

June 20, 2023

Todd Peterson
Montana Dakota Utilities
Lewis & Clark Station
400 N 4th Street
Bismarck, ND 58501

Sent via email: Todd.Peterson@mdu.com

RE: Final Permit Issuance for MAQP #0691-09

Dear Mr. Peterson:

Montana Air Quality Permit (MAQP) #0691-09 is deemed final as of June 20, 2023, by DEQ. This permit is for the Lewis & Clark Station, a peaking electrical generation station. All conditions of the Decision remain the same. Enclosed is a copy of your permit with the final date indicated.

For DEQ,



Bo Wilkins
Bureau Chief
Air Quality Bureau
(406) 444-3626



Troy M Burrows
Air Quality Scientist
Air Quality Bureau
(406) 444-1452

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**Montana Department of Environmental Quality
Air, Energy & Mining Division
Air Quality Bureau**

Montana Air Quality Permit #0691-09

Montana Dakota Utilities
Lewis & Clark Station
SW 1/4 of Section 9, Township 22 N, Range 59 E in Richland County, MT
400 N 4th Street
Bismarck, ND 58501

June 20, 2023



MONTANA AIR QUALITY PERMIT

Issued To: Montana-Dakota Utilities Co.
Lewis & Clark Station
400 N 4th Street
Bismarck, ND 58501

MAQP: #0691-09
Administrative Amendment (AA)
Request Received: 5/18/2023
Department Decision on AA: 6/2/2023
Permit Final: 06/20/2023

A Montana Air Quality Permit (MAQP), with conditions, is hereby granted to Montana-Dakota Utilities Co. (Montana-Dakota) – Lewis & Clark Station, pursuant to Sections 75-2-204 and 211 of the Montana Code Annotated (MCA), as amended, and Administrative Rules of Montana (ARM) 17.8.740, *et seq.*, as amended, for the following:

SECTION I: Permitted Facilities

A. Plant Location

The Lewis & Clark Station is located in the SW 1/4 of Section 9, Township 22 N, Range 59 E in Richland County, Montana. A list of the permitted equipment is located in Section I.A of the permit analysis.

B. Current Permit Action

On May 18, 2023, DEQ received a request for an Administrative Amendment (AA) to this permit to add a diesel-fired fire pump engine, 355-horsepower, as a piece of permitted equipment. This engine has been permitted at the facility for years in the Operating Permit (Title V) and has been compliant with the applicable regulations but was not included in the MAQP. This AA will correct this oversight.

SECTION II: Conditions and Limitations

A. Emission Limitations

1. Montana-Dakota shall not cause or authorize emissions to be discharged into the outdoor atmosphere from any sources installed after November 23, 1968, that exhibit an opacity of 20% or greater averaged over 6 consecutive minutes (ARM 17.8.304).
2. Montana-Dakota shall not cause or authorize emissions to be discharged into the outdoor atmosphere from any sources installed on or before November 23, 1968, that exhibit an opacity of 40% or greater averaged over 6 consecutive minutes (ARM 17.8.304).
3. Montana-Dakota shall not cause or authorize the use of any street, road, or parking lot without taking reasonable precautions to control emissions of airborne particulate matter (ARM 17.8.308).

4. Montana-Dakota shall treat all unpaved portions of the haul roads, access roads, parking lots, or general plant area with water and/or chemical dust suppressant as necessary to maintain compliance with the reasonable precautions limitation in Section II.A.3 (ARM 17.8.749)
5. Montana-Dakota shall not operate more than two 20V34SG Wärtsilä (Wärtsilä) natural gas RICE generator sets at any given time at the Lewis & Clark Station. Each of the engines shall be of a lean burn four-stroke design, with a nominal gross output of approximately 9.3 megawatts (MW) (ARM 17.8.749).
6. Montana-Dakota shall limit gas consumption during normal operation of the two Wärtsilä natural gas RICE to a maximum of 530.8 MMscf per rolling 12-month period combined (ARM 17.8.752).
7. Emissions from the Wärtsilä RICE generator sets shall be controlled with a selective catalytic reduction (SCR) system using urea as the reaction agent, and an oxidation catalyst capable of maintaining the required emission limits in Sections II.A.8, II.A.9, II.A.10, II.A.11, and, II.A.12 during normal operation. (ARM 17.8.752).
8. Montana-Dakota shall limit Nitrogen Oxides (NO_x) emissions from each of the Wärtsilä natural gas RICE generator sets to an emissions rate equal to or less than 2.6 lb/hr during normal operation (ARM 17.8.752).
9. Montana-Dakota shall limit carbon monoxide (CO) emissions from each of the Wärtsilä natural gas RICE generator sets to an emissions rate equal to or less than 2.4 lb/hr during normal operation (ARM 17.8.752).
10. Montana-Dakota shall limit volatile organic compounds (VOC) emissions from each of the Wärtsilä natural gas RICE generator sets to an emissions rate equal to or less than 7.6 lb/hr during normal operation (ARM 17.8.752).
11. Montana-Dakota shall limit sulfur dioxide (SO₂) emissions from each of the Wärtsilä natural gas RICE generator sets to an emissions rate equal to or less than 0.37 lb/hr during normal operation (ARM 17.8.752).
12. Montana-Dakota shall limit particulate matter (PM/PM₁₀/PM_{2.5}) emissions from each of the Wärtsilä natural gas RICE generator sets to an emissions rate equal to or less than 2.27 lb/hr during normal operation (ARM 17.8.752).
13. Montana-Dakota shall limit the total start-up operation¹ (cold, warm and hot) of the two Wärtsilä natural gas RICE to a maximum of 500 hours per rolling 12-month period combined (ARM 17.8.752).

¹ See Attachment 1 for definition of the term startup operation and clarification of when the limitation and its associated recordkeeping requirements apply.

14. Montana-Dakota shall operate a natural gas line heating unit and natural gas HVAC units with a maximum combined heat input not to exceed 4.2 MMBtu/hr (ARM 17.8.749).
15. Montana-Dakota shall operate no more than one emergency diesel-fired engine of no more than 3,285 hp with an associated 1,250 gallon diesel fuel storage tank (ARM 17.8.749).
16. Montana-Dakota shall comply with all applicable standards and limitations, and the reporting, recordkeeping, and notification requirements contained in 40 CFR 60, Subpart JJJJ, *Standards of Performance for Stationary Spark Ignition Internal Combustion Engines* and 40 CFR 63, Subpart ZZZZ, *National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines*, for any applicable natural gas fueled engine (ARM 17.8.340, 40 CFR 60, Subpart JJJJ, ARM 17.8.342, and 40 CFR 63, Subpart ZZZZ).
17. Montana-Dakota shall comply with all applicable standards and limitations, and the reporting, recordkeeping, and notification requirements contained in 40 CFR 60, Subpart IIII, *Standards of Performance for Stationary Compression Ignition Internal Combustion Engines* and 40 CFR 63, Subpart ZZZZ, *National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines*, for any applicable diesel fueled engine (ARM 17.8.340, 40 CFR 60, Subpart IIII, ARM 17.8.342, and 40 CFR 63, Subpart ZZZZ).

