E+00	2.13E-02	Vinyl Chloride (chloroethylene, VCM)	75-01-4	1.38E-02	1.08E+00	2.16E-02	Vinyl Chloride (chloroethylene, VCM)	75-01-4
Xylenes (m, o, p)	1330-20-7				Xylenes (m, o, p)	1330-20-7	6.12E-02	2.98E+00	2.68E-01	Xylenes (m, o, p)	1330-20-7	1.09E-01	3.02E+00	6.05E-02	Xylenes (m, o, p)	1330-20-7
Hydrogen Chloride	7647-01-0				Hydrogen Chloride	7647-01-0	8.11E-01	3.55E+00	3.55E+00	Hydrogen Chloride	7647-01-0				Hydrogen Chloride	7647-01-0
					2-Methylnaphthalene	91-57-6	2.30E-07	1.01E-06	1.01E-06							
					3-Methylcholanthrene	56-49-5	1.73E-08	7.57E-08	7.57E-08							
					7, 12-Dimethylbenz(a)anthracene		1.54E-07	6.73E-07	6.73E-07							
					Acenaphthene	83-32-9	1.73E-08	7.57E-08	7.57E-08							
					Acenaphthylene	203-96-8	1.73E-08	7.57E-08	7.57E-08							
					Anthracene	120-12-7	2.30E-08	1.01E-07	1.01E-07							
					Benz(a)anthracene	56-55-3	1.73E-08	7.57E-08	7.57E-08							
					Benzo(a)pyrene	50-32-8	1.15E-08	5.05E-08	5.05E-08							
					Benzo(b)fluoranthene	205-99-2	1.73E-08	7.57E-08	7.57E-08							
					Benzo(g,h,i)perylene	191-24-2	1.15E-08	5.05E-08	5.05E-08							
					Benzo(k)fluoranthene	207-08-9	1.73E-08	7.57E-08	7.57E-08							
					Chrysene	218-01-9	1.73E-08	7.57E-08	7.57E-08							
					Dibenzo(a,h)anthracene	53-70-3	1.15E-08	5.05E-08	5.05E-08							
					Fluoranthene	206-44-0	2.88E-08	1.26E-07	1.26E-07							
					Fluorene	86-73-7	2.69E-08	1.18E-07	1.18E-07							
					Formaldehyde	50-00-0	7.20E-04	3.15E-03	3.15E-03							
					Indeno(1,2,3-cd)pyrene	193-39-5	1.73E-08	7.57E-08	7.57E-08							
					Naphthalene	91-20-3	5.86E-06	2.56E-05	2.56E-05							
					Phenanthrene	85-01-8	1.63E-07	7.15E-07	7.15E-07							
					Pyrene	129-00-0	4.80E-08	2.10E-07	2.10E-07							
					Arsenic	7440-38-2	1.92E-06	8.41E-06	8.41E-06							
					Beryllium	7440-41-7	1.15E-07	5.05E-07	5.05E-07							
					Cadmium	7440-43-9	1.06E-05	4.63E-05	4.63E-05							
					Chromium	7440-47-3	1.34E-05	5.89E-05	5.89E-05							
					Cobalt	7440-48-4	8.06E-07	3.53E-06	3.53E-06							
					Manganese	7439-96-5	3.65E-06	1.60E-05	1.60E-05							
					Nickel	7440-02-0	2.02E-05	8.83E-05	8.83E-05							
					Selenium	7782-49-2	2.30E-07	1.01E-06	1.01E-06							
Total HAPs	NA	-	-	-	Total HAPs	NA	0.98	26.91	4.29	Total HAPs	NA	0.22	23.9	0.5	Total HAPs	NA

Paved Roads				Unpaved Roads				Fugitive emissions from landfill				Total Facility Emissions Summary Table			
FUGI 3				FUGI 4				FUGI 2							
e) Potential				e) Potential				e) Potential				f) Potential (tons/year)			
Lbs per Hr	Unc tpy	Limited tpy	Pollutant Name	CAS #	Lbs per Hr	Unc tpy	Limited tpy	Pollutant Name	CAS #	Lbs per Hr	Unc tpy			Limited tpy	
			NOx	NA				NOx	NA				NOx	40.8	40.8
			CO	NA				CO	NA				CO	163.2	163.2
			VOC	NA				VOC	NA	1.92	8.41	8.41	VOC	102.6	9.57
11.9	39.1	19.5	PM	NA	41.2	135.4	67.7	PM	NA				PM	184.2	97.0
2.38	7.82	3.91	PM10	NA	11.1	36.5	18.3	PM10	NA				PM10	54.1	32.0
0.58	1.92	1.92	PM2.5	NA	1.11	3.65	1.83	PM2.5	NA				PM2.5	15.36	13.5
			SO2	NA				SO2	NA				SO2	90.6	90.6
			CO2	NA				CO2	NA	2,079	9,108	9,108	CO2	180015	180015
			CH4	NA				CH4	NA	570	2,498		CH4	18543	2823
			N2O	NA				N2O	NA				N2O	0.71	0.71
			CO2e	NA				CO2e	NA	16,337	71,554	71,554	CO2e	643814	250790
			1,1,2,2-Tetrachloroethane	71556				1,1,2,2-Tetrachloroethane	71556	1.77E-02	7.74E-02	7.74E-02	1,1,2,2-Tetrachloroethane	9.48E-01	9.48E-02
			1,1,2-Trichloroethane	79345				1,1,2-Trichloroethane	79345	6.07E-03	2.66E-02	2.66E-02	1,1,2-Trichloroethane	2.99E-01	5.99E-03
			1,1-Dichloroethane (ethylidene dichloride)	75-34-3				1,1-Dichloroethane (ethylidene dichloride)	75-34-3	2.21E-02	9.66E-02	9.66E-02	1,1-Dichloroethane (ethylidene dichloride)	1.18E+00	1.18E-01
			1,1-Dichloroethene (vinylidene chloride)	75-35-4				1,1-Dichloroethene (vinylidene chloride)	75-35-4	1.85E-03	8.09E-03	8.09E-03	1,1-Dichloroethene (vinylidene chloride)	9.92E-02	9.92E-03
			1,2-Dichloroethane (ethylene dichloride)	107-06-2				1,2-Dichloroethane (ethylene dichloride)	107-06-2	3.82E-03	1.67E-02	1.67E-02	1,2-Dichloroethane (ethylene dichloride)	2.05E-01	2.05E-02
			1,2-Dichloropropane (propylene dichloride)	78-87-5				1,2-Dichloropropane (propylene dichloride)	78-87-5	1.93E-03	8.45E-03	8.45E-03	1,2-Dichloropropane (propylene dichloride)	1.04E-01	1.03E-02
			Acrylonitrile	107-13-1				Acrylonitrile	107-13-1	3.19E-02	1.40E-01	1.40E-01	Acrylonitrile	1.71E+00	2.25E-01
			Benzene	71-43-2				Benzene	71-43-2	1.42E-02	6.20E-02	6.20E-02	Benzene	7.59E-01	7.60E-02
			Carbon disulfide	75-15-0				Carbon disulfide	75-15-0	4.19E-03	1.83E-02	1.83E-02	Carbon disulfide	1.22E-01	2.04E-02
			Carbon Tetrachloride	56235				Carbon Tetrachloride	56235	5.84E-05	2.56E-04	2.56E-04	Carbon Tetrachloride	3.13E-03	3.13E-04
			Carbonyl sulfide	463-58-1				Carbonyl sulfide	463-58-1	2.79E-03	1.22E-02	1.22E-02	Carbonyl sulfide	8.15E-02	1.36E-02
			Chlorobenzene	108907				Chlorobenzene	108907	2.71E-03	1.19E-02	1.19E-02	Chlorobenzene	1.46E-01	1.45E-02
			Chloroethane (ethyl chloride)	75-00-3				Chloroethane (ethyl chloride)	75-00-3	7.65E-03	3.35E-02	3.35E-02	Chloroethane (ethyl chloride)	4.10E-01	4.10E-02
			Chloroform	67663				Chloroform	67663	3.40E-04	1.49E-03	1.49E-03	Chloroform	1.82E-02	1.82E-03
			Chloromethane (methyl chloride)	74-87-3				Chloromethane (methyl chloride)	74-87-3	5.79E-03	2.54E-02	2.54E-02	Chloromethane (methyl chloride)	3.11E-01	3.11E-02
			Dichlorobenzene	106467				Dichlorobenzene	106467	2.97E-03	1.30E-02	1.30E-02	Dichlorobenzene	1.59E-01	1.60E-02
			Dichloromethane (methylene chloride)	75-09-2				Dichloromethane (methylene chloride)	75-09-2	1.15E-01	5.04E-01	5.04E-01	Dichloromethane (methylene chloride)	6.18E+00	6.18E-01
			Ethylbenzene	100414				Ethylbenzene	100414	4.64E-02	2.03E-01	2.03E-01	Ethylbenzene	2.49E+00	2.49E-01
			Ethylene Dibromide	106934				Ethylene Dibromide	106934	1.78E-05	7.80E-05	7.80E-05	Ethylene Dibromide	5.20E-04	8.69E-05
			n-Hexane	110543				n-Hexane	110543	5.37E-02	2.35E-01	2.35E-01	n-Hexane	2.88E+00	2.88E-01
			Mercury	NA				Mercury	NA	5.56E-06	2.43E-05	2.43E-05	Mercury	2.98E-04	2.98E-04
			Methyl Isobutyl Ketone (hexone)	108-10-1				Methyl Isobutyl Ketone (hexone)	108-10-1	1.78E-02	7.78E-02	7.78E-02	Methyl Isobutyl Ketone (hexone)	9.53E-01	9.53E-02
			Tetrachloroethylene	127-18-4				Tetrachloroethylene	127-18-4	5.87E-02	2.57E-01	2.57E-01	Tetrachloroethylene	3.15E+00	3.15E-01
			Toluene (methylbenzene)	108-88-3				Toluene (methylbenzene)	108-88-3	3.43E-01	1.50E+00	1.50E+00	Toluene (methylbenzene)	1.84E+01	1.84E+00
			Trichloroethylene (trichloroethene)	79-01-6				Trichloroethylene (trichloroethene)	79-01-6	3.51E-02	1.54E-01	1.54E-01	Trichloroethylene (trichloroethene)	1.89E+00	1.89E-01
			Vinyl Chloride (chloroethylene, VCM)	75-01-4				Vinyl Chloride (chloroethylene, VCM)	75-01-4	4.35E-02	1.91E-01	1.91E-01	Vinyl Chloride (chloroethylene, VCM)	2.33E+00	2.33E-01
			Xylenes (m, o, p)	1330-20-7				Xylenes (m, o, p)	1330-20-7	1.22E-01	5.34E-01	5.34E-01	Xylenes (m, o, p)	6.54E+00	8.62E-01
			Hydrogen Chloride	7647-01-0				Hydrogen Chloride	7647-01-0				Hydrogen Chloride	3.55E+00	3.55E+00
														1.01E-06	1.01E-06
														7.57E-08	7.57E-08
														6.73E-07	6.73E-07
														7.57E-08	7.57E-08
														7.57E-08	7.57E-08
														1.01E-07	1.01E-07
														7.57E-08	7.57E-08
														5.05E-08	5.05E-08
														7.57E-08	7.57E-08
														5.05E-08	5.05E-08
														7.57E-08	7.57E-08
														7.57E-08	7.57E-08
														5.05E-08	5.05E-08
														1.26E-07	1.26E-07
														1.18E-07	1.18E-07
														3.15E-03	3.15E-03
														7.57E-08	7.57E-08
														2.56E-05	2.56E-05
														7.15E-07	7.15E-07
														2.10E-07	2.10E-07
														8.41E-06	8.41E-06
														5.05E-07	5.05E-07
														4.63E-05	4.63E-05
														5.89E-05	5.89E-05
														3.53E-06	3.53E-06
														1.60E-05	1.60E-05
														8.83E-05	8.83E-05
														1.01E-06	1.01E-06
-	-	-	Total HAPs	NA	-	-	-	Total HAPs	NA	0.96	4.21	4.21	Total HAPs	55.0	8.95

Criteria and GHG Calculations

Landfill Gas Recovery			
Emission Unit	Design Capacity	Units	MMBtu/hr
TREA 7 - TOx burning waste gas	2,235	scfm	7.3
TREA 6 - Open Flare burning LFG	4,000	scfm	
Emission Source			
Natural gas as supplemental gas to TOx	160.0	scfm	

Notes: Emissions from the open flare are always worst case for criteria pollutant as compared to the thermal oxidizer (see Worst case pollutants tab) so these calculations have been zero'ed out

Emission Source	Regulated Pollutants	Maximum Gas Consumption		Hours of Operation	Emission Factors		Uncontrolled	Controlled	Uncontrolled	Limited
							PTE	PTE	PTE	PTE
		cfm	MMCF/yr	(hrs/yr)			(lbs/hr)	(lbs/hr)	(TPY)	(TPY)
TREA 7 - TOx burning waste gas	VOCs ⁽¹⁾	2,235	1,175	8,760	10.6	lb/hr	10.6	0.21	46.3	0.93
	NMOC ⁽²⁾	2,235	1,175	8,760	27.1	lb/hr	27.1	0.54	118.8	2.38
	NO _x ⁽³⁾	2,235	1,175	8,760	0.06	lb/MMBTU	0.43	0.43	1.89	1.89
	SO ₂ ⁽⁴⁾	2,235	1,175	8,760	0.45	lb/hr	0.45	0.45	1.98	1.98
	CO ⁽⁵⁾	2,235	1,175	8,760	0.2	lb/MMBTU	1.46	1.46	6.39	6.39
	PM ₁₀ ⁽⁶⁾	2,235	1,175	8,760	1.7E-05	lb/scfm CH ₄	0.12	0.12	0.53	0.53
	PM _{2.5} ⁽⁶⁾	2,235	1,175	8,760	1.7E-05	lb/scfm CH ₄	0.12	0.12	0.53	0.53
	CO ₂ ⁽⁷⁾ Pass Through	2,235	1,175	8,760	52.07	kg/MMBtu	12198	12198	53429	53429
	CO ₂ ⁽⁷⁾ Combustion	2,235	1,175	8,760	52.07	kg/MMBtu	0	0	0	0
	CH ₄ ⁽⁸⁾	2,235	1,175	8,760	0.0032	kg/MMBtu	0.000	0.000	0.00	0.00
	N ₂ O ⁽⁸⁾	2,235	1,175	8,760	0.0006	kg/MMBtu	0.000	0.000	0.000	0.000
	CO _{2e} ⁽⁸⁾	2,235	1,175	8,760			12198	12198	53429	53429

EMISSION FACTOR SOURCE:

- (1) VOC (lb/hr) = [(gas flow in cfm * conc (ppmv) * 0.000001 * MW)/(std temp in R * gas constant)] * 60 min/hr * (1-control efficiency) where conc = 39% of NMOC, or 348 ppmv and MW = 86 lb/lb-mol. Control efficiency of 98% can be assumed.
- (2) NMOC (lb/hr) = [(gas flow in cfm * conc (ppmv) * 0.000001 * MW)/(std temp in R * gas constant)] * 60 min/hr * (1-control efficiency) where concentration = 893 ppmv (AP-42 default conc of 595 ppmv plus a safely factor of 1.5) and MW = 86 lb/lb-mol. Control efficiency of 98% can be assumed.
- (3) Manufacturer Specifications, with an emission factor of 0.06 lb/MMBtu and a rating of 7.3 MMBtu/hr
- (4) SO₂ (lb/hr) = [(gas flow in cfm * conc (ppmv) * 0.000001 * MW)/(std temp in R * gas constant)] * 60 min/hr * 100% conversion of S to SO₂ where H₂S concentration = 20 ppmv
(actual lab results show a total sulfur conc of 48.6 ppmv in LFG), MW = 64 lb/lb-mol, and the RNG treatment system is designed to remove all sulfur from this stream, so a conc of 20 ppmv is conservative)
- (5) Manufacturer Specifications, with an emission factor of 0.2 lb/MMBtu and a rating of 7.3 MMBtu/hr
- (6) Emission factor for Particulate Matter (in lb/hr/dscfm CH₄) is from AP-42, Table 2.4-5. PM and PM_{2.5} assumed to be the same as PM₁₀. 1.7E-05 lb/hr/dscfm CH₄*2235 scfm*0.5*60 = 1.14 lb/hr, where the gas flow is assumed to be 5.34% CH₄ (TOx design parameters).
- (7) CO₂ pass through = (scfm*ppmv*MW*0.000001)/(0.7302*520)*60 where ppmv is 785,000 and MW is 44 lb/lb-mol and CO₂ combustion = 52.0 kg/MMBtu*2.2 lb/kg*7.3 MMBtuhr
- (8) Emissions based on 40 CFR 98, TOx assumed to operate at maximum capacity 24 hours/day 365 days/year for PTE purposes. 40 CFR 98, Subpart C, Tables C-1, C-2, Rev. September 10, 2010; factors are for landfill gas or biogas if landfill gas was unavailable. 2 GWP of CH₄ increased from 21 to 25, effective Jan. 1, 2014. GWP of N₂O decreased from 310 to 298, effective Jan. 1, 2014.