B. Testing Requirements

1. The two Wärtsilä natural gas RICE generator sets shall initially be tested for NO_x, CO, and VOC concurrently, and PM within 180 days of the initial start-up date of the generator engine, and the results submitted to DEQ in order to demonstrate compliance with the emission limitations contained in Sections II.A.8, II.A.9, and, II.A.10 during normal operation. (ARM 17.8.105, ARM 17.8.749, and ARM 17.8.752).
2. After the initial source test, Montana-Dakota shall test each Wärtsilä natural gas RICE generator set for NO_x, CO and VOC concurrently, every 8,760 hours of operation or 3 years, whichever comes first or according to another testing/monitoring schedule as may be approved by DEQ (ARM 17.8.105, ARM 17.8.340, ARM 17.8.749, and ARM 17.8.752).
3. All compliance source tests shall conform to the requirements of the Montana Source Test Protocol and Procedures Manual (ARM 17.8.106).
4. DEQ may require further testing (ARM 17.8.105).

C. Operational Reporting Requirements

1. Montana-Dakota shall supply DEQ with annual production information for all emission points, as required by DEQ in the annual emission inventory request. The request will include, but is not limited to, all sources of

emissions identified in the emission inventory contained in the permit analysis.

Production information shall be gathered on a calendar-year basis and submitted to DEQ by the date required in the emission inventory request. Information shall be in the units required by DEQ. This information may be used to calculate operating fees, based on actual emissions from the facility, and/or to verify compliance with permit limitations (ARM 17.8.505).

2. Montana-Dakota shall notify DEQ of any construction or improvement project conducted, pursuant to ARM 17.8.745, that would include ***the addition of a new emissions unit***, change in control equipment, stack height, stack diameter, stack flow, stack gas temperature, source location, or fuel specifications, or would result in an increase in source capacity above its permitted operation. The notice must be submitted to DEQ, in writing, 10 days prior to startup or use of the proposed de minimis change, or as soon as reasonably practicable in the event of an unanticipated circumstance causing the de minimis change and must include the information requested in ARM 17.8.745(l)(d) (ARM 17.8.745).
3. Montana-Dakota shall document, by month, the gas consumption during normal operation of the two Wärtsilä natural gas RICE collected in the data acquisition system (DAS). By the 25th day of each month, Montana-Dakota shall total the hours of operation for the natural gas RICE for the previous month. The monthly information will be used to demonstrate compliance with the rolling 12-month limitation in Section II.A.9. The information for each of the previous months shall be submitted along with the annual emission inventory (ARM 17.8.749).
4. Montana-Dakota shall document, by month, the hours of start-up operations (cold, warm and hot) of the two Wärtsilä natural gas RICE collected in the DAS. By the 25th day of each month, Montana-Dakota shall total the hours of start-up operation for the natural gas RICE for the previous month. The monthly information will be used to demonstrate compliance with the rolling 12-month limitation in Section II.A.13. The information for each of the previous months shall be submitted along with the annual emission inventory (ARM 17.8.749).
5. All records compiled in accordance with this permit must be maintained by Montana-Dakota as a permanent business record for at least 5 years following the date of the measurement, must be available at the plant site for inspection by DEQ, and must be submitted to DEQ upon request (ARM 17.8.749).

SECTION III: General Conditions

- A. Inspection – Montana-Dakota shall allow DEQ’s representatives access to the source at all reasonable times for the purpose of making inspections or surveys, collecting samples, obtaining data, or observing any monitoring or testing, and otherwise conducting all necessary functions related to this permit.

- B. Waiver – The permit and the terms, conditions, and matters stated herein shall be deemed accepted if Montana-Dakota fails to appeal as indicated below.
- C. Compliance with Statutes and Regulations – Nothing in this permit shall be construed as relieving Montana-Dakota of the responsibility for complying with any applicable federal or Montana statute, rule, or standard, except as specifically provided in ARM 17.8.740, *et seq.* (ARM 17.8.756).
- D. Enforcement – Violations of limitations, conditions and requirements contained herein may constitute grounds for permit revocation, penalties, or other enforcement action as specified in Section 75-2-401, *et seq.*, MCA.
- E. Appeals – Any person or persons jointly or severally adversely affected by DEQ’s decision may request, within 15 days after DEQ renders its decision, upon affidavit setting forth the grounds therefor, a hearing before the Board of Environmental Review (Board). A hearing shall be held under the provisions of the Montana Administrative Procedures Act. The filing of a request for a hearing does not stay DEQ’s decision, unless the Board issues a stay upon receipt of a petition and a finding that a stay is appropriate under Section 75-2-211(11)(b), MCA. The issuance of a stay on a permit by the Board postpones the effective date of DEQ’s decision until conclusion of the hearing and issuance of a final decision by the Board. If a stay is not issued by the Board, DEQ’s decision on the application is final 16 days after DEQ’s decision is made.
- F. Permit Inspection – As required by ARM 17.8.755, Inspection of Permit, a copy of the air quality permit shall be made available for inspection by DEQ at the location of the source.
- G. Permit Fee – Pursuant to Section 75-2-220, MCA, failure to pay the annual operation fee by Montana-Dakota may be grounds for revocation of this permit, as required by that section and rules adopted thereunder by the Board.
- H. Duration of Permit – Construction or installation must begin, or contractual obligations entered into that would constitute substantial loss within 3 years of permit issuance and proceed with due diligence until the project is complete or the permit shall expire (ARM 17.8.762).

Attachment 1
Clarification of Start-up Operations and Conditions

For peaking units, startup emissions are a more frequent occurrence than for baseload facilities. One reason engines such as the Wärtsilä RICE are chosen as peaking units is because the RICE have a fast startup profile. The Wärtsilä RICE can achieve full load within approximately 10 minutes and an emission-controlled load within approximately 30 minutes from a cold start. However, the fast startup of the RICE results in varying exhaust flow, non-stable temperature, and a range of emission and oxygen levels. The emission control performance and emissions estimates during startup are based on Wärtsilä estimates and laboratory data.

Montana-Dakota anticipates a maximum of 1000 startups per year for the two engines combined (equating to 500 startup events under cold start conditions). During startup, emissions controls (SCR and catalytic oxidation) are not up to temperature, and the full-load emissions limits are not applicable. Wärtsilä characterizes three types of startup for the RICE: cold, warm, and hot startups. Cold startups are described as starting up when the temperature of the SCR catalyst material inside the reactor is close to ambient temperature. These cold catalyst starts are generally expected when the engine has not operated in the previous 2-3 days. To fit in the framework of emissions, a cold start would be defined as starting up following a downtime of greater than 10 hours. A warm start would be defined as starting up following a downtime of between 6 and 10 hours. A hot start would be defined as starting up following a downtime of less than 6 hours. Shorter downtime periods are associated with shorter startup periods and lower emissions.

For the purposes of determining when to apply the startup emission rates, “startup operation” is defined as that period of time from initial start (engine ignition) until applied load and associated equipment, including post-combustion controls, achieve normal operation. Normal operation is achieved when the following criteria have been met:

- (1) Exhaust gas temperature at the exit of the SCR reaches 330 degrees Celsius (°C)\626°F; and
- (2) Urea injection has commenced.

The “startup operation” definition is intended to provide a consistent basis for defining when the engine is in “startup operation” and can be generally applied to all types of startups (i.e., cold, warm, and hot). The proposed operating parameters can be directly measured and recorded using the engine’s data acquisition system (DAS).

Depending on the type of start, the emission control system will reach its full abatement efficiency within 10-30 minutes from the start. Wärtsilä has developed startup emissions for each type of startup. SO₂ emissions remain the same because they are based purely on fuel sulfur content.

To determine the emissions from startup, an average rate of emissions during startup operations was calculated assuming the same number of cold, warm, and hot startups. Multiplying that lb/hr value by the 500 hours per year in startup yields the annual startup emissions in tpy. Montana-Dakota will track the hours in startup in the DAS by recording the time from engine ignition to the exit gas temperature reaching 626°F and urea injection commencing (when normal operation begins).

Montana Air Quality Permit (MAQP) Analysis
Montana Dakota Utilities Co. – Lewis & Clark Station
MAQP #0691-08

I. Introduction/Process Description

Montana Dakota Utilities Co. (Montana-Dakota) – Lewis & Clark Station consists of two natural gas reciprocating internal combustion engine generator sets, a diesel-fired emergency generator, and gas line heater for generation of electricity. The facility is located in the SW 1/4 of Section 9, Township 22 N, Range 59 E in Richland County, Montana.

A. Permitted Equipment

MAQP #0691 applies to:

- Two 20V34SG Wärtsilä natural gas reciprocating internal combustion engine (RICE) generating sets.
- One diesel-fired emergency generator of no more than 3,285 hp with a diesel fuel storage tank of 1,250 gallons.
- An indirect fired fuel heater (gas line heater).
- One diesel-fired fire pump engine, 355-horsepower.
- Associated building heating, ventilating and air conditioning (HVAC) units.
- Two 250-gallon double-walled fuel tanks, one for diesel and the other for gasoline.

B. Source Description

The Montana-Dakota Lewis & Clark Station shall operate two Wärtsilä natural gas RICE generator sets as peaking units to provide Montana-Dakota with additional generating resources to help meet its customers peak load requirements as well as providing reliability support to the region as a result of the increased peak electric demand in the areas around the Bakken oilfields in Eastern Montana and Western North Dakota. An emergency diesel-fired generator at the facility provides backup power when the regular power is interrupted.

C. Permit History

On February 25, 2009, the Department of Environmental Quality (DEQ) issued **MAQP #0691-00**. Unit 1 and associated equipment are not required to have a MAQP as defined in ARM 17.8.743. Unit 1 was in operation before November 23, 1968, and has not undergone modification resulting in an increase of the potential to emit of more than 25 tons per year (tpy) of any regulated airborne pollutant. However, the facility is subject to mercury emission limitations under ARM 17.8.771.

MAQP #0691-00 established a mercury emissions limit and associated operating requirements for the boiler in order to comply with ARM 17.8.771.

On March 27, 2009, DEQ received a request from Montana-Dakota to amend Attachment 2 of MAQP #0691-00. Subsequent to the issuance of MAQP #0691-00, DEQ determined that additional changes to Attachment 2 would be appropriate based on further consideration and internal discussion of Montana-Dakota's previous comments, as well as DEQ's needs with respect to the mercury monitoring requirements in Attachment 2. Specifically, the permit action amended Attachment 2 to remove the requirements to report the total ounces of mercury (for both the reporting quarter and the calendar year to date) as well as the total heat input of the boiler for each month of the quarter and the calendar year to date. **MAQP #0691-01** replaced MAQP #0691-00.

On November 7, 2014, DEQ received an application to modify MAQP #0691-01 to construct, operate and maintain two 20V34SG Wärtsilä natural gas RICE generator sets (with an engine horsepower (hp) rating of approximately 12,526 hp), an indirect fired fuel heater (1.2 MMBtu/hr natural gas line heater), and associated building heating, ventilating and air condition (HVAC) units, for the purpose of generating electricity at the Lewis & Clark Station. **MAQP #0691-02** replaced MAQP #0691-01.

On May 4, 2015, DEQ received a request to administratively amend Montana-Dakota's MAQP #0691-02 to change the wording of the condition requiring that they install and operate an oxidizing agent injection (OAI) system and an activated carbon injection (ACI) system to achieve compliance with their mercury emissions limit. Montana-Dakota has had both of these systems installed and in operation since January 2010. During low load conditions, Montana-Dakota has noticed that the use of the OAI causes the ACI system to overcompensate because of increased oxidized mercury in the flue gas. Montana-Dakota utilizes an ACI sorbent that also contains an oxidizing agent so the ACI system by itself provides both oxidizing and sorbing (also referred to as adsorption) of mercury. Since the ACI system they use is also acting as an OAI system and they believe that the ACI system alone will provide for optimized mercury control during low load conditions, Montana-Dakota requested that the wording of the applicable permit condition be changed to "Montana-Dakota shall operate and maintain a mercury control system that oxidizes and sorbs emissions of mercury to achieve compliance with the mercury emissions limit." Both the dedicated ACI and OAI systems will continue to be used as necessary, such as during full load conditions. The proposed language maintains the requirement that Montana-Dakota utilize activated carbon injection as well as an oxidizing agent for mercury control and provides for some operational flexibility to optimize that control over the full range of load conditions. **MAQP #0691-03** replaced MAQP #0691-02.

On June 24, 2016, DEQ received an application to modify MAQP #0691-03 in accordance with the requirements of ARM 17.8.771(9) to establish a revised mercury emission limit. ARM 17.8.771(9) requires that no later than 10 years after issuance of a permit establishing a mercury emission limit under ARM 17.8.771(1)(b)(i), and every 10 years thereafter, the affected facility must file an application to establish a revised mercury emission limit. Montana-Dakota received their initial MAQP

establishing a mercury emissions limit for Unit 1 on February 25, 2009, and this application was intended to fulfill the ARM 17.8.771(9) requirement. The application included a review of mercury control information for other lignite units in the United States and the control system in place at Lewis & Clark Station. Montana-Dakota proposed to change the mercury emission limit from 1.5 pounds per trillion British thermal units (lb/TBtu) on a rolling 12-month average basis to 2.8 lb/TBtu on a rolling 12-month average basis.

ARM 17.8.771 and ARM 17.8.772 were established in 2006 and are collectively referred to as the Montana Mercury Rule. When these rules were crafted, mercury control technology was in the early development stages for electricity generating units and there was uncertainty that sources could reliably achieve the applicable mercury emission limits. The Montana Mercury Rule contemplated this uncertainty and included “soft landing” provisions for sources that failed to achieve the applicable mercury emission limit under normal operation, despite properly implementing a mercury control strategy that was approved according to the rule. These provisions offer an avenue to establish a less-stringent alternative mercury emission limit in association with a revised mercury control strategy. The revised mercury control strategy must demonstrate how compliance with ARM 17.8.771(1)(b) is projected to be achieved as soon as reasonably practicable but no later than 2018. The level of this alternative mercury emission limit has an upper bound as well as an expiration date of January 1, 2018. A lignite-combusting source which had been granted an alternative mercury emission limit could potentially seek a revised alternative mercury emission limit not to exceed 2.8 lb/TBtu on a rolling 12-month average basis effective after January 1, 2018 (ARM 17.8.771(8)(a)). The Montana-Dakota application sought to establish an alternative mercury emission limit at this level.