Emission Source	Regulated Pollutants (1)	Maximum Gas Consumption		Hours of Operation	Emission Factors		Uncontrolled	Controlled	Uncontrolled	Limited
							PTE	PTE	PTE	PTE
		cfm	MMCF/yr	(hrs/yr)			(lbs/hr)	(lbs/hr)	(TPY)	(TPY)
TREA 6 - Open flare burning LFG	NO _x ⁽²⁾	4,000		8,760	0.068	lb/MMBTU	7.43	7.43	32.5	32.5
	SO ₂ ⁽³⁾	4,000		8,760	20.2	lb/hr	20.2	20.2	88.6	88.6
	CO ⁽⁴⁾	4,000		8,760	0.31	lb/MMBTU	33.9	33.9	148.3	148.3
	PM ₁₀ ⁽⁵⁾	4,000		8,760	1.7E-05	lb/scfm CH ₄	2.04	2.04	8.94	8.94
	PM _{2.5} ⁽⁵⁾	4,000		8,760	1.7E-05	lb/scfm CH ₄	2.04	2.04	8.94	8.94
	CO ₂ ⁽⁶⁾ (Flare combustion)	4,000		8,760	52.07	kg/MMBtu	13906	13906	60906	60906
	CH ₄ ⁽⁷⁾	4,000		8,760	0.0032	kg/MMBtu	0.86	0.86	3.75	3.75
	N ₂ O ⁽⁷⁾	4,000		8,760	0.00060	kg/MMBtu	0.160	0.160	0.70	0.70
	CO _{2e} ⁽⁷⁾	4,000		8,760			13975	13975	61210	61210

EMISSION FACTOR SOURCE:

- (1) VOC emissions from combustion have not been calculated here because they are assumed to be very small and are most likely captured in the EQUI 29 emissions.
- (2) Manufacturer Specifications, with an emission factor of 0.068 lb/MMBtu and a rating of 109.2 MMBtu/hr
- (3) Sulfur concentration of 500 ppmv based on AP-42 5th Ed., Section 2.4.4.2, November 1998 with an increased safety factor. Lb/hr = (flow*ppmv*lb/lb mole*0.000001)/(0.7302*520)*60 = 20.2 lb/hr, where molecular weight = 64 lb/lb-mol (actual lab results show a total sulfur conc of 48.6 ppm in LFG)
- (4) Manufacturer Specifications, with an emission factor of 0.31 lb/MMBtu and a rating of 109.2 MMBtu/hr
- (5) Emission factor for Particulate Matter (in lb/hr/dscfm CH₄) is from AP-42, Table 2.4-5. PM and PM_{2.5} assumed to be the same as PM₁₀. 1.7E-05 lb/hr/dscfm CH₄*4000 scfm*0.5*60 = 2.04 lb/hr, where the gas flow is assumed to be 50% CH₄.

(6) CO₂ combustion = 52.0 kg/MMBtu*2.2 lb/kg*506.5 Btu/CF*4000 CF/min*0.000001*60

(7) Emissions based on 40 CFR 98, TOx assumed to operate at maximum capacity 24 hours/day 365 days/year for PTE purposes. 40 CFR 98, Subpart C, Tables C-1, C-2, Rev. September 10, 2010; factors are for landfill gas or biogas if landfill gas was unavailable. 2 GWP of CH₄ increased from 21 to 25, effective Jan. 1, 2014. GWP of N₂O decreased from 310 to 298, effective Jan. 1, 2014.

Emission Source	Regulated Pollutants	Maximum Gas Consumption		Hours of Operation	Emission Factors ⁽⁷⁾		Uncontrolled	Controlled	Uncontrolled	Limited
							PTE	PTE	PTE	PTE
		cfm	MMCF/yr				(lbs/hr)	(lbs/hr)	(TPY)	(TPY)
Natural gas as supplemental gas to TOx	VOCs ⁽¹⁾	160	84	8,760	5.5	lb/10 ⁶ scf	0.053	0.053	0.231	0.231
	NO _x ⁽²⁾	160	84	8,760	0.15	lb/MMBTU	1.46	1.46	6.37	6.37
	SO ₂ ⁽³⁾	160	84	8,760	0.6	lb/10 ⁶ scf	0.0058	0.0058	0.025	0.025
	CO ⁽⁴⁾	160	84	8,760	0.20	lb/MMBTU	1.94	1.94	8.50	8.50
	PM ₁₀ ⁽⁵⁾	160	84	8,760	7.60	lb/10 ⁶ scf	0.073	0.073	0.32	0.32
	PM _{2.5} ⁽⁵⁾	160	84	8,760	7.60	lb/10 ⁶ scf	0.073	0.073	0.32	0.32
	CO ₂ ⁽⁶⁾	160	84	8,760	53.06	kg/MMBtu	1132	1132	4959	4959
	CH ₄ ⁽⁷⁾	160	84	8,760	1.00E-03	kg/MMBtu	0.021	0.021	0.093	0.093
	N ₂ O ⁽⁷⁾	160	84	8,760	1.00E-04	kg/MMBtu	0.0021	0.0021	0.0093	0.0093
	CO _{2e} ^U	160	84	8,760			1133	1133	4965	4965

EMISSION FACTOR SOURCE:

(1) AP-42 5th Ed., "Compilation of Air Pollutant Emissions Factors, Vol. 1: Stationary Point and Area Sources," 1998 Table 1.4-2.

(2) Manufacturer Specifications, with an emission factor of 0.15 lb/MMBtu and a rating of 9.7 MMBtuhr

(3) AP-42 5th Ed., "Compilation of Air Pollutant Emissions Factors, Vol. 1: Stationary Point and Area Sources," 1998 Table 1.4-2.

(4) Manufacturer Specifications, with an emission factor of 0.20 lb/MMBtu and a rating of 9.7 MMBtuhr

(5) AP-42 Table 1.4-2. PM and PM_{2.5} assumed to be the same as PM₁₀

(6) CFR Part 98 Table C-1, factor for natural gas, use mfr rating of 9.7 MMBtu/hr

(7) Emissions based on 40 CFR 98, TOx assumed to operate at maximum capacity 24 hours/day 365 days/year for PTE purposes. 40 CFR 98, Subpart C, Tables C-1, C-2, Rev. September 10, 2010; factors are for landfill gas or biogas if landfill gas was unavailable. 2 GWP of CH₄ increased from 21 to 25, effective Jan. 1, 2014. GWP of N₂O decreased from 310 to 298, effective Jan. 1, 2014.

LFG Recovery + Waste Gas Combustion ¹					NG as supplemental gas to TOx				Total PTE after RNG			
Regulated Pollutants	Uncontrolled	Controlled	Uncontrolled	Limited	Uncontrolled	Controlled	Uncontrolled	Limited	Uncontrolled	Controlled	Uncontrolled	Limited
	PTE (lbs/hr)	PTE (lbs/hr)	PTE (TPY)	PTE (TPY)	PTE (lbs/hr)	PTE (lbs/hr)	PTE (TPY)	PTE (TPY)	PTE (lbs/hr)	PTE (lbs/hr)	PTE (TPY)	PTE (TPY)
VOCs	10.57	0.21	46.30	0.93	0.053	0.053	0.231	0.231	10.622	0.264	46.53	1.16
NMOC	27.12	0.54	118.80	2.38	N/A	N/A	N/A	N/A	27.12	0.54	118.8	2.38
NOx	7.86	7.86	34.4	34.4	1.46	1.46	6.37	6.37	9.31	9.31	40.8	40.8
SO ₂	20.7	20.7	90.6	90.6	0.0058	0.0058	0.025	0.025	20.7	20.7	90.6	90.6
CO	35.3	35.3	154.7	154.7	1.94	1.94	8.50	8.50	37.3	37.3	163.2	163.2
PM ₁₀	2.16	2.16	9.47	9.47	0.073	0.073	0.32	0.32	2.23	2.23	9.79	9.79
PM _{2.5}	2.16	2.16	9.47	9.47	0.073	0.073	0.32	0.32	2.23	2.23	9.79	9.79
CO ₂	26104	26104	114336	114336	1132	1132	4959	4959	27236	27236	119295	119295
CH ₄	0.86	0.86	3.75	3.75	0.021	0.021	0.093	0.093	0.88	0.88	3.84	3.84
N ₂ O	0.16	0.16	0.70	0.70	0.0021	0.0021	0.0093	0.0093	0.16	0.16	0.71	0.71
CO _{2e}	26173	26173	114639	114639	1133	1133	4965	4965	27307	27307	119604	119604

Worst case criteria pollutant calcs

Landfill Gas Recovery			
Emission Unit	Design Capacity	Units	MMBtu/hr
TREA 7 - TOx burning waste gas	2,235	scfm	7.3
TREA 6 - Open Flare burning LFG	4,000	scfm	
Emission Source			
Natural gas as supplemental gas to TOx	160.0	scfm	

Emission Source	Regulated Pollutants	Maximum Gas Consumption		Hours of Operation (hrs/yr)	Emission Factors		Uncontrolled PTE	Controlled PTE	Uncontrolled PTE	Limited PTE
		cfm	MMCF/yr				(lbs/hr)	(lbs/hr)	(TPY)	(TPY)
TREA 7 - TOx burning waste gas	VOCs ⁽¹⁾	2,235	1,175	8,760	10.6	lb/hr	10.6	0.21	46.3	0.93
	NMOC ⁽²⁾	2,235	1,175	8,760	27.1	lb/hr	27.1	0.54	118.8	2.38
	NO _x ⁽³⁾	2,235	1,175	8,760	0.06	lb/MMBTU	0.44	0.44	1.92	1.92
	SO ₂ ⁽⁴⁾	2,235	1,175	8,760	0.45	lb/hr	0.45	0.45	1.98	1.98
	CO ⁽⁵⁾	2,235	1,175	8,760	0.2	lb/MMBTU	1.46	1.46	6.39	6.39
	PM ₁₀ ⁽⁶⁾	2,235	1,175	8,760	1.7E-05	lb/scfm CH ₄	0.12	0.12	0.53	0.53
	PM _{2.5} ⁽⁶⁾	2,235	1,175	8,760	1.7E-05	lb/scfm CH ₄	0.12	0.12	0.53	0.53
	CO ₂ ⁽⁷⁾ Pass Through	2,235	1,175	8,760	52.07	kg/MMBtu	12198	12198	53429	53429
	CO ₂ ⁽⁷⁾ Combustion	2,235	1,175	8,760	52.07	kg/MMBtu	836	836	3663	3663
	CH ₄ ⁽⁸⁾	2,235	1,175	8,760	0.0032	kg/MMBtu	0.051	0.051	0.23	0.23
	N ₂ O ⁽⁸⁾	2,235	1,175	8,760	0.0006	kg/MMBtu	0.010	0.010	0.042	0.042
	CO _{2e} ⁽⁸⁾	2,235	1,175	8,760			13039	13039	57110	57110

EMISSION FACTOR SOURCE:

- (1) VOC (lb/hr) = [(gas flow in cfm * conc (ppmv) * 0.000001 * MW)/(std temp in R * gas constant)] * 60 min/hr * (1-control efficiency) where conc = 39% of NMOC, or 348 ppmv and MW = 86 lb/lb-mol. Control efficiency of 98% can be assumed.
- (2) NMOC (lb/hr) = [(gas flow in cfm * conc (ppmv) * 0.000001 * MW)/(std temp in R * gas constant)] * 60 min/hr * (1-control efficiency) where concentration = 893 ppmv (AP-42 default conc of 595 ppmv plus a safely factor of 1.5) and MW = 86 lb/lb-mol. Control efficiency of 98% can be assumed.
- (3) Manufacturer Specifications, with an emission factor of 0.06 lb/MMBtu and a rating of 7.3 MMBtu/hr
- (4) SO₂ (lb/hr) = [(gas flow in cfm * conc (ppmv) * 0.000001 * MW)/(std temp in R * gas constant)] * 60 min/hr * 100% conversion of S to SO₂ where H₂S concentration = 20 ppmv
(actual lab results show an H₂S conc of 41.3 ppmv in LFG), MW = 64 lb/lb-mol, and the RNG treatment system is designed to remove all sulfur from this stream, so a conc of 20 ppmv is conservative)
- (5) Manufacturer Specifications, with an emission factor of 0.2 lb/MMBtu and a rating of 7.2 MMBtu/hr
- (6) Emission factor for Particulate Matter (in lb/hr/dscfm CH₄) is from AP-42, Table 2.4-5. PM and PM_{2.5} assumed to be the same as PM₁₀. 1.7E-05 lb/hr/dscfm CH₄*2235 scfm*0.5*60 = 1.14 lb/hr, where the gas flow is assumed to be 5.34% CH₄ (TOx design parameters).
- (7) CO₂ pass through = (scfm*ppmv*MW*0.000001)/(0.7302*520)*60 where ppmv is 785,000 and MW is 44 lb/lb-mol and CO₂ combustion = 52.0 kg/MMBtu*2.2 lb/kg*7.3 MMBtuhr
- (8) Emissions based on 40 CFR 98, TOx assumed to operate at maximum capacity 24 hours/day 365 days/year for PTE purposes. 40 CFR 98, Subpart C, Tables C-1, C-2, Rev. September 10, 2010; factors are for landfill gas or biogas if landfill gas was unavailable. 2 GWP of CH₄ increased from 21 to 25, effective Jan. 1, 2014. GWP of N₂O decreased from 310 to 298, effective Jan. 1, 2014.

Emission Source	Regulated Pollutants (1)	Maximum Gas Consumption		Hours of Operation (hrs/yr)	Emission Factors		Uncontrolled PTE	Controlled PTE	Uncontrolled PTE	Limited PTE
		cfm	MMCF/yr				(lbs/hr)	(lbs/hr)	(TPY)	(TPY)
TREA 6 - Open flare burning LFG	NO _x ⁽²⁾	4,000		8,760	0.068	lb/MMBTU	7.43	7.43	32.5	32.5
	SO ₂ ⁽³⁾	4,000		8,760	20.2	lb/hr	20.2	20.2	88.6	88.6
	CO ⁽⁴⁾	4,000		8,760	0.31	lb/MMBTU	33.9	33.9	148.3	148.3
	PM ₁₀ ⁽⁵⁾	4,000		8,760	1.7E-05	lb/scfm CH ₄	2.04	2.04	8.94	8.94
	PM _{2.5} ⁽⁵⁾	4,000		8,760	1.7E-05	lb/scfm CH ₄	2.04	2.04	8.94	8.94
	CO ₂ ⁽⁶⁾ (Flare combustion)	4,000		8,760	52.07	kg/MMBtu	13906	13906	60906	60906
	CH ₄ ⁽⁷⁾	4,000		8,760	0.0032	kg/MMBtu	0.86	0.86	3.75	3.75
	N ₂ O ⁽⁷⁾	4,000		8,760	0.00060	kg/MMBtu	0.160	0.160	0.70	0.70
	CO _{2e} ⁽⁷⁾	4,000		8,760			13975	13975	61210	61210

EMISSION FACTOR SOURCE:

- (1) VOC emissions from combustion have not been calculated here because they are assumed to be very small and are most likely captured in the EQUI 29 emissions.
- (2) Manufacturer Specifications, with an emission factor of 0.068 lb/MMBtu and a rating of 109.2 MMBtu/hr
- (3) Sulfur concentration of 500 ppmv based on AP-42 5th Ed., Section 2.4.4.2, November 1998 with an increased safety factor. Lb/hr = (flow*ppmv*lb/lb mole*0.000001)/(0.7302*520)*60 = 20.2 lb/hr, where molecular weight = 64 lb/lb-mol
- (4) Manufacturer Specifications, with an emission factor of 0.31 lb/MMBtu and a rating of 109.2 MMBtu/hr

(5) Emission factor for Particulate Matter (in lb/hr/dscfm CH₄) is from AP-42, Table 2.4-5. PM and PM_{2.5} assumed to be the same as PM₁₀. 1.7E-05 lb/hr/dscfm CH₄*4000 scfm*0.5*60 = 2.04 lb/hr, where the gas flow is assumed to be 50% CH₄.

(6) CO₂ combustion = 52.0 kg/MMBtu*2.2 lb/kg*506.5 Btu/CF*4000 CF/min*0.000001*60

(7) Emissions based on 40 CFR 98, TOx assumed to operate at maximum capacity 24 hours/day 365 days/year for PTE purposes. 40 CFR 98, Subpart C, Tables C-1, C-2, Rev. September 10, 2010; factors are for landfill gas or biogas if landfill gas was unavailable. 2 GWP of CH₄ increased from 21 to 25, effective Jan. 1, 2014. GWP of N₂O decreased from 310 to 298, effective Jan. 1, 2014.

Emission Source	Regulated Pollutants	Maximum Gas Consumption		Hours of Operation	Emission Factors ⁽⁷⁾		Uncontrolled PTE	Controlled PTE	Uncontrolled PTE	Limited PTE
		cfm	MMCF/yr				(lbs/hr)	(lbs/hr)	(TPY)	(TPY)
Natural gas as supplemental gas to TOx	VOCs ⁽¹⁾	160	84	8,760	5.5	lb/10 ⁶ scf	0.053	0.053	0.231	0.231
	NO _x ⁽²⁾	160	84	8,760	0.15	lb/MMBTU	1.46	1.46	6.37	6.37
	SO ₂ ⁽³⁾	160	84	8,760	0.6	lb/10 ⁶ scf	0.0058	0.0058	0.025	0.025
	CO ⁽⁴⁾	160	84	8,760	0.20	lb/MMBTU	1.94	1.94	8.50	8.50
	PM ₁₀ ⁽⁵⁾	160	84	8,760	7.60	lb/10 ⁶ scf	0.073	0.073	0.32	0.32
	PM _{2.5} ⁽⁶⁾	160	84	8,760	7.60	lb/10 ⁶ scf	0.073	0.073	0.32	0.32
	CO ₂ ⁽⁶⁾	160	84	8,760	53.06	kg/MMBtu	1132	1132	4959	4959
	CH ₄ ⁽⁷⁾	160	84	8,760	1.00E-03	kg/MMBtu	0.021	0.021	0.093	0.093
	N ₂ O ⁽⁷⁾	160	84	8,760	1.00E-04	kg/MMBtu	0.0021	0.0021	0.0093	0.0093
	CO _{2e} ⁽⁷⁾	160	84	8,760			1133	1133	4965	4965

EMISSION FACTOR SOURCE:

(1) AP-42 5th Ed., "Compilation of Air Pollutant Emissions Factors, Vol. 1: Stationary Point and Area Sources," 1998 Table 1.4-2.

(2) Manufacturer Specifications, with an emission factor of 0.15 lb/MMBtu and a rating of 9.7 MMBtu/hr

(3) AP-42 5th Ed., "Compilation of Air Pollutant Emissions Factors, Vol. 1: Stationary Point and Area Sources," 1998 Table 1.4-2.

(4) Manufacturer Specifications, with an emission factor of 0.20 lb/MMBtu and a rating of 9.7 MMBtu/hr

(5) AP-42 Table 1.4-2. PM and PM_{2.5} assumed to be the same as PM₁₀

(6) CFR Part 98 Table C-1, factor for natural gas, use mfr rating of 9.7 MMBtu/hr

(7) Emissions based on 40 CFR 98, TOx assumed to operate at maximum capacity 24 hours/day 365 days/year for PTE purposes. 40 CFR 98, Subpart C, Tables C-1, C-2, Rev. September 10, 2010; factors are for landfill gas or biogas if landfill gas was unavailable. 2 GWP of CH₄ increased from 21 to 25, effective Jan. 1, 2014. GWP of N₂O decreased from 310 to 298, effective Jan. 1, 2014.

LFG Recovery + Waste Gas Combustion					NG as supplemental gas to TOx				Total PTE after RNG			
Regulated Pollutants	Uncontrolled PTE	Controlled PTE	Uncontrolled PTE	Limited PTE	Uncontrolled PTE	Controlled PTE	Uncontrolled PTE	Limited PTE	Uncontrolled PTE	Controlled PTE	Uncontrolled PTE	Limited PTE
	(lbs/hr)	(lbs/hr)	(TPY)	(TPY)	(lbs/hr)	(lbs/hr)	(TPY)	(TPY)	(lbs/hr)	(lbs/hr)	(TPY)	(TPY)
VOCs	10.57	0.21	46.30	0.93	0.053	0.053	0.231	0.231	10.6	0.26	46.5	1.16
NMOC	27.12	0.54	118.80	2.38	N/A	N/A	N/A	N/A	27.1	0.54	118.8	2.38
NOx	7.86	7.86	34.4	34.4	1.46	1.46	6.37	6.37	9.32	9.32	40.8	40.8
SO ₂	20.7	20.7	90.6	90.6	0.0058	0.0058	0.025	0.025	20.7	20.7	90.6	90.6
CO	35.3	35.3	154.7	154.7	1.94	1.94	8.50	8.50	37.3	37.3	163.2	163.2
PM ₁₀	2.16	2.16	9.47	9.47	0.073	0.073	0.32	0.32	2.23	2.23	9.79	9.79
PM _{2.5}	2.16	2.16	9.47	9.47	0.073	0.073	0.32	0.32	2.23	2.23	9.79	9.79
CO ₂	26940	26940	117999	117999	1132	1132	4959	4959	28073	28073	122958	122958
CH ₄	0.91	0.91	3.97	3.97	0.021	0.021	0.093	0.093	0.93	0.93	4.07	4.07
N ₂ O	0.17	0.17	0.75	0.75	0.0021	0.0021	0.0093	0.0093	0.17	0.17	0.75	0.75
CO _{2e}	27014	27014	118320	118320	1133	1133	4965	4965	28147	28147	123284	123284

HAPs from TREA 7 (Thermal oxidizer) burning waste gas

Assume 8760 hr/yr of operation

From Worst case pollutants tab, the thermal oxidizer is worst case for most pollutants except carbon disulfide and carbonyl sulfide so they are zero'ed out on this tab

2235 scfm

Compound	Halogenated	HAP	VOC	CAS	MW (lb/lb-mol)	Conc in Inlet Gas (adjusted) (ppmv) ¹	Conc in Inlet Gas (ppmv) ¹	Control Efficiency ⁴ (%)	PTE	PTE	PTE	PTE
									Uncontrolled	Controlled	Uncontrolled	Limited
									lb/hr	lb/hr	ton/yr	ton/yr
1,1,1 - Trichloroethane (methyl chloroform)	x	x	--	71-55-6	133.41	0.72	0.48	98%	3.39E-02	6.78E-04	1.49E-01	2.97E-03
1,1,2,2 - Tetrachloroethane	x	x	x	79-34-5	167.85	1.67	1.11	98%	9.87E-02	1.97E-03	4.32E-01	8.65E-03
1,1 - Dichloroethane (ethylidene dichloride)	x	x	x	75-34-3	98.96	3.53	2.35	98%	1.23E-01	2.46E-03	5.40E-01	1.08E-02
1,1 - Dichloroethene (vinylidene chloride)	x	x	x	75-35-4	96.94	0.30	0.201	98%	1.03E-02	2.06E-04	4.52E-02	9.04E-04
1,2 - Dichloroethane (ethylene dichloride)	x	x	x	107-06-2	98.96	0.61	0.407	98%	2.13E-02	4.27E-04	9.35E-02	1.87E-03
1,2 - Dichloropropane (propylene dichloride)	x	x	x	78-87-5	112.99	0.27	0.18	98%	1.08E-02	2.15E-04	4.72E-02	9.44E-04
Acrylonitrile (Propenenitrile)	--	x	x	107-13-1	53.06	9.50	6.33	91%	1.78E-01	1.60E-02	7.79E-01	7.01E-02
Benzene	--	x	x	71-43-2	78.12	2.87	1.91	98%	7.90E-02	1.58E-03	3.46E-01	6.92E-03
Carbon Disulfide ⁵	--	x	x	75-15-0	76.14	0.87	0.58	99.7%	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Carbon Tetrachloride	x	x	x	56-23-5	153.84	0.01	0.004	98%	3.26E-04	6.52E-06	1.43E-03	2.86E-05
Carbonyl Sulfide ⁵	--	x	x	463-58-1	60.07	0.74	0.49	99.7%	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Chlorobenzene (monochlorobenzene)	x	x	x	108-90-7	112.56	0.38	0.254	98%	1.51E-02	3.03E-04	6.63E-02	1.33E-03
Chloroethane (ethyl chloride)	x	x	x	75-00-3	64.52	1.88	1.25	98%	4.27E-02	8.54E-04	1.87E-01	3.74E-03
Chloroform (trichloromethane)	x	x	x	67-66-3	119.38	0.05	0.03	98%	1.90E-03	3.79E-05	8.31E-03	1.66E-04
Chloromethane (methyl chloride)	x	x	x	74-87-3	50.49	1.82	1.21	98%	3.24E-02	6.47E-04	1.42E-01	2.84E-03
1,4 Dichlorobenzene (p-dichlorobenzene)	x	x	x	106-46-7	147	0.32	0.213	98%	1.66E-02	3.32E-04	7.27E-02	1.45E-03
Dichloromethane (methylene chloride)	x	x	--	75-09-2	84.93	21.45	14.3	98%	6.43E-01	1.29E-02	2.82E+00	5.64E-02
Ethylbenzene	--	x	x	100-41-4	106.17	6.92	4.61	98%	2.59E-01	5.19E-03	1.14E+00	2.27E-02
Ethylene dibromide (1,2 dibromoethane)	x	x	x	106-93-4	187.88	0.00	0.001	98%	9.95E-05	1.99E-06	4.36E-04	8.72E-06
Hexane	--	x	x	110-54-3	86.18	9.86	6.57	98%	3.00E-01	6.00E-03	1.31E+00	2.63E-02
Mercury (total)	--	x	--	7439-97-6	200.61	0.00	0.000292	0%	3.10E-05	3.10E-05	1.36E-04	1.36E-04
Methyl Isobutyl Ketone (hexone)	--	x	x	108-10-1	100.16	2.81	1.87	98%	9.92E-02	1.98E-03	4.35E-01	8.69E-03
Tetrachloroethylene (perchloroethylene, -ethene)	x	x	--	127-18-4	165.83	5.60	3.73	98%	3.28E-01	6.55E-03	1.44E+00	2.87E-02
Toluene (methylbenzene)	--	x	x	108-88-3	92.14	58.95	39.3	98%	1.92E+00	3.84E-02	8.40E+00	1.68E-01
Trichloroethylene (trichloroethene)	x	x	x	79-01-6	131.38	4.23	2.82	98%	1.96E-01	3.93E-03	8.60E-01	1.72E-02
Vinyl Chloride (chloroethylene, VCM)	x	x	x	75-01-4	62.50	11.01	7.34	98%	2.43E-01	4.86E-03	1.06E+00	2.13E-02
Xylenes (m, o, p)	--	x	x	1330-20-7	106.17	18.15	12.1	91%	6.81E-01	6.12E-02	2.98E+00	2.68E-01
Hydrogen Chloride ^{2,3}		x	--	7647-01-0	36.5	63.00	42	0%	8.11E-01	8.11E-01	3.55E+00	3.55E+00
VOC									4.33E+00	1.47E-01	1.90E+01	6.42E-01
Total HAP									6.14E+00	9.78E-01	2.69E+01	4.28E+00
Maximum Single HAP									1.92E+00	8.11E-01	8.40E+00	3.55E+00

Notes:

¹AP-42 5th Ed., "Compilation of Air Pollutant Emissions Factors, Vol. 1: Stationary Point and Area Sources," Table 2.4-1, Nov. 1998. These concentrations were increased by a safety factor of 1.5 to account for the treatment process of the LFG prior to sending to TREA 7. Sulfur containing compounds are non-halogenated. H2S concentration taken from "Pine Bend - Narrative to Support Air Permit and Air Emission Calculations" prepared by SCS Energy.

²Product of combustion

³Because HCl is a production of combustion, a default ionic Cl LFG concentration of 42 ppmv is listed; AP-42, Section 2.4.4.

⁴Control efficiencies provided by manufacturer.

⁵These emissions appear at EQUI 29

HAPs from TREA 7 (Thermal oxidizer) burning natural gas

Emissions are from natural gas burned for firing of the thermal oxidizer

NG inlet flow 160 scfm

9600 scf/hr

NG Compound	CAS	Emission Factor (lb/10 ⁶ scf) ¹	PTE Uncontrolled	PTE Controlled	PTE Uncontrolled	PTE Limited
			lb/hr	lb/hr	ton/yr	ton/yr
2-Methylnaphthalene	91-57-6	2.40E-05	2.30E-07	2.30E-07	1.01E-06	1.01E-06
3-Methylcholanthrene	56-49-5	1.80E-06	1.73E-08	1.73E-08	7.57E-08	7.57E-08
7, 12-Dimethylbenz(a)anthracene		1.60E-05	1.54E-07	1.54E-07	6.73E-07	6.73E-07
Acenaphthene	83-32-9	1.80E-06	1.73E-08	1.73E-08	7.57E-08	7.57E-08
Acenaphthylene	203-96-8	1.80E-06	1.73E-08	1.73E-08	7.57E-08	7.57E-08
Anthracene	120-12-7	2.40E-06	2.30E-08	2.30E-08	1.01E-07	1.01E-07
Benz(a)anthracene	56-55-3	1.80E-06	1.73E-08	1.73E-08	7.57E-08	7.57E-08
Benzene	71-43-2	2.10E-03	2.02E-05	2.02E-05	8.83E-05	8.83E-05
Benzo(a)pyrene	50-32-8	1.20E-06	1.15E-08	1.15E-08	5.05E-08	5.05E-08
Benzo(b)fluoranthene	205-99-2	1.80E-06	1.73E-08	1.73E-08	7.57E-08	7.57E-08
Benzo(g,h,i)perylene	191-24-2	1.20E-06	1.15E-08	1.15E-08	5.05E-08	5.05E-08
Benzo(k)fluoranthene	207-08-9	1.80E-06	1.73E-08	1.73E-08	7.57E-08	7.57E-08
Chrysene	218-01-9	1.80E-06	1.73E-08	1.73E-08	7.57E-08	7.57E-08
Dibenzo(a,h)anthracene	53-70-3	1.20E-06	1.15E-08	1.15E-08	5.05E-08	5.05E-08
Dichlorobenzene	25321-22-6	1.20E-03	1.15E-05	1.15E-05	5.05E-05	5.05E-05
Fluoranthene	206-44-0	3.00E-06	2.88E-08	2.88E-08	1.26E-07	1.26E-07
Fluorene	86-73-7	2.80E-06	2.69E-08	2.69E-08	1.18E-07	1.18E-07
Formaldehyde	50-00-0	7.50E-02	7.20E-04	7.20E-04	3.15E-03	3.15E-03
Hexane	110-54-3	1.80E+00	1.73E-02	1.73E-02	7.57E-02	7.57E-02
Indeno(1,2,3-cd)pyrene	193-39-5	1.80E-06	1.73E-08	1.73E-08	7.57E-08	7.57E-08
Naphthalene	91-20-3	6.10E-04	5.86E-06	5.86E-06	2.56E-05	2.56E-05
Phenanthrene	85-01-8	1.70E-05	1.63E-07	1.63E-07	7.15E-07	7.15E-07
Pyrene	129-00-0	5.00E-06	4.80E-08	4.80E-08	2.10E-07	2.10E-07
Toluene	108-88-3	3.40E-03	3.26E-05	3.26E-05	1.43E-04	1.43E-04
Arsenic	7440-38-2	2.00E-04	1.92E-06	1.92E-06	8.41E-06	8.41E-06
Beryllium	7440-41-7	1.20E-05	1.15E-07	1.15E-07	5.05E-07	5.05E-07
Cadmium	7440-43-9	1.10E-03	1.06E-05	1.06E-05	4.63E-05	4.63E-05
Chromium	7440-47-3	1.40E-03	1.34E-05	1.34E-05	5.89E-05	5.89E-05
Cobalt	7440-48-4	8.40E-05	8.06E-07	8.06E-07	3.53E-06	3.53E-06
Manganese	7439-96-5	3.80E-04	3.65E-06	3.65E-06	1.60E-05	1.60E-05
Mercury	7439-97-6	2.60E-04	2.50E-06	2.50E-06	1.09E-05	1.09E-05
Nickel	7440-02-0	2.10E-03	2.02E-05	2.02E-05	8.83E-05	8.83E-05
Selenium	7782-49-2	2.40E-05	2.30E-07	2.30E-07	1.01E-06	1.01E-06
Total HAP			1.81E-02	1.81E-02	7.94E-02	7.94E-02
Maximum Single HAP			1.73E-02	1.73E-02	7.57E-02	7.57E-02

¹ AP-42 5th Ed., "Compilation of Air Pollutant Emissions Factors, Vol. 1: Stationary Point and Area Sources," Tables 1.4-3 amd 1.4-4.

Fugitive PM from unpaved roads FUGI 4

$E = k * [(s/12)^a * (W/3)^b] * (1-(P/N))$ (AP-42 Chapter 13.2)

Factor	Description	PM2.5 value (lb/VMT)	PM10 value (lb/VMT)	PM value (lb/VMT)
E =	Emission factor (lb/VMT, vehicle miles traveled), AP-42, Section 13.2.2,Eqn 2	0.153	1.53	5.66
k (lb/VMT)=	Particle size multiplier, AP-42 Table 13.2.2-2, factors for industrial roads	0.15	1.50	4.90
s =	Surface material silt content (%), AP-42, Table 13.2.2-1, factor for municipal solid waste landfills	6.4	6.4	6.4
W =	Mean vehicle weight (ton), value provided by facility	24.4	24.4	24.4
a =	Constant from AP-42 Table 13.2.2-2, factor for industrial roads	0.9	0.9	0.7
b =	Constant from AP-42 Table 13.2.2-2, factor for industrial roads	0.45	0.45	0.45
P =	Number of wet days, AP-42, Figure 13.2.1-2	110	110	110
N =	Number of days in averaging period	365	365	365
CE =	Control efficiency (%)	50%		
Daily hours of operation		9		

Mean vehicle weight	Total Miles Traveled/yr (VMT)
Total vehicle count = 131/day	47,815
Unloaded weight = 18 tons	
Loaded weight = 31.2 tons	47,815
Mean weight = 24.4 tons	

Pollutant	Vehicles/day	VMT	Emisison factor (lb/VMT)	Uncontrolled PTE (lbs/hr)	Controlled PTE (lbs/hr)	PTE un- restricted (tpy)	PTE limited (tpy)
PM-2.5	131	47,815	0.153	2.22	1.11	3.65	1.83
PM-10	131	47,815	1.53	22.2	11.1	36.5	18.3
PM	131	47,815	5.66	82.4	41.2	135.4	67.7

From 2014 Emission Inventory, assume 9 hours/day of operation for 260 days/yr for actual emissions
Assume 24 hr/day, 365 days/yr for PTE

Fugitive PM from paved roads FUGI 3

$E = \{[k * (sL)^{0.91} * W^{1.02}] * (1 - P/4N)\}$ (AP-42 Chapter 13.2)

Factor	Description	PM-2.5 value (lb/VMT)	PM-10 value (lb/VMT)	PM value (lb/VMT)
E =	Emission factor (lb/VMT, vehicle miles traveled), AP-42, Section 13.2.1,Eqn 1	0.080	0.33	1.63
k (lb/VMT)=	Particle size multiplier, AP-42 Table 13.2.2-2	0.00054	0.0022	0.011
sL =	Silt loading (g/m ²)	7.4	7.4	7.4
W =	Mean vehicle weight (ton)	24.4	24.4	24.4
P =	Number of wet days, AP-42, Figure 13.2.1-2	110	110	110
N =	Number of days in averaging period	365	365	365
CE	Control efficiency (%)	50%		
Daily hours of operation		9		

Mean vehicle weight	Total Miles Traveled/yr (VMT)
Total vehicle count = 131/day	47,815
Unloaded weight = 18 tons	
Loaded weight = 31.3 tons	
Mean weight = 24.4 tons	
Assume operation 9 hours/day	

Paved Road Emissions

Pollutant	Vehicles/day	VMT	Emisison factor (lb/VMT)	Uncontrolled PTE (lbs/hr)	Controlled PTE (lbs/hr)	PTE un-restricted (tpy)	PTE limited (tpy)	PTE limited (lb/yr)	Insignificant Activity Threshold (lb/yr)	Insignificant?
PM-2.5	131	47,815	0.080	1.17	0.58	1.92	0.96			
PM-10	131	47,815	0.33	4.76	2.38	7.82	3.91	7,818	2000	No
PM	131	47,815	1.63	23.8	11.9	39.1	19.5	39,088	2000	No

FUGI 2 and EQUI 29 Landfill Emissions

Inputs			
MSW Max Design Capacity	29,800,000	Cubic Yards	
Landfill Gas Generation Rate ¹	2,102,400,000	scf/yr LFG	
	4,000	scfm	
Percent Fugitive Emissions ²	15%		
LFG Fugitive Flowrate	600	scfm	
Percent Landfill Emissions (captured) ²	85%		
LFG (captured) Flowrate	3,400	scfm	