Due to the characteristics of the lignite coal, Montana-Dakota must rely on an aggressive application of the oxidizing agent calcium bromide (CaBr₂) to the coal feed prior to combustion. The CaBr₂ is highly corrosive and results in accelerated wear on the coal feeding equipment, primarily the air heater baskets, coal feeder pipes, and coal mills. Montana-Dakota must repair and replace these components on a much more frequent basis than before the mercury control system was operating. By achieving a mercury emission rate of 2.8 lb/TBtu on a rolling 12-month average basis rather than 1.5 lb/TBtu, Montana-Dakota could potentially reduce the rate of CaBr₂ application and reduce the rate of corrosion on the coal feeding equipment. The application indicated that compliance with the proposed 2.8 lb/TBtu on a rolling 12-month basis would also comply with the federal regulation 40 CFR 63, Subpart UUUUU – National Emissions Standard for Hazardous Air Pollutants: Coal and Oil-Fired Electric Utility Steam Generating Units, commonly referred to as the Mercury and Air Toxics Standard (MATS).

DEQ determined that while the Montana Mercury Rule includes provisions for establishing an alternative mercury emission limit, it is dependent on the source not being able to reliably achieve the applicable limit found in ARM 17.8.771(1)(b) under normal operation. The Lewis & Clark Station has been achieving the applicable mercury emission limit in accordance with the rule and therefore did not meet the criteria for seeking an alternative mercury emission limit. DEQ did not issue **MAQP #0691-04** and MAQP #0691-03 remained in place.

On January 2, 2019, DEQ received a complete MAQP application in accordance with the requirements of ARM 17.8.771(9) to establish a revised mercury emission limit. ARM 17.8.771(9) requires that no later than 10 years after issuance of a permit containing a mercury emission limit under ARM 17.8.771(1)(b)(i), and every 10 years thereafter, the affected facility must file an application to establish a revised mercury emission limit. Montana-Dakota received their initial MAQP establishing a mercury emissions limit for Unit 1 on February 25, 2009, and this application was intended to fulfill the ARM 17.8.771(9) requirement. Montana-Dakota proposed to retain the mercury emission limit of 1.5 lb/TBtu on a rolling 12-month basis as the revised mercury emission limit. **MAQP #0691-05** replaced MAQP #0691-03.

On July 29, 2020, DEQ received a request to modify MAQP #0691-05 to allow construction and operation of one diesel-fired emergency generator (Caterpillar Model 3561B) of no more than 3,285 hp and its associated 1,250-gallon diesel fuel storage tank. **MAQP #0691-06** replaced MAQP #0691-05.

On July 21, 2021, DEQ received a request to modify MAQP #0691-06 to remove all references to Emitting Unit #1 (coal-fired boiler), which had permanently been removed from service. The emissions associated with Emitting Unit #1 were removed from the emission inventory. **MAQP #0691-07** replaced MAQP #0691-06.

On June 28, 2022, DEQ received a de minimis notification and request for an administrative amendment (AA) to replace two existing fuel tanks (one 500-gallon diesel, one 140-gallon gasoline) with two new 250-gallon double-walled tanks (one for each respective fuel) at the Lewis & Clark Station. DEQ concurred that this change meets the criteria of a de minimis change pursuant to Administrative Rules of Montana (ARM) 17.8.745 in a July 6, 2022, letter to Montana-Dakota. As requested in the de minimis notification, DEQ is updating the MAQP to include the replacement fuel tanks in the list of equipment in the Permit Analysis. **MAQP #0691-08** replaced MAQP #0691-07.

D. Current Permit Action

On May 18, 2023, DEQ received a request for an Administrative Amendment (AA) to this permit to add a diesel-fired fire pump engine, 355-horsepower, as a piece of permitted equipment. This engine has been permitted at the facility for years in the Operating Permit (Title V) and has been compliant with the applicable regulations but was not included in the MAQP. This AA will correct this oversight. **MAQP #0691-09** replaces MAQP #0691-08.

E. Additional Information

Additional information, such as applicable rules and regulations, Best Available Control Technology (BACT)/Reasonably Available Control Technology (RACT) determinations, air quality impacts, and environmental assessments, is included in the analysis associated with each change to the permit.

II. Applicable Rules and Regulations

The following are partial explanations of some applicable rules and regulations that apply to the facility. The complete rules are stated in the ARM and are available, upon request, from DEQ. Upon request, DEQ will provide references for the location of complete copies of all applicable rules and regulations or copies where appropriate.

A. ARM 17.8, Subchapter 1 – General Provisions, including but not limited to:

1. ARM 17.8.101 Definitions. This rule includes a list of applicable definitions used in this chapter, unless indicated otherwise in a specific subchapter.
2. ARM 17.8.105 Testing Requirements. Any person or persons responsible for the emission of any air contaminant into the outdoor atmosphere shall, upon written request of DEQ, provide the facilities and necessary equipment (including instruments and sensing devices) and shall conduct tests, emission or ambient, for such periods of time as may be necessary using methods approved by DEQ.
3. ARM 17.8.106 Source Testing Protocol. The requirements of this rule apply to any emission source testing conducted by DEQ, any source or other entity as required by any rule in this chapter, or any permit or order issued pursuant to this chapter, or the provisions of the Clean Air Act of Montana, 75-2-101, *et seq.*, Montana Code Annotated (MCA).

Montana-Dakota shall comply with the requirements contained in the Montana Source Test Protocol and Procedures Manual, including, but not limited to, using the proper test methods and supplying the required reports. A copy of the Montana Source Test Protocol and Procedures Manual is available from DEQ upon request.

4. ARM 17.8.110 Malfunctions. (2) DEQ must be notified promptly by telephone whenever a malfunction occurs that can be expected to create emissions in excess of any applicable emission limitation or to continue for a period greater than 4 hours.
5. ARM 17.8.111 Circumvention. (1) No person shall cause or permit the installation or use of any device or any means that, without resulting in reduction of the total amount of air contaminant emitted, conceals, or dilutes an emission of air contaminant that would otherwise violate an air pollution control regulation. (2) No equipment that may produce emissions shall be operated or maintained in such a manner as to create a public nuisance.

B. ARM 17.8, Subchapter 2 – Ambient Air Quality, including, but not limited to the following:

1. ARM 17.8.204 Ambient Air Monitoring
2. ARM 17.8.210 Ambient Air Quality Standards for Sulfur Dioxide
3. ARM 17.8.211 Ambient Air Quality Standards for Nitrogen Dioxide
4. ARM 17.8.212 Ambient Air Quality Standards for Carbon Monoxide
5. ARM 17.8.213 Ambient Air Quality Standard for Ozone

6. ARM 17.8.214 Ambient Air Quality Standard for Hydrogen Sulfide
7. ARM 17.8.220 Ambient Air Quality Standard for Settled Particulate Matter
8. ARM 17.8.221 Ambient Air Quality Standard for Visibility
9. ARM 17.8.222 Ambient Air Quality Standard for Lead
10. ARM 17.8.223 Ambient Air Quality Standard for PM₁₀

Montana-Dakota must maintain compliance with the applicable ambient air quality standards.