LFG Compound	CAS	MW	Concentration ³	Total LF emissions		FUGI 2		EQUI 29		EQUI 29	
				Uncontrolled Landfill Emissions		Landfill Fugitive Emissions		Landfill Emissions		Controlled Landfill Emissions (98% control)	
				lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
1,1,1 - Trichloroethane (methyl chloroform)	71-55-6	133.41	4.80E-01	4.05E-02	1.77E-01	6.07E-03	2.66E-02	3.44E-02	1.51E-01	6.88E-04	3.01E-03
1,1,2,2 - Tetrachloroethane	79-34-5	167.85	1.11E+00	1.18E-01	5.16E-01	1.77E-02	7.74E-02	1.00E-01	4.39E-01	2.00E-03	8.77E-03
1,1 - Dichloroethane (ethylidene dichloride)	75-34-3	98.96	2.35E+00	1.47E-01	6.44E-01	2.21E-02	9.66E-02	1.25E-01	5.47E-01	2.50E-03	1.09E-02
1,1 - Dichloroethene (vinylidene chloride)	75-35-4	96.94	2.01E-01	1.23E-02	5.40E-02	1.85E-03	8.09E-03	1.05E-02	4.59E-02	2.09E-04	9.17E-04
1,2 - Dichloroethane (ethylene dichloride)	107-06-2	98.96	4.07E-01	2.55E-02	1.12E-01	3.82E-03	1.67E-02	2.16E-02	9.48E-02	4.33E-04	1.90E-03
1,2 - Dichloropropane (propylene dichloride)	78-87-5	112.99	1.80E-01	1.29E-02	5.63E-02	1.93E-03	8.45E-03	1.09E-02	4.79E-02	2.19E-04	9.57E-04
Acrylonitrile (Propenenitrile)	107-13-1	53.06	6.33E+00	2.12E-01	9.30E-01	3.19E-02	1.40E-01	1.80E-01	7.91E-01	3.61E-03	1.58E-02
Benzene	71-43-2	78.12	1.91E+00	9.43E-02	4.13E-01	1.42E-02	6.20E-02	8.02E-02	3.51E-01	1.60E-03	7.02E-03
Carbon Disulfide	75-15-0	76.14	5.80E-01	2.79E-02	1.22E-01	4.19E-03	1.83E-02	2.37E-02	1.04E-01	4.75E-04	2.08E-03
Carbon Tetrachloride	56-23-5	153.84	4.00E-03	3.89E-04	1.70E-03	5.84E-05	2.56E-04	3.31E-04	1.45E-03	6.61E-06	2.90E-05
Carbonyl Sulfide	463-58-1	60.07	4.90E-01	1.86E-02	8.15E-02	2.79E-03	1.22E-02	1.58E-02	6.93E-02	3.16E-04	1.39E-03
Chlorobenzene (monochlorobenzene)	108-90-7	112.56	2.54E-01	1.81E-02	7.92E-02	2.71E-03	1.19E-02	1.54E-02	6.73E-02	3.07E-04	1.35E-03
Chloroethane (ethyl chloride)	75-00-3	64.52	1.25E+00	5.10E-02	2.23E-01	7.65E-03	3.35E-02	4.33E-02	1.90E-01	8.67E-04	3.80E-03
Chloroform	67-66-3	119.38	3.00E-02	2.26E-03	9.92E-03	3.40E-04	1.49E-03	1.92E-03	8.43E-03	3.85E-05	1.69E-04
Chloromethane (methyl chloride)	74-87-3	50.49	1.21E+00	3.86E-02	1.69E-01	5.79E-03	2.54E-02	3.28E-02	1.44E-01	6.57E-04	2.88E-03
1,4 Dichlorobenzene (p-dichlorobenzene)	106-46-7	147	2.13E-01	1.98E-02	8.67E-02	2.97E-03	1.30E-02	1.68E-02	7.37E-02	3.37E-04	1.47E-03
Dichloromethane (methylene chloride)	75-09-2	84.93	1.43E+01	7.68E-01	3.36E+00	1.15E-01	5.04E-01	6.53E-01	2.86E+00	1.31E-02	5.72E-02
Ethylbenzene	75-08-1	106.17	4.61E+00	3.09E-01	1.36E+00	4.64E-02	2.03E-01	2.63E-01	1.15E+00	5.26E-03	2.30E-02
Ethylene dibromide (1,2 dibromoethane)	106-93-4	187.88	1.00E-03	1.19E-04	5.20E-04	1.78E-05	7.80E-05	1.01E-04	4.42E-04	2.02E-06	8.84E-06
Hexane	110-54-3	86.18	6.57E+00	3.58E-01	1.57E+00	5.37E-02	2.35E-01	3.04E-01	1.33E+00	6.09E-03	2.67E-02
Mercury (total)	7439-97-6	200.61	2.92E-04	3.70E-05	1.62E-04	5.56E-06	2.43E-05	3.15E-05	1.38E-04	3.15E-05	1.38E-04
Methyl Isobutyl Ketone (hexone)	108-10-1	100.16	1.87E+00	1.18E-01	5.19E-01	1.78E-02	7.78E-02	1.01E-01	4.41E-01	2.01E-03	8.82E-03
Tetrachloroethylene (perchloroethylene, -ethene)	127-18-4	165.83	3.73E+00	3.91E-01	1.71E+00	5.87E-02	2.57E-01	3.32E-01	1.46E+00	6.65E-03	2.91E-02
Toluene (methylbenzene)	108-88-3	92.14	3.93E+01	2.29E+00	1.00E+01	3.43E-01	1.50E+00	1.95E+00	8.52E+00	3.89E-02	1.70E-01
Trichloroethylene (trichloroethene)	79-01-6	131.38	2.82E+00	2.34E-01	1.03E+00	3.51E-02	1.54E-01	1.99E-01	8.72E-01	3.98E-03	1.74E-02
Vinyl Chloride (chloroethylene, VCM)	75-01-4	62.50	7.34E+00	2.90E-01	1.27E+00	4.35E-02	1.91E-01	2.47E-01	1.08E+00	4.93E-03	2.16E-02
Xylenes (m, o, p)	1330-20-7	106.17	1.21E+01	8.12E-01	3.56E+00	1.22E-01	5.34E-01	6.90E-01	3.02E+00	1.38E-02	6.05E-02
Total HAP				6.41	28.1	0.96	4.21	5.45	23.9	0.11	0.48
Maximum Single HAP (Toluene)				2.29	10.0	0.343	1.50	1.95	8.52	0.039	0.17

LFG Criteria & GHG Emissions											
LFG Compound	CAS	MW	Concentration ³	Uncontrolled Landfill Emissions		Landfill Fugitive Emissions (FUGI 2)		Captured Landfill Emissions (EQUI 29)		Controlled Captured Landfill Emissions (EQUI 29)	
		lb/lb-mol	ppmv	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr	lb/hr	ton/yr
VOCs	NA	86.18	235.0	12.8	56.1	1.92	8.41	10.9	47.7	0.22	0.95
NMOC			595.0	32.8	143.8	4.92	21.6	27.9	122.2	0.56	2.44
CO ₂	124-38-9	44.01	498,352	13863	60719	2079	9108	11783	51612	11783	51612
CH ₄	74-82-8	16.04	500,000	5069	22203	570	2498	3663	16042	73.3	320.84
CO ₂ e	NA	NA	NA	140593	615798	16337	71554	103346	452656	13615	59632
H ₂ S ⁴		34.08	41.3	0.89	3.90	0.10	0.44	0.64	2.82	0.072	0.32

Notes:

¹Landfill gas generation rate based on USEPA LandGEM model, Version 3.02

²MPCA believes that 85% of landfill gas at this facility can be captured and combusted at the flares or thermal oxidizer. This means the other 15% of emissions are released into the air. Per a Rolling Hills Applicability Determination from 2013, these uncaptured emissions are considered fugitive.

³Concentrations from AP-42 CH 2.4 Tables 2.4-1 and 2.4-2

⁴ Lab tests give H₂S concentration of 41.3 ppmv

Aggregate handling and Storage Piles

E = [(k * 0.0032) * ((U/5)^1.3)]/((M/2)^1.4) from AP-42 Chapter 13.2.4

Factor	Description	PM2.5 value (lb/ton)	PM10 value (lb/ton)	PM value (lb/ton)
E =	Emission factor (lb/ton), AP-42, Section 13.2.4, Eqn 1	1.41E-05	9.31E-05	1.97E-04
k =	Particle size multiplier, AP-42 , Chapter 13.2.4	5.30E-02	3.50E-01	7.40E-01
U (mph) =	Mean wind speed, site specific based on 2014 Emissions Inventory	6	6	6
M =	Surface material moisture content (%) from AP-42 Table 13.2.4-1, factors for municipal solid waste landfill, clay/dirt mix	14	14	14

Assume 2050 tons/day handled Site Specific factor from 2014 Emission Inventory
Assume 9 hours/day operation for 260 days/year

Pollutant	Material handled (tons/day)	Material handled (tons/hr)	Emisison factor (lb/ton)	PTE (lb/hr)	PTE (tpy)	PTE (lb/yr)	Insignificant Activity Threshold (lb/yr)	Insignificant?
PM2.5	2050	228	0.000014	0.0032	0.014	28.1	2000	Yes
PM10	2050	228	0.000093	0.021	0.093	185.8	2000	Yes
PM	2050	228	0.00020	0.045	0.20	392.8	2000	Yes

PM Fugitives from Tipper

E = [(k * 0.0032) * ((U/5)^1.3)]/((M/2)^1.4) from AP-42 Chapter 13.2.4
Cover material handling assumed to be similar to emissions from heavy construction (AP-42, Chapter 13.2.3)
Chapter 13.2.3 recommends using emission factors from AP-42, Chapter 13.2.4, Aggregate Handling and Storage Piles

Factor	Description	PM2.5 value (lb/ton)	PM10 value (lb/ton)	PM value (lb/ton)
E =	Emission factor (lb/ton), AP-42, Section 13.2.4, Eqn 1	2.87E-05	1.90E-04	4.01E-04
k =	Particle size multiplier, AP-42 , Chapter 13.2.4	5.30E-02	3.50E-01	7.40E-01
U (mph) =	Mean wind speed, site specific based on 2014 Emissions Inventory	8	8	8
M =	Surface material moisture content (%) from AP-42 Table 13.2.4-1, factors for municipal solid waste landfill, clay/dirt mix	11	11	11

Assume 2050 tons/day handled
Assume 10 hours/day operation for 260 days/year = 2600 hr/yr

Pollutant	Material handled (tons/day)	Material handled (tons/hr)	Emisison factor (lb/ton)	PTE (lb/hr)	PTE (tpy)	PTE (lb/yr)	Insignificant Activity Threshold (lb/yr)	Insignificant?
PM2.5	4298	430	2.87E-05	1.23E-02	0.016	32.1	2000	Yes
PM10	4298	430	1.90E-04	8.15E-02	0.106	212.0	2000	Yes
PM	4298	430	4.01E-04	1.72E-01	0.224	448.2	2000	Yes

IPER Analysis

Table 2

EQUI	Description	STRU	Airflow (acfm)	Gas temp (F)	Gas temp (Rankine)
TREA 7	Thermal oxidizer	12		1156	1616
EQUI 31	RNG	12		1156	1616

- 1 - IPER calculations based on: $c = 1.7627 \times V^{-0.3241}$, unless 7000 cfm or less, then the limit is 0.1 gr/dsc
2 - Potential emissions 1.14 lb/hr exceed the IPER calculated allowable emission rate.

* IPER does not apply to EQUI 29 or TREA 6 because they are covered under NSPS, subp. XXX and NI
Nor does IPER apply to fugitive sources

Std temp (Rankine)	SCFM	Table 2 (gr/dscf)	Table 2 (lb/hr)	Controlled stack emissions PTE (lb/hr)*
528	2,235	0.100	1.92	0.89
528	3,200	0.100	2.74	1.14

f (Minn. R. 7011.7035)

ESHAPs, subp. AAAA

Meet IPER (Yes/No)	Table 1 Throughput (lb/hr)	Table 1 PM (lb/hr)
Yes	NA	NA
Yes	NA	NA

Attachment 2 – Subject item inventory and facility requirements

SI List

AI ID (Name): 1546 (Pine Bend Energy LLC)

Activity: IND20090001

SI Category	SI Type	Subject Item ID	Delta Designation	Description	
Activity	Insignificant Air Emissions Activity	ACTV 1	All IAs	All IAs	
Agency Interest	Conventional Site	AISI 1546	Null	Null	
Component Group	Air Component Group	COMG 7	Null	Landfill and Treatment Systems	
Equipment	Data Acquisition System	EQUI 17	DAS020	LFG flow and pilot flame recorder	
		EQUI 18	DAS021	Off spec gas flow recorder	
		EQUI 19	DAS022	Waste gas flow and combustion temp recorder	
		EQUI 20	DAS023	LFG and combustion temp recorder	
		EQUI 21	DAS024	Natural gas flow recorder	
	Other Emission Unit	EQUI 29	Null	Industrial/Demolition Landfill	
		EQUI 31	Null	Renewable Natural Gas Plant	
	Parametric Monitor	EQUI 22	MR030	LFG flow meter	
		EQUI 23	MR031	Pilot flame continuous measurement	
		EQUI 24	MR032	Off spec gas flow meter	
		EQUI 25	MR033	Waste gas flow meter	
		EQUI 26	MR034	Combustion temp sensor	
		EQUI 27	MR035	LFG flow meter	
		EQUI 28	MR036	Natural gas flow meter	
Fugitive	Fugitive-Other	FUGI 2	FS001	Fugitive Emissions from Landfill	
	Paved Road	FUGI 3	Null	Fugitive PM from paved roads	
	Unpaved Roads	FUGI 4	Null	Fugitive PM from unpaved roads	
Structure	Building	STRU 1	BG001	Main Building	
		STRU 2	BG002	Gas Compressor Building	
		STRU 3	BG003	Office Building	
	Stack/Vent	STRU 4	SV001	Null	
		STRU 12	Null	Stack/Vent	
		STRU 13	Null	Stack/Vent	
Total Facility	Air Quality Total Facility	TFAC 1	03700138	Pine Bend RNG LLC	
Treatment	023-Flaring	TREA 6	Null	Open Flare	
	061-Dust Suppression by Water Spray	TREA 2	CE001	Dust Suppression by Water Spray	
		TREA 3	CE002	Dust Suppression by Water Spray	
	131-Thermal Oxidizer	TREA 7	Null	Low-BTU Gas Flare	

Insignificant Activities

AI ID (Name): 1546 (Pine Bend Energy LLC)
Activity: IND20090001

SI Category	SI Type	Status Description	Sub Attribute Description	
Activity	Insignificant Air Emissions Activity	Null	Minn. R. 7007.1300, subp. 3(A)	
			Minn. R. 7007.1300, subp. 3(B)(2)	
			Minn. R. 7007.1300, subp. 3(E)	
			Minn. R. 7007.1300, subp. 3(F)	

Emission Units 3

AI ID (Name): 1546 (Pine Bend Energy LLC)
Activity: IND20090001

SI Type	Subject Item ID	Delta Designation	Description	Manufacturer	Model	Max Design Capacity	Max Design Capacity Units	Material	Construction Start Date	Operation Start Date	Modification Date	
Other Emission Unit	EQUI 29	Null	Industrial/Demolition Landfill	Pine Bend Landfill	Custom	33,937,400	cubic yards/each	Waste	1/1/1971	1/1/1971	Null	
	EQUI 31	Null	Renewable Natural Gas Plant	Custom	Custom	999,999	million board feet/each	Material	4/7/2021	4/7/2021	Null	

Component Groups

AI ID (Name): 1546 (Pine Bend Energy LLC)

Activity: IND20090001

Subject Item ID	Delta Designation	Description	Group Member ID	
COMG 7	Null	Landfill and Treatment Systems	EQUI 29	
			EQUI 31	
			FUGI 2	
			TREA 6	

PTE by SI

AI ID (Name): 1546 (Pine Bend Energy LLC)
Activity: IND20090001

SI Category	SI Type	Subject Item ID	Delta Designation	Description	Pollutant	Potential (lbs/hr)	Unrestricted Potential (tons/yr)	Potential Limited (tons/yr)	Actual Emissions (tons/yr)
Equipment	Other Emission Unit	EQUI 29	Null	Industrial/ Demolition Landfill	1,1-Dichloroethane	0.000209	0.547	0.00877	
					1,1-Dichloroethylene (Vinylidene chloride)	0.000433	0.00459	0.000917	
					1,1,1-Trichloroethane	0.002	0.439	0.00877	
					1,1,2,2-Tetrachloroethane	0.0025	0.151	0.00301	
					1,2-Dibromoethane (Ethylene dibromide); EDB	0.00609	0.000422	8.84e-06	
					1,2-Dichloroethane	0.000219	0.0948	0.0019	
					1,2-Dichloropropane	0.00361	0.0479	0.000957	
					1,4-Dichlorobenzene (para-)	0.0131	0.0737	0.00147	
					Acrylonitrile	0.0016	0.791	0.0158	
					Benzene	0.000475	0.351	0.00702	
					Carbon Dioxide	11,783	51,612	51,612	
					Carbon Dioxide Equivalent	13,615	452,656	59,632	
					Carbon disulfide	6.61e-06	0.104	0.00208	
					Carbon tetrachloride	0.000316	0.00145	2.9e-05	
					Carbonyl sulfide	0.000307	0.0693	0.00139	
					Chlorobenzene (Monochlorobenzene)	0.000867	0.0673	0.00135	
					Chloroethane	3.85e-05	0.19	0.0038	
					Chloroform	0.000657	0.00843	0.000169	
					Chloromethane	0.0337	0.148	0.148	
					Dichloromethane (Methylene chloride)	0.00526	2.86	0.0572	
					Ethylbenzene	2.02e-06	1.15	0.023	
					HAPs - Single	0.00398	8.52	0.17	
					HAPs - Total	0.22	23.9	0.5	
					Hexane	3.15e-05	1.33	0.0267	
					Mercury	0.00201	0.000138	0.000138	
					Methane	73	16,042	321	
					Methyl isobutyl ketone (4-Methyl-2-pentanone)	0.00665	0.441	0.00882	
					Tetrachloroethylene (Perchloroethylene)	0.0389	1.46	0.0291	
					Toluene	0.00398	8.52	0.17	
					Trichloroethylene (TCE)	0.00493	0.872	0.0174	
					Vinyl chloride (chloroethene)	0.0138	1.08	0.0216	
					Volatile Organic Compounds	0.22	47.7	0.95	
					Xylenes, Total	0.109	3.02	0.0605	
Fugitive	Fugitive-Other	FUGI 2	FS001	Fugitive Emissions from Landfill	1,1-Dichloroethane	0.0221	0.0966	0.0966	
					1,1-Dichloroethylene (Vinylidene chloride)	0.00185	0.00809	0.00809	
					1,1,1-Trichloroethane	0.0177	0.0774	0.0774	
					1,1,2,2-Tetrachloroethane	0.00607	0.0266	0.0266	
					1,2-Dibromoethane (Ethylene dibromide); EDB	1.78e-05	7.8e-05	7.8e-05	
					1,2-Dichloroethane	0.00382	0.0167	0.0167	
					1,2-Dichloropropane	0.00193	0.00845	0.00845	
					1,4-Dichlorobenzene (para-)	0.00297	0.013	0.013	
					Acrylonitrile	0.0319	0.14	0.14	
					Benzene	0.0142	0.062	0.062	
					Carbon Dioxide	2,079	9,108	9,108	
					Carbon Dioxide Equivalent	16,337	71,554	71,554	
					Carbon disulfide	0.00419	0.0183	0.0183	
					Carbon tetrachloride	5.84e-05	0.000256	0.000256	
					Carbonyl sulfide	0.00279	0.0122	0.0122	
					Chlorobenzene (Monochlorobenzene)	0.00271	0.0119	0.0119	
					Chloroethane	0.00765	0.0335	0.0335	
					Chloroform	0.00034	0.00149	0.00149	
					Chloromethane	0.00579	0.0254	0.0254	
					Dichloromethane (Methylene chloride)	0.115	0.504	0.504	
					Ethylbenzene	0.0464	0.203	0.203	
					HAPs - Single	0.343	1.5	1.5	
					HAPs - Total	0.96	4.21	4.21	
					Hexane	0.0537	0.235	0.235	
					Mercury	5.56e-06	2.43e-05	2.43e-05	
					Methane	570	2,498	2,500	
					Methyl isobutyl ketone (4-Methyl-2-pentanone)	0.0178	0.0778	0.0778	
					Tetrachloroethylene (Perchloroethylene)	0.0587	0.257	0.257	
					Toluene	0.343	1.5	1.5	
					Trichloroethylene (TCE)	0.0351	0.154	0.154	
					Vinyl chloride (chloroethene)	0.0435	0.191	0.191	
					Volatile Organic Compounds	1.92	8.41	8.41	
					Xylenes, Total	0.122	0.534	0.534	
	Paved Road	FUGI 3	Null	Fugitive PM from paved roads	Particulate Matter	11.9	39.1	19.5	
	Unpaved	FUGI 4	Null	Fugitive PM	PM < 2.5 micron	0.58	1.92	0.96	
					PM < 10 micron	2.38	7.82	3.91	
					Particulate Matter	41.2	135.4	67.7	

PTE by SI

AI ID (Name): 1546 (Pine Bend Energy LLC)
Activity: IND20090001

SI Category	SI Type	Subject Item ID	Delta Designation	Description	Pollutant	Potential (lbs/hr)	Unrestricted Potential (tons/yr)	Potential Limited (tons/yr)	Actual Emissions (tons/yr)
Fugitive	Unpaved Roads	FUGI 4	Null	Fugitive PM from unpaved roads	PM < 2.5 micron	1.11	3.65	1.83	
					PM < 10 micron	11.1	36.5	18.3	
Treatment	023-Flaring	TREA 6	Null	Open Flare	Carbon Dioxide	13,906	60,906	60,906	
					Carbon Dioxide Equivalent	13,975	61,210	61,210	
					Carbon Monoxide	33.9	148.3	148.3	
					Methane	0.86	3.75	3.75	
					Nitrogen Oxides	7.43	32.5	32.5	
					Nitrous Oxide	0.16	0.7	0.7	
					Particulate Matter	2.04	8.94	8.94	
					PM < 2.5 micron	2.04	8.94	8.94	
					PM < 10 micron	2.04	8.94	8.94	
					Sulfur Dioxide	20.2	88.6	88.6	
	131-Thermal Oxidizer	TREA 7	Null	Low-BTU Gas Flare	1,1-Dichloroethane	0.00246	0.54	0.0108	
					1,1-Dichloroethylene (Vinylidene chloride)	0.000206	0.0452	0.000904	
					1,1,2-Trichloroethane	0.000678	0.149	0.00297	
					1,1,2,2-Tetrachloroethane	0.00197	0.432	0.00865	
					1,2-Dibromoethane (Ethylene dibromide); EDB	1.99e-06	0.000436	8.72e-06	
					1,2-Dichloroethane	0.000427	0.0935	0.00187	
					1,2-Dichloropropane	0.000215	0.0472	0.000944	
					1,4-Dichlorobenzene (para-)	0.00343	0.0727	0.0015	
					2-Methylnaphthalene	2.3e-07	1.01e-06	1.01e-06	
					3-Methylcholanthrene	1.73e-08	7.57e-08	7.57e-08	
					7,12-Dimethylbenz[a]anthracene	1.54e-07	6.73e-07	6.73e-07	
					Acenaphthene	1.73e-08	7.57e-08	7.57e-08	
					Acenaphthylene	1.73e-08	7.57e-08	7.57e-08	
					Acrylonitrile	0.016	0.779	0.0701	
					Anthracene	2.3e-08	1.01e-07	1.01e-07	
					Arsenic compounds	1.92e-06	8.41e-06	8.41e-06	
					Benzene	0.0016	0.346	0.00701	
					Benzo(a)anthracene	1.73e-08	7.57e-08	7.57e-08	
					Benzo(b)fluoranthene	1.73e-08	7.57e-08	7.57e-08	
					Benzo(ghi)perylene	1.15e-08	5.05e-08	5.05e-08	
					Benzo(k)fluoranthene	1.73e-08	7.57e-08	7.57e-08	
					Benzo[a]pyrene	1.15e-08	5.05e-08	5.05e-08	
					Beryllium	1.15e-07	5.05e-07	5.05e-07	
					Cadmium compounds	1.06e-05	4.63e-05	4.63e-05	
					Carbon Dioxide	13,331	58,389	58,389	
					Carbon Dioxide Equivalent	13,332	58,394	58,394	
					Carbon Monoxide	3.4	14.9	14.9	
					Carbon tetrachloride	6.52e-06	0.00143	2.86e-05	
					Chlorobenzene (Monochlorobenzene)	0.000303	0.0663	0.00133	
					Chloroethane	0.000854	0.187	0.00374	
					Chloroform	3.79e-05	0.00831	0.000166	
					Chloromethane	0.000647	0.142	0.00284	
					Chromium compounds	1.34e-05	5.89e-05	5.89e-05	
					Chrysene	1.73e-08	7.57e-08	7.57e-08	
					Cobalt compounds	8.06e-07	3.53e-06	3.53e-06	
					Dibenz[a,h]anthracene	1.15e-08	5.05e-08	5.05e-08	
					Dichloromethane (Methylene chloride)	0.0129	2.82	0.0564	
					Ethylbenzene	0.00519	1.14	0.0227	
					Fluoranthene	2.88e-08	1.26e-07	1.26e-07	
					Fluorene	2.69e-08	1.18e-07	1.18e-07	
					Formaldehyde	0.00072	0.00315	0.00315	
					HAPs - Single	0.0384	8.4	0.168	
					HAPs - Total	0.98	26.9	4.29	
					Hexane	0.006	1.31	0.0263	
					Hydrogen Chloride	0.811	3.55	3.55	
					Indeno(1,2,3-cd)pyrene	1.73e-08	7.57e-08	7.57e-08	
					Manganese compounds	3.65e-06	1.6e-05	1.6e-05	
					Mercury	3.1e-05	0.000136	0.000136	
					Methane	0.0213	0.0935	0.0935	
					Methyl isobutyl ketone (4-Methyl-2-pentanone)	0.00198	0.435	0.00869	
					Naphthalene	5.86e-06	2.56e-05	2.56e-05	
					Nickel compounds	2.02e-05	8.83e-05	8.83e-05	
					Nitrogen Oxides	1.89	8.27	8.27	
					Nitrous Oxide	0.00213	0.00935	0.00935	
					Particulate Matter	0.195	0.853	0.853	
					Phenanthrene	1.63e-07	7.15e-07	7.15e-07	
					PM < 2.5 micron	0.195	0.853	0.853	
					PM < 10 micron	0.195	0.853	0.853	

PTE by SI

AI ID (Name): 1546 (Pine Bend Energy LLC)
Activity: IND20090001

SI Category	SI Type	Subject Item ID	Delta Designation	Description	Pollutant	Potential (lbs/hr)	Unrestricted Potential (tons/yr)	Potential Limited (tons/yr)	Actual Emissions (tons/yr)
Treatment	131-Thermal Oxidizer	TREA 7	Null	Low-BTU Gas Flare	Pyrene	4.8e-08	2.1e-07	2.1e-07	
					Selenium compounds	2.3e-07	1.01e-06	1.01e-06	
					Sulfur Dioxide	0.458	2.01	2.01	
					Tetrachloroethylene (Perchloroethylene)	0.00655	1.44	0.0287	
					Toluene	0.0384	8.4	0.168	
					Trichloroethylene (TCE)	0.00393	0.86	0.0172	
					Vinyl chloride (chloroethene)	0.00486	1.06	0.0213	
					Volatile Organic Compounds	0.264	46.5	1.16	
					Xylenes, Total	0.0612	2.98	0.268	

Relationships

AI ID (Name): 1546 (Pine Bend Energy LLC)

Activity: IND20090001

SI Category	SI Type	Subject Item ID	Delta Designation	Description	Relationship	Related SI ID	% Flow	Related SI Type	Related Delta Designation	Relationship Start Date	Relationship End Date	
Equipment	Data Acquisition System	EQUI 17	DAS020	LFG flow and pilot flame recorder	receives from	EQUI 22	Null	Parametric Monitor	MR030	3/22/2023	Null	
						EQUI 23	Null	Parametric Monitor	MR031	3/22/2023	Null	
		EQUI 18	DAS021	Off spec gas flow recorder	receives from	EQUI 24	Null	Parametric Monitor	MR032	3/22/2023	Null	
		EQUI 19	DAS022	Waste gas flow and combustion temp recorder	receives from	EQUI 25	Null	Parametric Monitor	MR033	3/22/2023	Null	
						EQUI 26	Null	Parametric Monitor	MR034	3/22/2023	Null	
		EQUI 21	DAS024	Natural gas flow recorder	receives from	EQUI 28	Null	Parametric Monitor	MR036	3/22/2023	Null	
	Other Emission Unit	EQUI 29	Null	Industrial/Demolition Landfill	is controlled by	TREA 6	100	023-Flaring	Null	9/26/2023	Null	
		EQUI 31	Null	Renewable Natural Gas Plant	is controlled by	TREA 6	Null	023-Flaring	Null	6/26/2023	Null	
						TREA 7	Null	131-Thermal Oxidizer	Null	6/26/2023	Null	
Fugitive	Paved Road	FUGI 3	Null	Fugitive PM from paved roads	is controlled by	TREA 2	Null	061-Dust Suppression by Water Spray	CE001	6/21/2023	Null	
	Unpaved Roads	FUGI 4	Null	Fugitive PM from unpaved roads	is controlled by	TREA 3	100	061-Dust Suppression by Water Spray	CE002	6/21/2023	Null	
Treatment	023-Flaring	TREA 6	Null	Open Flare	is monitored by	EQUI 22	Null	Parametric Monitor	MR030	3/22/2023	Null	
						EQUI 23	Null	Parametric Monitor	MR031	3/22/2023	Null	
						EQUI 24	Null	Parametric Monitor	MR032	3/22/2023	Null	
						EQUI 26	Null	Parametric Monitor	MR034	3/22/2023	Null	
					sends to	EQUI 17	Null	Data Acquisition System	DAS020	3/22/2023	Null	
						EQUI 18	Null	Data Acquisition System	DAS021	3/22/2023	Null	
						EQUI 20	Null	Data Acquisition System	DAS023	3/22/2023	Null	
						STRU 13	Null	Stack/Vent	Null	3/22/2023	Null	
	131-Thermal Oxidizer	TREA 7	Null	Low-BTU Gas Flare	is monitored by	EQUI 24	Null	Parametric Monitor	MR032	3/22/2023	Null	
						EQUI 26	Null	Parametric Monitor	MR034	3/22/2023	Null	
						EQUI 28	Null	Parametric Monitor	MR036	3/22/2023	Null	
					sends to	EQUI 19	Null	Data Acquisition System	DAS022	3/22/2023	Null	
						EQUI 21	Null	Data Acquisition System	DAS024	3/22/2023	Null	
						STRU 12	Null	Stack/Vent	Null	3/22/2023	Null	

PMs

AI ID (Name): 1546 (Pine Bend Energy LLC)
Activity: IND20090001

Subject Item ID	Delta Designation	Description	Manufacturer	Model	Serial Number	Parameter Monitored	Bypass Capability? (parametric)	Install Date (parametric)	
EQUI 22	MR030	LFG flow meter	FCI Fluid Components International or similar	TBD	TBD	Process Throughput	Null	6/1/2021	
EQUI 23	MR031	Pilot flame continuous measurement	FCI Fluid Components International or similar	TBD	TBD	Process Throughput	Null	6/1/2021	
EQUI 24	MR032	Off spec gas flow meter	FCI Fluid Components International or similar	TBD	TBD	Process Throughput	Null	6/1/2021	
EQUI 25	MR033	Waste gas flow meter	FCI Fluid Components International or similar	2020325	TBD	Process Throughput	Null	6/1/2021	
EQUI 26	MR034	Combustion temp sensor	FCI Fluid Components International or similar	2020325	TBD	Process Throughput	Null	4/7/2021	
EQUI 27	MR035	LFG flow meter	FCI Fluid Components International or similar	2020325	TBD	Process Throughput	Null	4/7/2021	
EQUI 28	MR036	Natural gas flow meter	FCI Fluid Components International or similar	2020325	TBD	Process Throughput	Null	4/7/2021	

DAS

AI ID (Name): 1546 (Pine Bend Energy LLC)

Activity: IND20090001

Subject Item ID	Delta Designation	Description	Manufacturer	Model	Serial Number	Primary or Backup? (DASs)	Install Date (DASs)	
EQUI 17	DAS020	LFG flow and pilot flame recorder	Yokogawa or similar	DX1000	S5X506266	Primary	6/1/2021	
EQUI 18	DAS021	Off spec gas flow recorder	Yokogawa or similar	DX1000	S5X506266	Primary	6/1/2021	
EQUI 19	DAS022	Waste gas flow and combustion temp recorder	Yokogawa or similar	XMV	T212433713	Primary	4/7/2021	
EQUI 20	DAS023	LFG and combustion temp recorder	RKA Integrated Systems	XMV	T212433713	Primary	6/1/2021	
EQUI 21	DAS024	Natural gas flow recorder	RKA Integrated Systems	XMV	T212433713	Primary	4/7/2021	

FUGI

AI ID (Name): 1546 (Pine Bend Energy LLC)
Activity: IND20090001

Subject Item Type	Subject Item ID	Delta Designation	Description	Install Year	Pollutants Emitted	
Fugitive-Other	FUGI 2	FS001	Fugitive Emissions from Landfill	Null	Volatile Organic Compounds	
Paved Road	FUGI 3	Null	Fugitive PM from paved roads	Null	Null	
Unpaved Roads	FUGI 4	Null	Fugitive PM from unpaved roads	Null	Null	

Building

AI ID (Name): 1546 (Pine Bend Energy LLC)
Activity: IND20090001

Subject Item ID	Delta Designation	Description	Height	Units (height)	Length	Units (length)	Width	Units (width)	
STRU 1	BG001	Main Building	34.75	feet	116	feet	97	feet	
STRU 2	BG002	Gas Compressor Building	34.5	feet	46	feet	102.6	feet	
STRU 3	BG003	Office Building	11	feet	116	feet	72.75	feet	

Stack/Vents

AI ID (Name): 1546 (Pine Bend Energy LLC)
Activity: IND20090001

Subject Item ID	Delta Designation	Description	Stack Height (feet)	Stack Diameter (feet)	Stack Length (feet)	Stack Width (feet)	Stack Flow Rate (cubic ft/min)	Discharge Temperature (°F)	Flow Rate/Temp Information Source	Discharge Direction	
STRU 4	SV001	Null	50	13	Null	Null	Null	1,550	Null	Null	
STRU 12	Null	Stack/Vent	40	5	Null	Null	2,235	1,156	Test data	Upwards with no cap on stack/vent	
STRU 13	Null	Stack/Vent	40	1.2	Null	Null	4,000	1,156	Estimate	Upwards with no cap on stack/vent	

Other Controls

AI ID (Name): 1546 (Pine Bend Energy LLC)
Activity: IND20090001

Subject Item Type	Subject Item ID	Delta Designation	Description	Manufacturer (Model #)	Installation Start Date	Pollutants Controlled	Capture Efficiency (%)	Destruction/ Collect Efficiency (%)	Subject to CAM?	Large or Other PSEU?	Efficiency Basis	Other Basis Explanation	Other operating parameters?	Other operating parameters description	
023-Flaring	TREA 6	Null	Open Flare	John Zink Hamworthy Combustion (ZEF)	6/1/2021	Nonmethane organic compounds (NMOC)	85	98	No	Null	Other	Required by NSPS	No	Null	
						Volatile Organic Compounds	85	98	No	Null	Other	Required by NSPS	No	Null	
061-Dust Suppression by Water Spray	TREA 2	CE001	Dust Suppression by Water Spray	Null	Null	Particulate Matter	100	50	No	Null	Other	AP-42	No	Null	
	TREA 3	CE002	Dust Suppression by Water Spray	Null	Null	Particulate Matter	100	50	No	Null	Other	AP-42	No	Null	

Direct Flame Afterburners

AI ID (Name): 1546 (Pine Bend Energy LLC)
Activity: IND20090001

Subject Item Type	Subject Item ID	Delta Designation	Description	Manufacturer (Model #)	Installation Start Date	Pollutants Controlled	Capture Efficiency (%)	Destruction/Collect Efficiency (%)	Efficiency Basis	Other Basis Explanation	TO Burner Capacity (MMBTU/hr)	Inlet Temp/Outlet Temp (°F)	TO Min Combustion Temperature (°F)	TO Residence Time (secs)	
131-Thermal Oxidizer	TREA 7	Null	Low-BTU Gas Flare	John Zink Hamworthy Combustion (Zybrid)	4/7/2021	Volatile Organic Compounds	85	98	Mfr/Vendor data	Null	7.3	100/1800	1,600	0.7	