- C. ARM 17.8, Subchapter 3 – Emission Standards, including, but not limited to:
1. ARM 17.8.304 Visible Air Contaminants. (1) This rule requires that no person may cause or authorize emissions to be discharged into the outdoor atmosphere from any sources installed on or before November 23, 1968, that exhibit an opacity of 40% or greater averaged over 6 consecutive minutes (ARM 17.8.304). (2) This rule requires that no person may cause or authorize emissions to be discharged into the outdoor atmosphere from any source installed after November 23, 1968, that exhibit an opacity of 20% or greater averaged over 6 consecutive minutes.
 2. ARM 17.8.308 Particulate Matter, Airborne. (1) This rule requires an opacity limitation of less than 20% for all fugitive emission sources and that reasonable precautions be taken to control emissions of airborne particulate matter. (2) Under this rule, Montana-Dakota shall not cause or authorize the use of any street, road, or parking lot without taking reasonable precautions to control emissions of airborne particulate matter.
 3. ARM 17.8.309 Particulate Matter, Fuel Burning Equipment. This rule requires that no person shall cause, allow, or permit to be discharged into the atmosphere particulate matter caused by the combustion of fuel in excess of the amount determined by this rule.
 4. ARM 17.8.310 Particulate Matter, Industrial Process. This rule requires that no person shall cause, allow, or permit to be discharged into the atmosphere particulate matter in excess of the amount set forth in this rule.
 5. ARM 17.8.322 Sulfur Oxide Emissions--Sulfur in Fuel. This rule requires that no person shall burn liquid, solid, or gaseous fuel in excess of the amount set forth in this rule.
 6. ARM 17.8.322 Sulfur Oxide Emissions--Sulfur in Fuel. (4) Commencing July 1, 1972, no person shall burn liquid or solid fuels containing sulfur in excess of 1 pound of sulfur per million Btu fired. (5) Commencing July 1, 1971, no person shall burn any gaseous fuel containing sulfur compounds in excess of 50 grains per 100 cubic feet of gaseous fuel, calculated as hydrogen sulfide at standard conditions. Montana-Dakota will utilize pipeline quality natural gas for operating its fuel burning equipment, which will meet this limitation.

7. ARM 17.8.324 Hydrocarbon Emissions--Petroleum Products. (3) No person shall load or permit the loading of gasoline into any stationary tank with a capacity of 250 gallons or more from any tank truck or trailer, except through a permanent submerged fill pipe, unless such tank is equipped with a vapor loss control device as described in (1) of this rule.

8. ARM 17.8.340 Standard of Performance for New Stationary Sources and Emission Guidelines for Existing Sources. This rule incorporates, by reference, 40 CFR Part 60, Standards of Performance for New Stationary Sources (NSPS). Montana-Dakota is considered an NSPS affected facility under 40 CFR Part 60 and is subject to the requirements of the following subparts.
 - a. 40 CFR 60, Subpart A – General Provisions apply to all equipment or facilities subject to an NSPS Subpart as listed below:

 - b. 40 CFR 60, Subpart IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines contains NSPS requirements that apply to owners or operators of emergency stationary compression ignition internal combustion engines (ICE). Manufacturers must certify their 2007 model year and later emergency stationary CI ICE with greater than 3,000 hp meet the emission standards. Because the diesel-fired emergency compression ICE was manufactured after 2007, this NSPS applies.

 - c. 40 CFR 60, Subpart JJJJ – Standards of Performance for Stationary Spark Ignition Internal Combustion Engines contains NSPS requirements that apply to owners or operators of stationary spark ignition (SI) internal combustion engines (ICE) that commence construction, modification, or reconstruction after June 12, 2006, where the stationary ICE is manufactured after July 1, 2007, for engines greater than 500 bhp, or after January 1, 2008, for engines less than 500 bhp. Because the natural gas RICE were manufactured after July 1, 2007, this NSPS does apply.

9. ARM 17.8.342 Emission Standards for Hazardous Air Pollutants for Source Categories. The source, as defined and applied in 40 CFR Part 63, shall comply with the requirements of 40 CFR Part 63, as listed below:
 - a. 40 CFR 63, Subpart A – General Provisions apply to all equipment or facilities subject to a National Emission Standards for Hazardous Air Pollutants (NESHAP)Subpart as listed below:

 - b. Subpart ZZZZ – National Emission Standards for Hazardous Air Pollutants for Reciprocating Internal Combustion Engines. This rule establishes national emission limitations and operating limitations for hazardous air pollutants (HAP) emitted from stationary RICE located at major and area sources of HAP emissions. Affected sources include any existing, new or reconstructed stationary RICE located at a major or area source of HAP emissions. A stationary RICE is new if construction of the RICE commenced on or after June 12, 2006.

Since the two four-stroke-lean burn natural gas stationary RICE generators at the Montana-Dakota Lewis & Clark station were constructed after June 12, 2006, the engines are considered new stationary RICE located at an area source of HAP emissions and must meet the requirements specified by 40 CFR 63.6590(b)(3)(c) by meeting the requirements of 40 CFR 60 subpart JJJJ.

The emergency diesel-fired generator must meet the requirements specified by 40 CFR 63.6590(c)(1) by compliance with 40 CFR 60 Subpart IIII.

The diesel-fired fire pump engine must meet the requirements of 40 CFR 63, Subpart ZZZZ.

- c. Subpart CCCCCC—National Emission Standards for Hazardous Air Pollutants for Source Category: Gasoline Dispensing Facilities. This subpart establishes national emission limitations and management practices for hazardous air pollutants (HAP) emitted from the loading of gasoline storage tanks at gasoline dispensing facilities (GDF). This subpart also establishes requirements to demonstrate compliance with the emission limitations and management practices.

A GDF is any stationary facility which dispenses gasoline into the fuel tank of a motor vehicle, motor vehicle engine, nonroad vehicle, or nonroad engine, including a nonroad vehicle or nonroad engine used solely for competition. These facilities include, but are not limited to, facilities that dispense gasoline into on- and off-road, street, or highway motor vehicles, lawn equipment, boats, test engines, landscaping equipment, generators, pumps, and other gasoline-fueled engines and equipment. The 250-gallon gasoline tank (IEU06) located at the Montana-Dakota Lewis & Clark facility is subject to this subpart.

- D. ARM 17.8, Subchapter 4 – Stack Height and Dispersion Techniques, including, but not limited to:
 - 1. ARM 17.8.401 Definitions. This rule includes a list of definitions used in this chapter, unless indicated otherwise in a specific subchapter.
 - 2. ARM 17.8.402 Requirements. Montana-Dakota must demonstrate compliance with the ambient air quality standards with a stack height that does not exceed Good Engineering Practices (GEP). The proposed height of the new or modified stack for Montana-Dakota is below the allowable 65-meter GEP stack height.
- E. ARM 17.8, Subchapter 5 – Air Quality Permit Application, Operation, and Open Burning Fees, including, but not limited to:
 - 1. ARM 17.8.504 Air Quality Permit Application Fees. This rule requires that an applicant submit an air quality permit application fee concurrent with the submittal of an air quality permit application. A permit application is incomplete until the proper application fee is paid to DEQ. A permit fee is

not required for the current permit action because the permit action is considered an administrative permit change.

2. ARM 17.8.505 Air Quality Operation Fees. An annual air quality operation fee must, as a condition of continued operation, be submitted to DEQ by each source of air contaminants holding an air quality permit (excluding an open burning permit) issued by DEQ. The air quality operation fee is based on the actual or estimated actual amount of air pollutants emitted during the previous calendar year.

An air quality operation fee is separate and distinct from an air quality permit application fee. The annual assessment and collection of the air quality operation fee, described above, shall take place on a calendar-year basis. DEQ may insert into any final permit issued after the effective date of these rules, such conditions as may be necessary to require the payment of an air quality operation fee on a calendar-year basis, including provisions that prorate the required fee amount.

F. ARM 17.8, Subchapter 7 – Permit, Construction, and Operation of Air Contaminant Sources, including, but not limited to:

1. ARM 17.8.740 Definitions. This rule is a list of applicable definitions used in this chapter, unless indicated otherwise in a specific subchapter.
2. ARM 17.8.743 Montana Air Quality Permits--When Required. This rule requires a person to obtain an air quality permit or permit modification for any facility or emitting unit upon which construction commenced, or that was installed, before November 23, 1968, when that facility or emitting unit is modified after that date and the modification increases the potential to emit (PTE) by more than 25 tons per year of any airborne pollutant, other than lead, that is regulated under this chapter. Although Montana-Dakota was in operation before November 23, 1968 with a PTE less than 25 tons per year, an MAQP application was required pursuant to ARM 17.8.771 for mercury-emitting generating units. In addition, subsequent equipment installations at the facility had a PTE increase greater than 25 tons per year of VOCs therefore, an air quality permit is required.
3. ARM 17.8.744 Montana Air Quality Permits--General Exclusions. This rule identifies the activities that are not subject to the Montana Air Quality Permit program.
4. ARM 17.8.745 Montana Air Quality Permits--Exclusion for De Minimis Changes. This rule identifies the de minimis changes at permitted facilities that do not require a permit under the Montana Air Quality Permit Program.
5. ARM 17.8.748 New or Modified Emitting Units--Permit Application Requirements. (1) This rule requires that a permit application be submitted prior to installation, modification, or use of a source. An application is not required for permit actions considered administrative amendments. (7) This rule requires that the applicant notify the public by means of legal publication in a newspaper of general circulation in the area affected by the application

for a permit. An affidavit of publication of public notice was not required for the current permit action because the permit change is considered an administrative permit change.

6. ARM 17.8.749 Conditions for Issuance or Denial of Permit. This rule requires that the permits issued by DEQ must authorize the construction and operation of the facility or emitting unit subject to the conditions in the permit and the requirements of this subchapter. This rule also requires that the permit must contain any conditions necessary to assure compliance with the Federal Clean Air Act (FCAA), the Clean Air Act of Montana, and rules adopted under those acts.
7. ARM 17.8.752 Emission Control Requirements. This rule requires a source to install the maximum air pollution control capability that is technically practicable and economically feasible, except that BACT shall be utilized. The required BACT analysis is included in Section III of this permit analysis.
8. ARM 17.8.755 Inspection of Permit. This rule requires that air quality permits shall be made available for inspection by DEQ at the location of the source.
9. ARM 17.8.756 Compliance with Other Requirements. This rule states that nothing in the permit shall be construed as relieving Montana-Dakota of the responsibility for complying with any applicable federal or Montana statute, rule, or standard, except as specifically provided in ARM 17.8.740, *et seq.*
10. ARM 17.8.759 Review of Permit Applications. This rule describes DEQ's responsibilities for processing permit applications and making permit decisions on those permit applications that do not require the preparation of an environmental impact statement.
11. ARM 17.8.762 Duration of Permit. An air quality permit shall be valid until revoked or modified, as provided in this subchapter, except that a permit issued prior to construction of a new or modified source may contain a condition providing that the permit will expire unless construction is commenced within the time specified in the permit, which in no event may be less than 1 year after the permit is issued.
12. ARM 17.8.763 Revocation of Permit. An air quality permit may be revoked upon written request of the permittee, or for violations of any requirement of the Clean Air Act of Montana, rules adopted under the Clean Air Act of Montana, the FCAA, rules adopted under the FCAA, or any applicable requirement contained in the Montana State Implementation Plan (SIP).
13. ARM 17.8.764 Administrative Amendment to Permit. An air quality permit may be amended for changes in any applicable rules and standards adopted by the Board of Environmental Review (Board) or changed conditions of operation at a source or stack that do not result in an increase of emissions as a result of those changed conditions. The owner or operator of a facility may not increase the facility's emissions beyond permit limits unless the increase

meets the criteria in ARM 17.8.745 for a de minimis change not requiring a permit, or unless the owner or operator applies for and receives another permit in accordance with ARM 17.8.748, ARM 17.8.749, ARM 17.8.752, ARM 17.8.755, and ARM 17.8.756, and with all applicable requirements in ARM Title 17, Chapter 8, Subchapters 8, 9, and 10.

14. ARM 17.8.765 Transfer of Permit. This rule states that an air quality permit may be transferred from one person to another if written notice of intent to transfer, including the names of the transferor and the transferee, is sent to DEQ.

ARM 17.8.771 Mercury Emission Standards for Mercury-Emitting Generating Units. This rule identifies mercury emission limitation requirements, mercury control strategy requirements, and application requirements for mercury-emitting generating units.

- G. ARM 17.8, Subchapter 8 – Prevention of Significant Deterioration of Air Quality, including, but not limited to:

1. ARM 17.8.801 Definitions. This rule is a list of applicable definitions used in this subchapter.
2. ARM 17.8.818 Review of Major Stationary Sources and Major Modifications--Source Applicability and Exemptions. The requirements contained in ARM 17.8.819 through ARM 17.8.827 shall apply to any major stationary source and any major modification, with respect to each pollutant subject to regulation under the FCAA that it would emit, except as this subchapter would otherwise allow.

This facility is not a major stationary source under the Prevention of Significant Deterioration regulations (ARM 17.8.818).

- H. ARM 17.8, Subchapter 12 – Operating Permit Program Applicability, including, but not limited to:

1. ARM 17.8.1201 Definitions. (23) Major Source under Section 7412 of the FCAA is defined as any source having:
 - a. PTE > 100 tons/year of any pollutant;
 - b. PTE > 10 tons/year of any one hazardous air pollutant (HAP), PTE > 25 tons/year of a combination of all HAPs, or lesser quantity as DEQ may establish by rule; or
 - c. PTE > 70 tons/year of particulate matter with an aerodynamic diameter of 10 microns or less (PM₁₀) in a serious PM₁₀ nonattainment area.
2. ARM 17.8.1204 Air Quality Operating Permit Program. (1) Title V of the FCAA amendments of 1990 requires that all sources, as defined in ARM 17.8.1204(1), obtain a Title V Operating Permit. In reviewing and issuing

MAQP #0691-08 for Montana-Dakota, the following conclusions were made:

- a. The facility's PTE is less than 100 tons/year for any pollutant.
- b. The facility's PTE is less than 10 tons/year for any one HAP and less than 25 tons/year for all HAPs.
- c. This source is not located in a serious PM₁₀ nonattainment area.
- d. This facility is subject to a current NSPS (40 CFR 60, Subparts IIII and JJJJ).
- e. This facility is subject to current NESHAP (40 CFR 63, Subpart ZZZZ and Subpart CCCCCC).
- f. This source was a Title IV affected source when the coal-fired boiler was in operation but the remaining generator units are below 25 MWe and therefore do not appear subject to Title IV.
- g. This source is not an EPA designated Title V source.

Based on these facts, DEQ determined that Montana-Dakota is no longer subject to the Title V operating permit program with the removal of Emitting Unit #1.

III. BACT Determination

A BACT determination is required for each new or modified source. Montana-Dakota shall install on the new or modified source the maximum air pollution control capability which is technically practicable and economically feasible, except that BACT shall be utilized.

A BACT determination was not required for the current permit action because the permit change is considered an administrative permit change.