SI Id	Sequence	Requirement
TFAC 1	1240	Permit Appendices: This permit contains appendices as listed in the permit Table of Contents. The Permittee shall comply with all requirements contained in Appendices A. Insignificant activities and general applicable requirements, B. 40 CFR Part 60, Subpart XXX – Standards of Performance for Municipal Solid Waste Landfills That Commenced Construction, Reconstruction, or Modification After July 17, 2014, C. 40 CFR Part 60, Subpart A - General Provisions, D. 40 CFR Part 63, Subpart AAAA – National Emissions Standards for Hazardous Air Pollutants: Municipal Solid Waste Landfills, E 40 CFR Part 63, Subpart A - General Provisions. [Minn. R. 7007.0800, subp. 2(A) & (B)]
	1245	The Permittee must comply with Minn. Stat. 116.385. The Permittee may not use trichloroethylene at its permitted facility including in any manufacturing, processing, or cleaning processes, except as described in Minn. Stat. 116.385, subd. 2(b) and 4. This is a state-only requirement and is not enforceable by the U.S. Environmental Protection Agency (EPA) Administrator and citizens under the Clean Air Act. [Minn. R. 7007.0100, subp. 7(X), Minn. Stat. 116.385]
	1260	PERMIT SHIELD: Subject to the limitations in Minn. R. 7007.1800, compliance with the conditions of this permit shall be deemed compliance with the specific provision of the applicable requirement identified in the permit as the basis of each condition. Subject to the limitations of Minn. R. 7007.1800 and 7017.0100, subp. 2, notwithstanding the conditions of this permit specifying compliance practices for applicable requirements, any person (including the Permittee) may also use other credible evidence to establish compliance or noncompliance with applicable requirements. This permit shall not alter or affect the liability of the Permittee for any violation of applicable requirements prior to or at the time of permit issuance. [Minn. R. 7007.1800(A)(2)]
	1300	The Permittee shall comply with National Primary and Secondary Ambient Air Quality Standards, 40 CFR pt. 50, and the Minnesota Ambient Air Quality Standards, Minn. R. 7009.0010 to 7009.0090. Compliance shall be demonstrated upon written request by the MPCA. [Minn. R. 7007.0800, subp. 2(A) & (B), Minn. R. 7009.0020-7009.0090, Minn. Stat. 116.07, subd. 4a(a)]
	1380	Circumvention: Do not install or use a device or means that conceals or dilutes emissions, which would otherwise violate a federal or state air pollution control rule, without reducing the total amount of pollutant emitted. [Minn. R. 7011.0020]
	1390	The Permittee must at all times properly operate and maintain the facilities and systems of treatment and control and the appurtenances related to them that are installed or used by the Permittee to achieve compliance with the conditions of the permit. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance procedures. [Minn. R. 7007.0800, subp. 16(J)]
	1400	Operation and Maintenance Plan: Retain at the stationary source an operation and maintenance plan for all air pollution control equipment. At a minimum, the O & M plan shall identify all air pollution control equipment and control practices and shall include a preventative maintenance program for the equipment and practices, a description of (the minimum but not necessarily the only) corrective actions to be taken to restore the equipment and practices to proper operation to meet applicable permit conditions, a description of the employee training program for proper operation and maintenance of the control equipment and practices, and the records kept to demonstrate plan implementation. [Minn. R. 7007.0800, subp. 14, Minn. R. 7007.0800, subp. 16(J)]
	1410	Operation Changes: In any shutdown, breakdown, or deviation the Permittee must immediately or as soon as possible considering plant and personnel safety take all practical steps to modify operations to reduce the emission of any regulated air pollutant. No emissions units that have an unreasonable shutdown or breakdown frequency of process or control equipment are permitted to operate. [Minn. R. 7019.1000, subp. 4]
	1420	Fugitive Emissions: Do not cause or permit the handling, use, transporting, or storage of any material in a manner which may allow avoidable amounts of particulate matter to become airborne. Comply with all other requirements listed in Minn. R. 7011.0150. [Minn. R. 7011.0150]
	1430	Noise: The Permittee shall comply with the noise standards set forth in Minn. R. 7030.0010 to 7030.0080 at all times during the operation of any emission units. This is a state only requirement and is not enforceable by the EPA Administrator or citizens under the Clean Air Act. [Minn. R. 7030.0010-7030.0080]

SI Id	Sequence	Requirement
	1440	Inspections: The Permittee shall comply with the inspection procedures and requirements as found in Minn. R. 7007.0800, subp. 9(A). [Minn. R. 7007.0800, subp. 9(A)]
	1450	The Permittee shall comply with the General Conditions listed in Minn. R. 7007.0800, subp. 16. [Minn. R. 7007.0800, subp. 16]
	1460	Performance Testing: Conduct all performance tests in accordance with Minn. R. ch. 7017 unless otherwise noted in this permit. [Minn. R. ch. 7017]
	1470	Performance Test Notifications and Submittals: Performance Test Notification and Plan: due 30 days before each Performance Test Performance Test Pre-test Meeting: due seven days before each Performance Test Performance Test Report: due 45 days after each Performance Test The Notification, Test Plan, and Test Report must be submitted in a format specified by the commissioner. [Minn. R. 7017.2017, Minn. R. 7017.2030, subps. 1-4, Minn. R. 7017.2035, subps. 1-2]
	1480	Limits set as a result of a performance test (conducted before or after permit issuance) apply until superseded as stated in the MPCA's Notice of Compliance letter granting preliminary approval. Preliminary approval is based on formal review of a subsequent performance test on the same unit as specified by Minn. R. 7017.2025, subp. 3. The limit is final upon issuance of a permit amendment incorporating the change. [Minn. R. 7017.2025, subp. 3]
	1490	Monitoring Equipment Calibration - The Permittee shall either: 1. Calibrate or replace required monitoring equipment every 12 months; or 2. Calibrate at the frequency stated in the manufacturer's specifications. For each monitor, the Permittee shall maintain a record of all calibrations, including the date conducted, and any corrective action that resulted. The Permittee shall include the calibration frequencies, procedures, and manufacturer's specifications (if applicable) in the Operations and Maintenance Plan. Any requirements applying to continuous emission monitors are listed separately in this permit. [Minn. R. 7007.0800, subp. 4(D)]
	1500	Operation of Monitoring Equipment: Unless noted elsewhere in this permit, monitoring a process or control equipment connected to that process is not necessary during periods when the process is shutdown, or during checks of the monitoring systems, such as calibration checks and zero and span adjustments. If monitoring records are required, they should reflect any such periods of process shutdown or checks of the monitoring system. [Minn. R. 7007.0800, subp. 4(D)]
	1510	Recordkeeping: Retain all records at the stationary source, unless otherwise specified within this permit, for five (5) years from the date of monitoring, sample, measurement, or report. Records which must be retained at this location include all calibration and maintenance records, all original recordings for continuous monitoring instrumentation, and copies of all reports required by the permit. Records must conform to the requirements listed in Minn. R. 7007.0800, subp. 5(A). [Minn. R. 7007.0800, subp. 5(C)]
	1520	Recordkeeping: Maintain records describing any insignificant modifications (as required by Minn. R. 7007.1250, subp. 3) or changes contravening permit terms (as required by Minn. R. 7007.1350, subp. 2), including records of the emissions resulting from those changes. [Minn. R. 7007.0800, subp. 5(B)]
	1530	If the Permittee determines that no permit amendment or notification is required prior to making a change, the Permittee must retain records of all calculations required under Minn. R. 7007.1200. For expiring permits, these records shall be kept for a period of five years from the date the change was made or until permit reissuance, whichever is longer. The records shall be kept at the stationary source for the current calendar year of operation and may be kept at the stationary source or office of the stationary source for all other years. The records may be maintained in either electronic or paper format. [Minn. R. 7007.1200, subp. 4]

SI Id	Sequence	Requirement
	1610	Shutdown Notifications: Notify the commissioner at least 24 hours in advance of a planned shutdown of any control equipment or process equipment if the shutdown would cause any increase in the emissions of any regulated air pollutant. If the Permittee does not have advance knowledge of the shutdown, the Permittee must notify the commissioner as soon as possible after the shutdown. However, notification is not required in the circumstances outlined in items A, B, and C of Minn. R. 7019.1000, subp. 3. At the time of notification, the owner or operator must inform the commissioner of the cause of the shutdown and the estimated duration. The owner or operator must notify the commissioner when the shutdown is over. [Minn. R. 7019.1000, subp. 3]
	1620	Breakdown Notifications: Notify the commissioner within 24 hours of a breakdown of more than one hour of any control equipment or process equipment if the breakdown causes any increase in the emissions of any regulated air pollutant. The 24-hour time period starts when the breakdown was discovered or reasonably should have been discovered by the owner or operator. However, notification is not required in the circumstances outlined in items A, B, and C of Minn. R. 7019.1000, subp. 2. At the time of notification or as soon as possible thereafter, the Permittee must inform the commissioner of the cause of the breakdown and the estimated duration. The Permittee must notify the commissioner when the breakdown is over. [Minn. R. 7019.1000, subp. 2]
	1630	Notification of Deviations Endangering Human Health or the Environment: Immediately after discovery of the deviation or immediately after when the deviation reasonably should have been discovered, notify the commissioner either orally or by e-mail, or telephone the state duty officer at 800-422-0798 or 651-649-5451, of any deviation from permit conditions that could endanger human health or the environment. [Minn. R. 7019.1000, subp. 1]
	1640	Notification of Deviations Endangering Human Health or the Environment Report: Within two working days of discovery, notify the commissioner in writing of any deviation from permit conditions that could endanger human health or the environment. Include the following information in this written description: 1. the cause of the deviation; 2. the exact dates of the period of the deviation, if the deviation has been corrected; 3. whether or not the deviation has been corrected; 4. the anticipated time by which the deviation is expected to be corrected, if not yet corrected; and 5. steps taken or planned to reduce, eliminate, and prevent reoccurrence of the deviation. [Minn. R. 7019.1000, subp. 1]
	1650	The Permittee must submit a semiannual deviations report : Due semiannually, by the 30th of January and July. The first semiannual report submitted by the Permittee must cover the calendar half-year in which the permit is issued. The first report of each calendar year covers January 1 - June 30. The second report of each calendar year covers July 1 - December 31. Submit this on form DRF-2 (Deviation Reporting Form). If no deviations have occurred, submit the signed report certifying that there were no deviations. [Minn. R. 7007.0800, subp. 6(B)(2)]
	1670	Application for Permit Amendment: If a permit amendment is needed, submit an application in accordance with the requirements of Minn. R. 7007.1150 through Minn. R. 7007.1500. Submittal dates vary, depending on the type of amendment needed. Upon adoption of a new or amended federal applicable requirement, and if there are three or more years remaining in the permit term, the Permittee shall file an application for an amendment within nine months of promulgation of the applicable requirement, pursuant to Minn. R. 7007.0400, subp. 3. [Minn. R. 7007.0400, subp. 3, Minn. R. 7007.1150 - 7007.1500]

SI Id	Sequence	Requirement
	1680	Extension Requests: The Permittee may apply for an Administrative Amendment to extend a deadline in a permit by no more than 120 days, provided the proposed deadline extension meets the requirements of Minn. R. 7007.1400, subp. 1(H). Performance testing deadlines from the General Provisions of 40 CFR pt. 60 and pt. 63 are examples of deadlines for which the MPCA does not have authority to grant extensions and therefore do not meet the requirements of Minn. R. 7007.1400, subp. 1(H). [Minn. R. 7007.1400, subp. 1(H)]
	1700	The Permittee must submit a compliance certification : Due annually, by the 31st of January (for the previous calendar year). Submit this on form CR-04 (Annual Compliance Certification Report). This report covers all deviations experienced during the calendar year. If no deviations have occurred, submit the signed report certifying that there were no deviations. [Minn. R. 7007.0800, subp. 6(D)]
	1703	Within 15 days of a request from the Commissioner, the Permittee must provide a complete summary of all performance tests required at the facility including the subject item, pollutant, most recent test date (if applicable), and the date of the next test in an approved format. [Minn. R. 7007.0800, subp. 16(L)]
	1720	The Permittee shall submit an application for permit reissuance : Due 180 calendar days before Permit Expiration Date. [Minn. R. 7007.0400, subp. 2]
	1730	Emission Inventory Report: due on or before April 1 of each calendar year following permit issuance. Submit in a format specified by the Commissioner. [Minn. R. 7019.3000-7019.3100]
	1740	Emission Fees: due 30 days after receipt of an MPCA bill. [Minn. R. 7002.0005-7002.0085]
	1780	The Permittee shall not have engines that meet subparagraph (1)(iii) under the definition of Nonroad Engine at 40 CFR Section 1068.30 in one location within the stationary source for more than 12 consecutive months. A location is any single site at a building, structure, facility, or installation. Any engine, or engines, that replaces an engine at a location and that is intended to perform the same or similar function as the engine it replaced will be included in calculating the consecutive time period. [40 CFR 1068.30]
	1790	For a nonroad engine that is excluded from any requirements of 40 CFR Part 1068 because it is a stationary engine, the Permittee may not move it or install it in any mobile equipment, except as allowed by the provisions of 40 CFR Part 1068. The Permittee may not circumvent or attempt to circumvent the residence-time requirements of subparagraph (2)(iii) of the Nonroad Engine definition at 40 CFR Section 1068.30. [40 CFR 1068.101(b)(3)]
	1800	The Permittee shall conduct an inventory of all engines on-site that meet subparagraph (1)(iii) under the definition of Nonroad Engine at 40 CFR Section 1068.30, once each calendar quarter; inventories shall not take place in consecutive months. This applies to nonroad engines that are owned by the Permittee, or rented and operated by the Permittee, or brought onsite and operated by a vendor or contractor. The inventory shall include the following: 1) Date that the nonroad engine is inventoried. 2) Identification number. 3) Function of the nonroad engine (e.g. compressor, welder). 4) Location of the engine within the stationary source. 5) Statement that the nonroad engine has not been located in a single location for 12 consecutive months, and movement between locations has not been for purposes of circumvention of residence time requirements of subparagraph (2)(iii) under the definition of Nonroad Engine at 40 CFR Section 1068.30. [40 CFR 1068.30(nonrd engn)(1)(iii), Minn. R. 7007.0800, subps. 4-5]

SI Id	Sequence	Requirement
	1810	A nonroad engine ceases to be a nonroad engine and becomes a new stationary engine if: 1. At any time, it meets the criteria specified in subparagraph (2)(iii) under the definition of Nonroad Engine in 40 CFR Section 1068.30. For example, a portable generator engine ceases to be a nonroad engine if it is used or will be used in a single specific location for 12 months or longer. If the Administrator or the Permitting authority determines that an engine will be or has been used in a single specific location for 12 months or longer, it ceased to be a nonroad engine when it was placed in that location. OR 2. It is otherwise regulated by a federal New Source Performance Standard promulgated under section 111 of the Clean Air Act (42 U.S.C. 7411). [40 CFR 1068.31(e)]
COMG 7	1	The Permittee must submit an initial design capacity report: Due 90 days after construction commenced that includes the information specified in 40 CFR Section 60.767(a)(2)(i) and (ii). [40 CFR 60.767(a), 40 CFR 63.1981, Minn. R. 7011.3515, Minn. R. 7011.7390]
	2	The Permittee must submit a collection and control system design plan: Due within 1 year of the first NMOC emission rate report in which the NMOC emission rate equals or exceeds 34 megagrams per year. The collection and control system design plan must be prepared and approved by a professional engineer and must meet the requirements of 40 CFR Section 60.767(c)(1) through (7). [40 CFR 60.767(c), 40 CFR 63.1981, Minn. R. 7011.3515, Minn. R. 7011.7390]
	3	The Permittee must comply with all applicable requirements of 40 CFR pt. 60, subp. XXX as follows: 40 CFR 60.760(a); 40 CFR 60.761; 40 CFR 60.762(b)(1),(b)(2)(ii),(b)(2)(iii)(A),(C), (b)(2)(iv)-(v); 40 CFR 60.764(a)(1-5),(b)-(e); 40 CFR 60.767(a)(1),(3),(b)(3),(c)-(f),(i); 40 CFR 60.768(a),(b)(1),(b)(4)-(5),(c)(5),(d)(2),(e)(6),(f)-(j); and 40 CFR 60.769(a),(b), and (c)(1). A copy of 40 CFR pt. 60, subp. XXX is included in Appendix B. If the standard changes or upon adoption of a new or amended federal applicable requirement, and if there are more than 3 years remaining in the permit term, the Permittee shall file an application for an amendment within nine months of promulgation of the applicable requirement, pursuant to Minn. R. 7007.0400, subp. 3. [40 CFR pt. 60, subp. XXX, Minn. R. 7007.0400, subp. 3, Minn. R. 7011.3515]
	4	The Permittee that has already been required to submit a collection and control system design plan under 40 CFR Section 60.767(c) or 40 CFR Section 63.1981(d) must submit a revised design plan following 40 CFR Section 60.767(d)(1) and (2). [40 CFR 60.767(d), 40 CFR 63.1981(e), Minn. R. 7011.3515, Minn. R. 7011.7390]
	5	The permittee must submit a closure report: Due within 30 days of waste acceptance cessation. [40 CFR 60.767(e), 40 CFR 63.1981(f), Minn. R. 7011.3515, Minn. R. 7011.7390]
	6	The Permittee must submit an equipment removal report: Due 30 days prior to removal or cessation of operation of the control equipment that includes the information specified in 40 CFR Section 60.767(f)(1). [40 CFR 60.767(f), 40 CFR 63.1981(g), Minn. R. 7011.3515, Minn. R. 7011.7390]
	7	The Permittee must submit a semi-annual report: Due 30 days after the end of each calendar half-year that includes the information specified in 40 CFR Section 63.1981(h)(1) through (8). [40 CFR 60.767(g), 40 CFR 63.1981(h), Minn. R. 7011.3515, Minn. R. 7011.7390]