IV. Emission Inventory

MAQP #0691-02 Permit Action

Project Emissions Summary									
	Description New Emitting Units	PM10 (tpy)	PM2.5 (tpy)	SOx (tpy)	NOx (tpy)	VOC (tpy)	CO (tpy)	CO2e (tpy)	HAPS (tpy)
EU10	20V34SG Wärtsilä RICE Generators #1 & #2	9.77	9.77	1.56	13.11	34.87	11.13	34967.66	7.49
IEU15	Natural Gas Line Heater	0.04	0.04	0.03	0.24	0.03	0.41	723.57	0.01
IEU16	Building Heaters\HVAC Units	0.08	0.08	0.06	1.03	0.06	0.44	1641.18	0.02
IEU17	Fugitive Road Dust	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total Emissions		9.93	9.90	1.65	14.38	34.96	11.97	37332.40	7.52

20V34SG Wärtsilä Reciprocating Internal Combustion Engines

Generator Electrical Output - Gross	9341	kW
Engines	2	
Fuel	Natural Gas	
Annual Hours of Operation**	3970	hours
Natural Gas Heat Content	1086	btu/scf
Heat Rate	7761	Btu/kWh
Heat Input	72.6	MMBtu/hr

**The RICE emissions are calculated as individual units, but the permitted limit a natural gas throughput limit of 530.8 MMScf/ rolling 12-month period combined. Calculating each RICE (they are identical) at 3790 hours per year equates to the same overall emissions.

Calculation: (72.6 MMBtu/hr / 1,086 Btu/scf) * (3,970 hr/yr-engine * 2 engines) = 530.8 MMscf/yr

Startup Type	Number of annual startups	Average Daily Startups total
3Cold Start	166.7	0.5
6-hrs down	166.7	0.5
12-hrs down	166.7	0.5
Total	500	1.4

Startup Emission Data ¹			
Emission rate Per startup type (lb/30 min)			
Pollutant	Cold Start	Warm Start	Hot Start
NOx	7.4	5.9	3.4
CO	6.5	1.8	1.3
VOC	10.2	9.4	8.6
PM2.5/PM10/PM	1.5	1.5	1.5
SO2	0.2	0.2	0.2

1. Data supplied by manufacturer

Startup Emission Data			
30 minute startup with 30 minute steady state operation			
Pollutant	Emission rate Per startup type (lb/hr)		
	Cold Start	Warm Start	Hot Start
NOx	14.80	11.80	6.80
CO	13.00	3.60	2.60
VOC	20.40	18.80	17.20
PM2.5/PM10/PM	3.00	3.00	3.00
SO2	0.37	0.37	0.37

1. NOx Startup emissions: $166.7 \text{ hr/yr} \times (14.8 \text{ lb/hr} + 11.8 \text{ lb/hr} + 6.8 \text{ lb/hr}) = 5,567.78 \text{ lb/yr}$
 $5,567.78/2000 \text{ (lb/ton)} = 2.784 \text{ tpy}$

Steady State Emissions							Startup Emissions Total ¹	Annual Emissions Incl Startup (2 engines)
Pollutant	Steady State Emission Factor	Emission Factor Units	Factor Source	Emissions lb/hr	Emissions Each tpy	Emissions Total tpy		
NOx	2.60	lb/hr	Manuf	2.6	5.2	10.3	2.78	13.1
CO	2.40	lb/hr	Manuf	2.4	4.8	9.5	1.6	11.1
VOC	7.6	lb/hr	Manuf	7.6	15.1	30.2	4.7	34.9
PM2.5/PM10/PM	0.0313	lb/MMBtu	Manuf	2.27	4.5	9.0	0.75	9.8
SO2	0.0051	lb/MMBtu	Manuf	0.37	0.7	1.5	0.0925	1.6
CO2	942.00	lb/MWh-gross	Manuf	8799.22	17466.5	34932.9	0	34932.9
CH4	0.001	kg/mmBtu	40 CFR 98 Subpart C, Table C-2	0.16	0.3	0.6	-	0.6
N2O	0.0001	kg/mmBtu	40 CFR 98 Subpart C, Table C-2	0.02	0.0	0.1	-	0.1
CO2e	applying global warming potentials to mass emission rates		40 CFR 98 Subpart A, Table A-1	8808	17483.8	34967.7	-	34967.7

Hazardous Air Pollutants (HAPs) - 20V34SG Wäertsilä Reciprocating Internal Combustion Engines

Total HAPs	7.49 TPY
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355 Horsepower Diesel Fired Fire Pump Engine

Pollutant/Parameter	Permit Limit	Compliance Demonstration Method Frequency	Reporting Requirement
40 CFR 63 Subpart ZZZZ	40 CFR 63 Subpart ZZZZ	40 CFR 63 Subpart ZZZZ	Semiannual and 40 CFR 63 Subpart ZZZZ

Natural Gas Line Heater

Max. Fuel Combustion Rate =	1.20 MMBtu/hr
Fuel Usage =	9.68 MMscf/yr
Fuel Low Heating Value=	1,086 MMBtu/MMscf
Hours of Operation =	8,760 hr/yr
Conversions:	1,086 MMBtu/MMscf
	2000 lbs/ton

Criteria Pollutants					
Pollutant	Emissions Factor	Units	Emissions Factor Reference	Emissions (lbs/hr)	Emissions (tons/yr)
PM	7.6	lb/MMscf	AP-42 Table 1.4-2 (07/98)	8.40E-03	0.037
NOx	50	lb/MMscf	AP-42 Table 1.4-1 (07/98)	5.52E-02	0.242
CO	84	lb/MMscf	AP-42 Table 1.4-1 (07/98)	9.28E-02	0.407
VOC	5.5	lb/MMscf	AP-42 Table 1.4-2 (07/98)	6.08E-03	0.027
SO2	5.71	lb/MMscf	Calculated, 2 gr/100 scf	6.31E-03	0.028
CO2	148774.0	lb/MMscf	AP-42 Table 1.4-2 (07/98)	1.64E+02	720.033
CH4	2.3	lb/MMscf	AP-42 Table 1.4-2 (07/98)	2.54E-03	0.011
N2O	2.2	lb/MMscf	AP-42 Table 1.4-2 (07/98)	2.43E-03	0.011
Total CO2e	149504.3	lb/MMscf	AP-42 Table 1.4-2 (07/98)	1.65E+02	723.568

Sample Calculation:

PM Emissions = (Emission Factor, lbs/MMscf) / (Fuel Heating Value, MMBtu/MMscf) x (Fuel Combustion Rate MMBtu/hr)

PM Emissions (lb/hr): (7.6 lb/MMscf) / (1086 MMBtu/MMscf) x (1.2 MMBtu/hr) = 0.0084 lbs/hr

PM Emissions (tons/yr): 0.0084 lbs/hr x (8760 hrs/yr) / (2000 lbs/ton) = 0.037 tons/yr

HAPs - Line Heater

Total HAPs	9.14E-03 TPY
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Building Heaters\HVAC Units

Max. Fuel Combustion Rate =	3.00 MMBtu/hr*
Fuel Usage =	21.95 MMscf/yr
Hours of Operation =	8,760 hr/yr
Fuel High Heating Value=	1,197 MMBtu/MMscf
Conversions:	454 grams/lb
	2000 lbs/ton

*Maximum combined heat input rate for building heaters associated with this project