SI Id	Sequence	Requirement
	8	The Permittee must submit information regarding corrective actions according to 40 CFR 63.1960(j)(1) and (2). (1) For corrective action that is required according to 40 CFR 63.1960(a)(3) or (4) and is not completed within 60 days after the initial exceedance, the Permittee must submit a notification as soon as practicable but no later than 75 days after the first measurement of positive pressure or temperature exceedance. (2) For corrective action that is required according to 40 CFR 63.1960(a)(3) or (4) and is expected to take longer than 120 days after the initial exceedance to complete, the Permittee must submit the root cause analysis, corrective action analysis, and corresponding implementation timeline as soon as practicable but no later than 75 days after the first measurement of positive pressure or temperature monitoring value of 62.8 degrees Celsius (145 degrees Fahrenheit) or above unless a higher operating temperature value has been approved by the Administrator for the well. The Administrator must approve the plan for corrective action and the corresponding timeline. [40 CFR 60.762(b)(2)(iv), 40 CFR 60.767(j), 40 CFR 63.1981(h), Minn. R. 7011.3515, Minn. R. 7011.7390]
	9	24-hour high temperature report. Where the Permittee seeks to demonstrate compliance with the operational standard for temperature in 40 CFR 63.1958(c)(1) and a landfill gas temperature measured at either the wellhead or at any point in the well is greater than or equal to 76.7 degrees Celsius (170 degrees Fahrenheit) and the carbon monoxide concentration measured is greater than or equal to 1,000 ppmv, then the Permittee must report the date, time, well identifier, temperature and carbon monoxide reading via email within 24 hours of the measurement unless a higher operating temperature value has been approved per 40 CFR 63.1958(c). [40 CFR 60.767(m), 40 CFR 63.1981(k), Minn. R. 7011.3515, Minn. R. 7011.7390]
	10	The Permittee shall start up a collection and control system that captures the gas generated within the landfill as required by 40 CFR 60.762(b)(2)(ii)(C) and (b)(2)(iii) within 30 months after the first annual report submitted in which the NMOC emission rate equals or exceeds 34 megagrams per year. [40 CFR 60.762(b)(2)(ii), 40 CFR 63.1959(a)(2)(ii)(A), Minn. R. 7011.3515, Minn. R. 7011.7390]
	11	Revised design plan. The Permittee must submit a revised design plan for approval as follows: (1) At least 90 days before expanding operations to an area not covered by the previously approved design plan. (2) Prior to installing or expanding the gas collection system in a way that is not consistent with the design plan that was submitted to the Administrator according to 40 CFR 60.767(c). [40 CFR 60.767(d), 40 CFR 63.1981, 40 CFR 63.1981(e), Minn. R. 7011.3515, Minn. R. 7011.7390]
	4600	The Permittee must comply with all applicable requirements of 40 CFR pt. 60, subp. A as follows: 40 CFR 60.1(a)-(c); 40 CFR 60.2; 40 CFR 60.3; 40 CFR 60.4; 40 CFR 60.5(a),(b); 40 CFR 60.6(a)-(c); 40 CFR 60.7(a)(1)-(4); 40 CFR 60.7(b); 40 CFR 60.7(f)-(h); 40 CFR 60.8(a); 40 CFR 60.8(c)-(h); 40 CFR 60.9; 40 CFR 60.11(a); 40 CFR 60.11(d); 40 CFR 60.11(g); 40 CFR 60.12;

SI Id	Sequence	Requirement
		40 CFR 60.13(a)-(b); 40 CFR 60.13(b); 40 CFR 60.13(e)(1); 40 CFR 60.13(f); 40 CFR 60.13(h)(2)-(3); 40 CFR 60.14(a); 40 CFR 60.14(b); 40 CFR 60.17; 40 CFR 60.18(a)-(b) 40 CFR 60.18(c)(1)-(3),(6); 40 CFR 60.18(d)-(f); 40 CFR 60.19(a)-(d); 40 CFR 60.19(f)(1)-(4); A copy of 40 CFR pt. 60, subp. A is included in Appendix C. If the standard changes or upon adoption of a new or amended federal applicable requirement, and if there are more than 3 years remaining in the permit term, the Permittee shall file an application for an amendment within nine months of promulgation of the applicable requirement, pursuant to Minn. R. 7007.0400, subp. 3. [40 CFR pt. 60, subp. A, Minn. R. 7007.0400, subp. 3, Minn. R. 7007.1150-7007.1500, Minn. R. 7011.0050, Minn. R. 7017.1010 & 7017.2025, Minn. R. 7019.0100]
4601		The Permittee must comply with all applicable requirements of 40 CFR pt. 63, subp. AAAA, as follows: 40 CFR 63.1930(b); 40 CFR 63.1935(a)(3); 40 CFR 63.1940(a),(c); 40 CFR 63.1945(b); 40 CFR 63.1950; 40 CFR 63.1955(a),(c); 40 CFR 63.1957; 40 CFR 63.1958; 40 CFR 63.1959(a); 40 CFR 63.1959(b)(1); 40 CFR 63.1959(b)(2)(i),(ii); 40 CFR 63.1959(b)(2)(iii)(A),(C);
		40 CFR 63.1959(c)-(f); 40 CFR 63.1960; 40 CFR 63.1961(a),(c)-(h); 40 CFR 63.1962; 40 CFR 63.1964; 40 CFR 63.1965; 40 CFR 63.1975; 40 CFR 63.1981; 40 CFR 63.1982; 40 CFR 63.1983(a),(b)(1),(3)-(5),(c)(2)-(8),(d)-(h); 40 CFR 63.1985; 40 CFR 63.1990; and 40 CFR pt. 63, subp. AAAA, Table 1, Applicability of NESHAP General Provisions, as specified elsewhere in this permit. A copy of 40 CFR pt. 63, subp. AAAA is included in Appendix D. If the standard changes or upon adoption of a new or amended federal applicable requirement, and if there are more than 3 years remaining in the permit term, the Permittee shall file an application for an amendment within nine months of promulgation of the applicable requirement, pursuant to Minn. R. 7007.0400, subp. 3. [40 CFR pt. 63, subp. AAAA, Minn. R. 7007.0400, subp. 3, Minn. R. 7011.7390]

SI Id	Sequence	Requirement
	7910	The Permittee must comply with all applicable requirements of 40 CFR pt. 63, subp. A as follows: 40 CFR 63.1(a); 40 CFR 63.1(b)(1); 40 CFR 63.1(c)(1)-(2); 40 CFR 63.1(e); 40 CFR 63.2; 40 CFR 63.3; 40 CFR 63.4(a)-(c); 40 CFR 63.5(b)(3); 40 CFR 63.6(a)(1); 40 CFR 63.6(c)(1)-(2); 40 CFR 63.6(e)(1); 40 CFR 63.6(f);
		40 CFR 63.6(g); 40 CFR 63.7(a)-(b); 40 CFR 63.7(c)(1); 40 CFR 63.7(c)(2)(i),(ii),(iii)(A)-(C),(iv)-(v); 40 CFR 63.7(c)(3); 40 CFR 63.7(d); 40 CFR 63.7(e)(2)-(3); 40 CFR 63.7(g); 40 CFR 63.8(a); 40 CFR 63.8(c)(2)-(3); 40 CFR 63.8(c)(4)(i); 40 CFR 63.8(c)(5)-(6); 40 CFR 63.8(c)(7)(ii); 40 CFR 63.8(c)(8); 40 CFR 63.8(g)(1),(3-5); 40 CFR 63.9(a)(1),(3),(4)(ii); 40 CFR 63.9(b)(1)(i),(iii); 40 CFR 63.9(b)(2);
		40 CFR 63.9(e); 40 CFR 63.9(h)(1),(3),(6); 40 CFR 63.9(i)(1); 40 CFR 63.9(k); 40 CFR 63.10(a)(1),(3),(4)(ii); 40 CFR 63.10(a)(5); 40 CFR 63.10(b)(1); 40 CFR 63.10(b)(2)(iii),(vi)-(xi),(xiv); 40 CFR 63.10(d)(1); 40 CFR 63.10(d)(2); 40 CFR 63.11(a)(1)-(2); 40 CFR 63.11(b)(1)-(6); 40 CFR 63.12(a)(1)-(2); 40 CFR 63.13; 40 CFR 63.14; and 40 CFR 63.15(a)-(b) . A copy of 40 CFR pt. 63, subp. A is included in Appendix E. If the standard changes or upon adoption of a new or amended federal applicable requirement, and if there are more than three years remaining in the permit term, the Permittee shall file an application for an amendment within nine months of promulgation of the applicable requirement, pursuant to Minn. R. 7007.0400, subp. 3. [40 CFR pt. 63, subp. A, Minn. R. 7007.0400, subp. 3, Minn. R. 7007.1150-7007.1500, Minn. R. 7011.0050, subp. 1(B), Minn. R. 7017.1010 & 7017.2025, Minn. R. 7019.0100]

SI Id	Sequence	Requirement
	7911	The Permittee shall operate the collection system with negative pressure at each wellhead except under the following conditions: (1) A fire or increased well temperature. The Permittee must record instances when positive pressure occurs in efforts to avoid a fire. These records must be submitted with the annual reports as provided 40 CFR 63.1981(h); (2) Use of a geomembrane or synthetic cover. The Permittee must develop acceptable pressure limits in the design plan; (3) A decommissioned well. A well may experience a static positive pressure after shut down to accommodate for declining flows. All design changes must be approved by the Administrator as specified in 40 CFR 63.1981(d)(2). [40 CFR 60.762(b)(2)(iv), 40 CFR 63.1958(b), Minn. R. 7011.3515, Minn. R. 7011.7390]
	7912	The Permittee shall operate each interior wellhead in the collection system with a landfill gas Temperature $\leq$ 62.8 degrees Celsius (145 degrees Fahrenheit). The Permittee may establish a higher operating temperature value at a particular well. A higher operating value demonstration must be submitted to the Administrator for approval and must include supporting data demonstrating that the elevated parameter neither causes fires nor significantly inhibits anaerobic decomposition by killing methanogens. The demonstration must satisfy both criteria in order to be approved (i.e., neither causing fires nor killing methanogens is acceptable). [40 CFR 60.762(b)(2)(iv), 40 CFR 63.1958(c), Minn. R. 7011.3515, Minn. R. 7011.7390]
FUGI 3	3201	The Permittee shall minimize or eliminate fugitive emissions from all paved surfaces. The Permittee shall use water to control fugitive particulate emissions, except as provided below. If fugitive emissions are observed, the Permittee shall record: 1) The date that fugitive dust was observed; 2) What corrective actions were taken, when the corrective actions were taken, and whether the corrective actions eliminated the fugitive dust; 3) If dust control measures were not taken because of a rainfall event or because an area is snow or ice-covered, documentation of the event or condition along with the source of measurement for rainfall (e.g. on-site rain gauge); 4) If dust control measures were not taken because of weather conditions, documentation of the date and the weather conditions (e.g. documentation that the temperature indicated freezing conditions). The Permittee is not required to use water to control fugitive particulate emissions under any of the following circumstances: 1) If there was a 0.10 inch rainfall during the previous 24 hours, or 2) If the areas to be controlled are covered with snow or ice, or 3) During freezing conditions. [Minn. R. 7007.0800, subps. 2(A) and 5(A), Minn. R. 7011.0150]
FUGI 4	1	The Permittee must visually inspect all unpaved surfaces for fugitive emissions on each day of operation. If visible emissions are observed, the Permittee shall take appropriate corrective action. Corrective actions include, but are not limited to, watering or use of chemical stabilizers during adversely dry conditions. The facility shall maintain records of daily watering reports and fugitive emissions exception reports. [Minn. R. 7007.0800, subp. 2(A), Minn. R. 7011.0150]
TREA 6	5	The Permittee shall operate and maintain control equipment such that it achieves a control efficiency for Methane Gas $\geq$ 98 percent control efficiency. [Minn. R. 7007.0800, subp. 2(A) & (B)]
	7	The Permittee shall operate and maintain control equipment such that it achieves a control efficiency for Nonmethane organic compounds (NMOC) $\geq$ 98 percent control efficiency. [Minn. R. 7007.0800, subp. 2(A) & (B)]
	9	The Permittee shall operate and maintain control equipment such that it achieves a control efficiency for HAPs - Volatile $\geq$ 98 percent control efficiency. [Minn. R. 7007.0800, subp. 2(A) & (B)]
	10	The Permittee must operate and maintain control equipment such that it achieves a control efficiency for Volatile Organic Compounds $\geq$ 98 percent control efficiency. [Minn. R. 7007.0800, subp. 2(A)]

SI Id	Sequence	Requirement
	12	Visible Emissions: TREA 6 shall be designed for and operated with no visible emissions, except for periods not to exceed a total of 5 minutes during any 2 consecutive hours. [40 CFR 60.18(c)(1), 40 CFR 60.762(b)(2)(iii)(A), 40 CFR 63.11(b)(4), 40 CFR 63.1959(b)(2)(iii)(A), Minn. R. 7011.0050, Minn. R. 7011.3515, Minn. R. 7011.7390]
	17	Fuel type: landfill gas and off-spec gas only. [Minn. R. 7007.0800, subp. 2(A) & (B)]
	18	Initial performance test. The Permittee shall conduct a performance test within 180 days of initial startup of TREA 6 to ensure that the flare is operated in accordance with the parameters established in 40 CFR 63.11(b). The net heating value of the combusted landfill gas as determined in 40 CFR 63.11(b)(6)(ii) is calculated from the concentration of methane in the landfill gas as measured by EPA Method 3C of appendix A to 40 CFR Part 60. A minimum of three 30-minute EPA Method 3C samples are determined. The measurement of other organic components, hydrogen, and carbon monoxide is not applicable. EPA Method 3C may be used to determine the landfill gas molecular weight for calculating the flare gas exit velocity under 40 CFR 63.11(b)(7) of subpart A. [40 CFR 63.1959(b)(2)(iii)(A), 40 CFR 63.1959(e), 40 CFR 63.7(a)(2), Minn. R. 7011.7390]
	17610	Initial performance test report. The Permittee shall submit performance test results according to the procedures of 40 CFR 60.767(i)(1) within 60 days after completion of the performance test. The report shall include any associated fuel analyses, according to 40 CFR 60.764(b), along with the following information required by 40 CFR 60.767(h)(1)-(6). [40 CFR 60.764(e)(1), 40 CFR 60.767(h), 40 CFR 63.1981, 40 CFR 63.1981(i), Minn. R. 7011.3515, Minn. R. 7011.7390]
	17615	The Permittee shall vent landfill gas from either/both EQUI 29 and EQUI 31 to TREA 6, and operate and maintain TREA 6 at all times that any landfill gas is vented to TREA 6. The Permittee shall vent off-spec gas from EQUI 31 to TREA 6, and operate and maintain TREA 6 at all times that any off-spec gas is vented to TREA 6. The Permittee shall document periods of non-operation of the control equipment TREA 6. [Minn. R. 7007.0800, subp. 2(A)]
	20210	If the Permittee replaces TREA 6, the replacement control must meet or exceed the control efficiency requirements of TREA 6 as well as comply with all other requirements of TREA 6. Prior to making such a change, the Permittee shall apply for and obtain the appropriate permit amendment, as applicable. If no amendment is needed for the replacement, the Permittee shall submit an electronic notice to the Agency using Form CR-05. The notice must be received by the Agency seven working days prior to the commencement/start of replacement. [Minn. R. 7007.0800, subp. 2(A)]
	20230	The flare must be operated with a flare flame or pilot flame (or an electronically controlled automatic igniter system) present at all times. [Minn. R. 7007.0800, subp. 14]
	20240	The Permittee must operate and maintain the flare in accordance with the Operations and Maintenance (O & M) Plan. The Permittee must keep copies of the O & M Plan available onsite for use by staff and MPCA staff. [Minn. R. 7007.0800, subp. 14]
	20250	Daily Monitoring: The Permittee must physically verify the operation of the device used to monitor for flame presence at least once each operating day to verify that it is working and recording properly. The Permittee must maintain a written record of the daily verifications. [Minn. R. 7007.0800, subps. 4-5]
	20280	Recordkeeping: The Permittee must record the date, times and duration of all periods during which: 1. the flare flame or all the pilot flames are absent; 3. whether or not emissions were being vented to the flare during periods of flame absence; and 4. whether or not emissions were being vented to the flare during periods of visible emissions. If periods of flame absence or visible emissions are recorded when emissions are being vented to the flare, the emissions during that time must be considered uncontrolled until flame presence and/or no visible emission conditions are restored. The period of time for which there is no flame or there are visible emissions are considered deviations as defined by Minn. R. 7007.0100, subp. 8a and must be reported. [Minn. R. 7007.0800, subps. 4-5]
	20300	Recordkeeping of Flame Presence: The Permittee must maintain records of flame presence and other supporting information. The Permittee must maintain written records of the monitoring. [Minn. R. 7007.0800, subp. 5]

SI Id	Sequence	Requirement
	20310	The Permittee must install, maintain, and operate a heat sensing device, such as an ultraviolet beam sensor or thermocouple, at the pilot light or the flame itself that continuously indicates and records the presence of a flame. [Minn. R. 7007.0800, subps. 4-5]
	20320	The Permittee must calibrate or replace the thermocouple or other equivalent monitoring device at least once every 12 months, or calibrate at the frequency stated in the manufacturer's specifications, and must maintain a written record of the calibration and any action resulting from the calibration. [Minn. R. 7007.0800, subp. 14, Minn. R. 7007.0800, subps. 4-5]
	20330	Annual Inspection: At least once per calendar year, the Permittee must conduct an inspection of the operating systems of the control device. The Permittee must keep a record of the inspection and any action resulting from the inspection. [Minn. R. 7007.0800, subp. 14, Minn. R. 7007.0800, subps. 4-5]
	20350	Corrective Actions: If any of the flare components are found during the inspections to need repair, or the presence of flame is not detected, the Permittee must take corrective action as soon as possible. Corrective actions include, but are not limited to, those outlined in the O & M Plan for the Flare. The Permittee must keep a record of the type and date of any corrective action taken. [Minn. R. 7007.0800, subp. 14, Minn. R. 7007.0800, subp. 2(A), Minn. R. 7007.0800, subp. 5]
TREA 7	5	The Permittee shall operate and maintain control equipment such that it achieves a control efficiency for Methane Gas $\geq$ 98 percent control efficiency. [Minn. R. 7007.0800, subp. 2(A) & (B)]
	7	The Permittee shall operate and maintain control equipment such that it achieves a control efficiency for Nonmethane organic compounds (NMOC) $\geq$ 98 percent control efficiency. [Minn. R. 7007.0800, subp. 2(A) & (B)]
	9	The Permittee shall operate and maintain control equipment such that it achieves a control efficiency for HAPs - Volatile $\geq$ 98 percent control efficiency. [Minn. R. 7007.0800, subp. 2(A) & (B)]
	10	The Permittee must operate and maintain control equipment such that it achieves a control efficiency for Volatile Organic Compounds $\geq$ 98 percent control efficiency. [Minn. R. 7007.0800, subp. 2(A)]
	17610	The Permittee shall vent waste gas from EQUI 31 to TREA 7 whenever EQUI 31 operates, and operate and maintain TREA 7 at all times that any waste gas is vented to TREA 7. The Permittee shall document periods of non-operation of the control equipment TREA 7 whenever EQUI 31 is operating. [Minn. R. 7007.0800, subp. 2(A)]
	17615	If the Permittee replaces TREA 7, the replacement control must meet or exceed the control efficiency requirements of TREA 7 as well as comply with all other requirements of TREA 7. Prior to making such a change, the Permittee shall apply for and obtain the appropriate permit amendment, as applicable. If no amendment is needed for the replacement, the Permittee shall submit an electronic notice to the Agency using Form CR-05. The notice must be received by the Agency seven working days prior to the commencement/start of replacement. [Minn. R. 7007.0800, subp. 2(A)]
	18740	The Permittee shall operate and maintain the thermal oxidizer in accordance with the Operation and Maintenance (O & M) Plan. The Permittee shall keep copies of the O & M Plan available onsite for use by staff and MPCA staff. [Minn. R. 7007.0800, subp. 14]
	18750	Temperature Monitoring: The Permittee shall maintain and operate a thermocouple monitoring device that continuously indicates and records the combustion chamber temperature of the thermal oxidizer. The monitoring device shall have a margin of error less than the greater of +/- 0.75 percent of the temperature being measured or +/- 4.5 degrees Fahrenheit. The recording device shall also calculate the three-hour rolling average combustion chamber temperature. Recorded values outside the range specified in this permit are considered Deviations as defined by Minn. R. 7007.0100, subp. 8a. [Minn. R. 7007.0800, subps. 4-5]
	18760	Daily Monitoring: The Permittee shall physically verify the operation of the temperature recording device at least once each operating day to verify that it is working and recording properly. The Permittee shall maintain a written record of the daily verifications. [Minn. R. 7007.0800, subps. 4-5]
	18770	Monitoring Equipment: The Permittee shall install and maintain thermocouples to conduct temperature monitoring required by this permit. The monitoring equipment must be installed, in use, and properly maintained whenever operation of the monitored control equipment is required. [Minn. R. 7007.0800, subps. 4-5]

SI Id	Sequence	Requirement
	18780	The Permittee shall maintain a continuous hard copy readout or computer disk file of the temperature readings and calculated three hour rolling average temperatures for the combustion chamber. [Minn. R. 7007.0800, subps. 4-5]
	18790	Annual Calibration: The Permittee shall calibrate the temperature monitor at least once every 12 months or at the frequency state in the manufacturer's specifications, and shall maintain a written record of the calibration and any action resulting from the calibration. [Minn. R. 7007.0800, subp. 14, Minn. R. 7007.0800, subp. 4, Minn. R. 7007.0800, subp. 5]
	18800	Quarterly Inspections: At least once per calendar quarter, the Permittee shall inspect the control equipment internal and external system components, including but not limited to the refractory, heat exchanger, and electrical systems. The Permittee shall maintain a written record of the inspection and any corrective actions taken resulting from the inspection. [Minn. R. 7007.0800, subp. 14, Minn. R. 7007.0800, subp. 4, Minn. R. 7007.0800, subp. 5]
	18810	Annual Inspection: At least once per calendar year, the Permittee shall conduct an internal inspection of the control device that includes all operating systems of the control device. The Permittee shall maintain a written record of the inspection and any action resulting from the inspection. [Minn. R. 7007.0800, subp. 14, Minn. R. 7007.0800, subp. 4, Minn. R. 7007.0800, subp. 5]
	18820	For periods when the thermal oxidizer is operated above the minimum combustion chamber temperature, the Permittee shall use either one of the following when completing calculations as required elsewhere in this permit: a. The control efficiency limit specified in this permit for this equipment (98%); or b. The control efficiency determined during the most recent MPCA approved performance test. If the tested efficiency is less than the efficiency limit in this permit, the Permittee must use the tested value in all calculations until the efficiency is demonstrated to be above the permit limit through a new test. [Minn. R. 7007.0800, subps. 4-5]
	18830	Corrective Actions: If the temperature is below the minimum specified by this permit or if the thermal oxidizer or any of its components are found during the inspections to need repair, the Permittee shall take corrective action as soon as possible. Corrective actions shall return the temperature to at least the permitted minimum and/or include completion of necessary repairs identified during the inspection, as applicable. Corrective actions include, but are not limited to, those outlined in the O & M Plan for the thermal oxidizer. The Permittee shall keep a record of the type and date of any corrective action taken. [Minn. R. 7007.0800, subp. 14, Minn. R. 7007.0800, subp. 2(A), Minn. R. 7007.0800, subp. 5]
	20350	Temperature $\geq$ 1556.6 degrees Fahrenheit 3-hour rolling average, at the combustion chamber outlet, unless a new limit is required to be set pursuant to Minn. R. 7017.2025, subp. 3. If a new minimum is required to be set it will be based on the values recorded during the most recent MPCA-approved performance test where compliance was demonstrated. The new limit shall be implemented upon receipt of the Notice of Compliance letter granting preliminary approval. The limit is final upon issuance of a permit amendment incorporating the change. If the 3-hour rolling average temperature is below the minimum temperature limit, the VOC emitted during that time shall be considered uncontrolled until the average temperature is above the minimum temperature limit. This shall be reported as a deviation. [Minn. R. 7007.0800, subp. 2(A)]

Points Calculator

1) AI ID No.:	1546	<table border="1"> <tr> <td>Total Points</td> <td>23</td> </tr> </table>	Total Points	23
Total Points	23			
2) Facility Name:	Pine Bend Energy LLC			
3) Small business? y/n?	No			
4) Air Project Tracking Numbers (including all rolled) :	6900, 6807, 6798, 2812			
5) Date of each Application Received:	9/1/2009, 11/3/2009, 12/15/2020, 1/12/2021, 6/8/2021			
6) Final Permit No.	03700138-101			
7) Permit Staff	Joy Wiecks			

Application Type	Air Project Tracking No.	Tempo Activity ID	Qty.	Points	Total Points	Total Additional Cost	Details
Administrative Amendment	6798	IND20200002	1	1	1	\$ 285.00	
Minor Amendment	2899, 6900, 6807	IND 20090002, IND20210001, IND20210002	3	4	12	\$ 3,420.00	
Applicability Request				10	0	\$ -	
Moderate Amendment				15	0	\$ -	
Major Amendment				25	0	\$ -	
Individual State Permit (not reissuance)				50	0	\$ -	
Individual Part 70 Permit (not reissuance)				75	0	\$ -	
Additional Points							
Modeling Review				15	0	\$ -	
BACT Review				15	0	\$ -	
LAER Review				15	0	\$ -	
CAA section 110(a)(2)(D)(i)(I) Review (i.e., Transport Rule / CAIR / CSAPR)				10	0	\$ -	
Part 75 CEM analysis				10	0	\$ -	
NSPS Review			1	10	10	\$ 2,850.00	
NESHAP Review				10	0	\$ -	
Case-by-case MACT Review				20	0	\$ -	
Netting				10	0	\$ -	
Limits to remain below threshold				10	0	\$ -	
Plantwide Applicability Limit (PAL)				20	0	\$ -	
AERA review				15	0	\$ -	
Variance request under 7000.7000				35	0	\$ -	
Confidentiality request under 7000.1300				2	0	\$ -	
EAW review					0		
Part 4410.4300, subparts 18, item A; and 29				15	0	\$ -	
Part 4410.4300, subparts 8, items A & B; 10, items A to C; 16, items A & D; 17, items A to C & E to G; and 18, items B & C				35	0	\$ -	
Part 4410.4300, subparts 4; 5 items A & B; 13; 15; 16, items B & C; and 17 item D				70	0	\$ -	
				Add'l Points	10		

NOTES:



APPLIED THERMAL SYSTEMS, INC.

As requested, we are providing below the expected and guaranteed levels of NOx and CO emissions from the duct burners. This data is based on that provided to you in our Supplement 6 letter dated May 17, 1994. Utilizing an aggregate of quoted emissions performance from the major vendors, the emissions at the full design-capable firing rate of 15 MM Btu/hr (LHV) per duct burner system are as follows:

Constituent	lb/MM Btu		lb/hr	
	Guaranteed	Expected	Guaranteed	Expected
NOx	0.12	0.10	1.8	1.5
CO	0.24	0.20	3.6	3.0

These emissions are for each duct burner at the rated design capacity, and are of course additive to the emissions in the gas turbine exhaust.

Thank you for the opportunity to be of service. Please do not hesitate to contact us or our local representative, Mr. Bill Evans of James Industries, if you have any other questions or require additional information.

Sincerely,

APPLIED THERMAL SYSTEMS, INC.

Phil Childers
Vice President
Sales & Marketing

*BFI
Duct Burner Emissions
June 14, 1994*

c: James Industries, Inc.
Mr. Bill Evans

9820 East 41st South, Suite 400
Tulsa, Oklahoma 74146-3816
(918) 622-1348 • Fax (918) 622-1457

Executive Summary

PINE BEND RNG LLC RNG PLANT WASTE GAS TOX EMISSION TEST RESULTS

Pine Bend RNG LLC (Pine Bend) contracted Impact Compliance & Testing, Inc. (ICT) to conduct a performance demonstration for the determination of nitrogen oxides (NO_x), carbon monoxide (CO), and non-methane organic compounds (NMOC), concentrations and emission rates from a thermal oxidizer (TOX) used to control waste gas from the Pine Bende renewable natural gas (RNG) facility located at the Pine Bend Landfill in Inver Grove Heights, Dakota County, Minnesota.

The following tables present the results from the performance demonstration.

Emission Unit	NO _x Emissions		CO Emissions		NMOC Emissions
	(lb/hr)	(lb/MMBtu)	(lb/hr)	(lb/MMBtu)	
EU014	0.71	0.04	1.79	0.11	0.00
Proposed Limits	-	0.06	-	0.20	0.03

Emission Unit	TOX Temp. (°F)	Waste Gas Flow (scfm)	Supp. Fuel Use (scfm)	Waste Gas CH ₄ (%)	Calculated Heat Input (MMBtu/hr)
EU014	1,639	1,096	106	15.1	16.48

The data presented above indicates that EU014 is in compliance with the CO, NO_x, and NMOC lb/MMBtu emission standards specified in the air permit application submitted to the Minnesota Pollution Control Agency (MPCA) on December 16, 2020.



Trace Sulfur Determination by ASTM D6228

Report Date: 16-May-22
Client Name: SCS Energy
GTI Sample Number: 222476-001
Sample Description: Flare Blower Skid 05/12/22 10:13
Date Analyzed: 13-May-22
Analyst: ES

Component Name	ppmv	Component Name	ppmv
Hydrogen Sulfide	41.3	Thiophene	
Sulfur Dioxide		2-Methylthiophene	0.08
Carbonyl Sulfide	0.06	3-Methylthiophene	
Carbon Disulfide	0.10	C2-Thiophenes	
Methyl Mercaptan	1.99		
Ethyl Mercaptan	0.07		
i-Propyl Mercaptan	0.40		
n-Propyl Mercaptan	0.05		
t-Butyl Mercaptan	0.07		
i-Butyl Mercaptan			
n-Butyl Mercaptan			
Benzothiophene			
C1-Benzothiophenes			
Thiophane			
Unknown #1 (RT 9.80)	2.62		
Dimethyl Disulfide	0.07		
Methyl Ethyl Disulfide			
Diethyl Disulfide			
Methyl n-Propyl Disulfide			
Methyl t-Butyl Disulfide			
Ethyl n-Propyl Disulfide			
Di-i-Propyl Disulfide			
Di-n-Propyl Disulfide			
i-Propyl t-Butyl Disulfide			
Di-t-Butyl Disulfide			
Dimethyl Trisulfide			

C3-Thiophenes

Dimethyl Sulfide	1.45	Unidentified Sulfur
Methyl Ethyl Sulfide		Compounds
Diethyl Sulfide		

		Total Sulfur Content	
Notes:	Component Detection	As molar ppm	48.6
	Limit:	As Grains/100 SCF:	
	0.05 ppmv of sulfur.	@ 14.696 psia, 60°F	2.88
	All blank values are below	@ 14.73 psia, 60°F	2.88
Total Unidentified:		2.83	
Total Identified:		45.6	



International Headquarters
P.O. Box 21220
Tulsa, Oklahoma 74121-1220
918/234-1800

December 21, 1993

Trinity Consultants Inc.
12801 N. Central Expressway
Suite 1200
Dallas, TX 75243

Attention: Pat Delamater
FAX No.214/385-9203

Reference: Enclosed Landfill Flare Emissions

Gentlemen:

The following emission levels can be guaranteed by the John Zink Company. These emission levels are based on field tests of operating units. If the expected values need to be guaranteed, please contact John Zink for special design considerations.

John Zink's standard landfill flares are designed to operate at 4:1 turndown (on heat release with 50% methane gas) for the emission levels between 1600 and 2000°F.

	1600°F	1800°F	2000°F
Overall Destruction Efficiency	98%	99%	99%
Nox, Lbs per MMBTU	.06	.08	.10
CO, Lbs, per MMBTU Guaranteed	.30	.20	.15
(Expected)	(.20)	(.15)	(.10)

John Zink's landfill flares can also operate at lower temperatures with the following emission levels. However, standard flares will need to operate at reduced flows to meet these emissions. Special designs are available to meet other conditions.

	1400°F	1500°F
Typical Operating Range (% of Rated Heat Release)	20% - 35%	20% - 55%
Destruction Efficiency	98%	98%
Nox, Lbs/MMBTU	.06	.06
CO, Lbs/MMBTU Guaranteed	.40	.35
(Expected)	(.30)	(.30)

If I can be of further assistance, please advise.

Sincerely,

JOHN ZINK COMPANY

Jim Franklin

JCF/dea
G:JIMFLT1221.doc
cc: JW/JZ Houston

Expected Emission Range (Design Flow)⁽¹⁾

Overall Destruction Efficiency ⁽²⁾	98%
NO _x , lb / MM BTU ⁽³⁾	0.068
CO, lb / MM BTU ⁽⁴⁾	0.31
VOC, lb /MM BTU ⁽⁵⁾	98% DRE

(1) Emissions and destruction efficiency stated are based on EPA 40 CFR 60.18 and AP-42 Supplement D.

(2) Typical sulphur containing compounds are expected to have greater than 98% oxidation efficiency.

(3) Excludes NO_x from fixed nitrogen.

(4) Excludes CO contribution present in the gas.

(5) VOC emissions will be the lesser of 98% DRE or 0.66 lbs/MMBTU.

NOTE: *Destruction efficiency, NO_x, and CO emissions shown are valid for combustion of specified gas only.
Expected emissions are not guaranteed unless expressly stated elsewhere in this proposal.*

PERFORMANCE

Expected Flue Gas

Operating Temperature	1600°F
CO ₂ Volume %	7.0
H ₂ O Volume %	8.2
N ₂ Volume %	72.6
O ₂ Volume %	12.2

Expected Flare Emission Range – (Design Flow – Combined Natural Gas Fuel and Tail Gas)⁽¹⁾

Operating Temperature	1600 °F
Overall Destruction Efficiency ⁽²⁾	98%
NO _x , lb / MMBTU ⁽³⁾	0.06
CO, lb / MMBTU ⁽⁴⁾	0.20

ZBRID Expected Emission Range (Design Flow – Natural Gas Fuel Only)⁽¹⁾

Operating Temperature	1400 – 1600 °F
Overall Destruction Efficiency ⁽²⁾	98%
NO _x , lb / MMBTU ⁽³⁾	0.15
CO, lb / MMBTU ⁽⁴⁾	0.20

(1) Expected emission rates at lower operating temperatures are available upon request.

(2) Typical sulphur containing compounds are expected to have greater than 98% oxidation efficiency.

(3) Excludes NO_x from fixed nitrogen.

(4) Excludes CO contribution present in the gas.

NOTE: Expected emissions are based on field tests of operating units and the higher heating value (HHV) of the gas. Destruction efficiency, NO_x, and CO emissions shown are valid for combustion of specified gas only. Expected emissions are not guaranteed unless expressly stated elsewhere in this proposal.



Environmental Advisory Commission Staff Report

SUBJECT: **2024 Environmental Advisory Commission Work Plan**

MEETING DATE: November 16, 2023

ITEM TYPE: Regular Agenda

CONTACT: Ally Sutherland, Environmental Specialist, 651.604.8511

PURPOSE/ACTION REQUESTED

The Environmental Advisory Commission is asked to consider recommending City Council approval of the draft 2024 EAC Work Plan attached.

BACKGROUND

The duties and functions of the City's Environmental Advisory Commission (EAC) are defined by City Code 2-4-2. These include advising the City Council on environmental issues including local landfill matters, wetland replacement applications and aircraft noise, and promoting public awareness of local environmental issues. The EAC, City Council and Staff found the first annual work plan developed in 2023 to be a helpful guiding document. Staff has prepared an updated work plan to define 2024 environmental priorities. The work plan includes goals developed by staff with feedback provided by the EAC on August 24, 2023. These goals were based on the 2023 work plan progress, regional trends, community requests, existing city environmental programming, and commissioner interests related to the duties of the commission. Staff believes the proposed work plan is achievable by December 2024 with support from the city's Environmental Specialist, EAC and technical assistance identified in the plan.

Upon Council approval of the work plan, staff and the EAC will initiate implementation of work plan action items, which will include some future requests for City Council approvals pertaining to each goal. It is expected that the time needed to support implementation of this work plan will not exceed staff time already budgeted for environmental programming within the Community Development Department. The vast majority of staff time spent on plan implementation will fall into the existing work plan of the Environmental Specialist, whose job duties include coordinating the development and implementation of sustainability projects with the Environmental Advisory Commission.

FISCAL IMPACT

This item is budget neutral for the City.

RECOMMENDATION

Staff recommend approval of the draft 2024 EAC Work Plan attached.

ATTACHMENTS

1. Draft 2024 EAC Work Plan

[DRAFT] 2024 ENVIRONMENTAL ADVISORY COMMISSION WORK PLAN

Duties and functions of the City of Inver Grove Heights Environmental Advisory Commission (EAC) are defined by City Code 2-4-2, which include reviewing and advising the City Council on environmental issues and promoting public awareness and understanding of local environmental issues. In 2024, the EAC will work on the following work plan actions with support from the city's Environmental Specialist:

- 1. Support the City's Energy Action Plan.** Extend the Xcel Energy Partners in Energy MOU through 2024 to assist with implementation of the Energy Action Plan.
- 2. Support the City's Solid Waste Abatement Program as related items arise.**
- 3. Support the new Sustainable IGH recognition program.** Sustainable IGH will be launched in Spring 2024. The EAC will help promote the program, review applications, and select awardees.
- 4. Review landfill expansion applications related to the anticipated Pine Bend Landfill proposed expansion.**
- 5. Incorporate stormwater and groundwater educational items into the EAC agendas.** Invite internal and external speakers to educate the EAC on priority topics.
- 6. Incorporate natural resource related educational items into the EAC agendas.** Invite internal and external speakers to educate the EAC on priority topics.
- 7. Process other business-as-usual items related to landfills, wetlands, airport noise, and other assigned duties of the Environmental Advisory Commission per City Code 2-4-2.**

Last updated 11/16/2023.