Criteria Pollutants					
Pollutant	Emission Factor	Units	Emission Factor Reference	Emissions (lbs/hr)	Emissions Pollutant (tons/yr)
PM	7.6	lb/MMscf	AP-42 Table 1.4-2 (07/98)	1.90E-02	0.08
NOx	94	lb/MMscf	AP-42 Table 1.4-1 (07/98)	2.36E-01	1.03
CO	40	lb/MMscf	AP-42 Table 1.4-1 (07/98)	1.00E-01	0.44
VOC	5.5	lb/MMscf	AP-42 Table 1.4-2 (07/98)	1.38E-02	0.06
SO2	5.71	lb/MMscf	Calculated, 2 gr/100 scf	1.43E-02	0.06
CO2	148774.0	lb/MMscf	AP-42 Table 1.4-2 (07/98)	3.73E+02	1633.16
CH4	2.3	lb/MMscf	AP-42 Table 1.4-2 (07/98)	5.76E-03	0.03
N2O	2.2	lb/MMscf	AP-42 Table 1.4-2 (07/98)	5.51E-03	0.02
Total CO2e	149504.3	lb/MMscf	AP-42 Table 1.4-2 (07/98)	3.75E+02	1641.18

Sample Calculation:

PM Emissions = (Emission Factor, lbs/MMscf) / (Fuel Heating Value, MMBtu/MMscf) x (Fuel Combustion Rate MMBtu/hr)

PM Emissions (lb/hr) = (7.6 lb/MMscf) / (1197 MMBtu/MMscf) x (3 MMBtu/hr) = 0.019 lbs/hr

PM Emissions (tons/yr) = (0.019 lbs/hr) x (8760 hrs/yr) / (2000 lbs/ton) = 0.083 tons/yr

HAPs - HVAC Units

Total HAPs	0.02 TPY
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Fugitive Emissions: Vehicle Traffic (fugitive emissions resulting from vehicular traffic inside the plant boundaries.)

For Unpaved Roads Using: Equation (1a) of AP-42 Chapter 13.2.2 including precipitation mitigation

$$E = \left[k \left(\frac{s}{12} \right)^a \left(\frac{W}{3} \right)^b \right] \left(\frac{365-p}{365} \right)$$

E = emission factor, (lb/vmt)

k = particle size multiplier (dimensionless), TSP = 4.9, PM10 = 1.5, PM2.5 = 0.15

a = particle size multiplier (dimensionless), TSP = 0.7, PM10 = 0.9, PM2.5 = 0.9

b = particle size multiplier (dimensionless), TSP = 0.45, PM10 = 0.45, PM2.5 = 0.45

s = silt content of road surface material (%)

W = mean vehicle weight, (ton)

p = number of days of precipitation

Plant Road silt content averaging				
Industry	Road Use	No. Samples	Slit Content % (Mean)	Weighted Sums
Copper smelting	Plant Road	3	17	51
Iron and steel production	Plant Road	135	6	810
Sand and gravel processing	Plant Road	3	4.8	14
Stone quarrying and processing	Plant Road	10	10	100
Western surface coal mining	Plant Road	2	5.1	10
	totals:	153	---	986
	Weighted Average:			6.4

Source	Particle Size Multiplier			Surface Silt Content %	Empirical Constant		Mean Vehicle Weight ton/W	Empirical Constant (All) b	# of days >0.01 in. Precip p*	Emission Factors		
	PM k	PM10 k	PM2.5 k		PM a	PM2.5 a				PM (lb/VMT)	PM10 (lb/VMT)	PM2.5 (lb/VMT)
Large Trucks	4.90	1.50	0.15	6.4	0.7	0.9	27.5	0.45	90	6.5	1.7	0.17
Personal Vehicles	4.90	1.50	0.15	6.4	0.7	0.9	2.5	0.45	90	2.2	0.6	0.06

Source	Number Trips per Year _b	Distance per Trip _c	VMT	Control Efficiency _d	Emission Rates						
					PM	PM10	PM2.5	PM	PM10	PM2.5	
					(lb/hr)	(lb/hr)	(lb/hr)	(tpy)	(tpy)	(tpy)	
Large Trucks	12	0.5	6	50%	0.0	0.0	0.0	0.01	0.00	0.000	
Personal Vehicles	520	0.5	260	50%	0.0	0.0	0.0	0.14	0.04	0.004	
					Totals	0.15	0.04	0.004			

a. Mean Precipitation days >0.01in from AP-42 Figure 13.2.2-1

b. Average number of trips estimated by Montana-Dakota

c. Data from AP-42 Table 13.2.2-1. No Industry listed represents the Lewis and Clark S determined from all plant roads listed in the table.

d. Watering control efficiency assumed to be 50%

e. Round Trip distance traveled per trip measured via Google Earth aerial imagery

Sample Calculation:

Emission Factor Determination

$$4.90 * \frac{(6.4418)^{0.7} * (27.5)^{0.45} * (365 - 90)}{12 * 3 * 365} = 6.5 \text{ lb/VMT}$$

Emission Rate Calculation

$$6.47 \text{ lb/VMT} * 6 \text{ VMT/yr} * 0.005 \text{ ton/lb} * (1 - 50\%) = 0.01 \text{ tpy}$$

TOTAL HAPs - Lewis & Clark Plant with Proposed Project

Hazardous Air Pollutant	Current Uncontrolled Facility PTE	Current Controlled Facility PTE	Natural Gas RICE Generators #1 & #2	Natural Gas Line Heater	Building Heaters\ HVAC Units	Total Proposed Facility PTE
TOTAL	27.16	7.55	7.49	9.12E-03	2.07E-02	15.07

CO₂ Emission Factors (for natural gas line heater and HVAC units only)

Gas Constituent	Methane	Ethane	Propane	Iso-Butane	N-Butane	Iso-Pentane	N-Pentane	Nitrogen	CO ₂
Mol. Weight	16.04	30.07	44.10	58.12	58.12	72.15	72.15	28.01	44.01
# of Carbon Atoms	1	2	3	4	4	5	5	0	2
% Carbon	74.80%	79.82%	81.64%	82.58%	82.58%	83.16%	83.16%	0.00%	54.53%
Btu/scf	911.00	1631.00	2353.00	3094.00	3101.00	3698.00	3709.00	0.00	0.00
Mol%	68.94%	22.32%	3.83%	0.10%	0.19%	0.02%	0.01%	3.66%	0.95%
	11.06	6.71	1.69	0.06	0.11	0.01	0.01	1.02	0.42
wt%	52.44%	31.82%	8.01%	0.29%	0.51%	0.06%	0.03%	4.86%	1.98%

Calculated Net BTU 1092.06
 Average Mol Wt 21.09
 gas wt% Carbon 72.98%
 CO₂ Emission Factor, lb/MMScf 148,774 (for natural gas line heater and HVAC units only)

Emergency Diesel-fired Generators

Firing Rate: 169 gallons/hr
 23.7 MMBtu/hr
 Rating: 3,285 Hp
 Fuel Heat Content: 140,000 btu/gal
 Fuel S Content: 0.0015 percent
 Hours of Operation: 500 hr/yr

Pollutant	Emission Factor		Source	Emissions (tpy)
NO _x	6.9	g/hp-hr	NSPS Subpart III, Table 1	12.5
CO	8.5	g/hp-hr	NSPS Subpart III, Table 1	15.4
PM/PM ₁₀ /PM _{2.5}	0.4	g/hp-hr	NSPS Subpart III, Table 1	0.7
SO ₂	1.52E-03	lb/MMBtu	AP-42, Table 3.4-1	0.0
VOC	1.0	g/hp-hr	NSPS Subpart III, Table 1	1.8

Note:

PM=PM₁₀=PM_{2.5}

Sample Calculation:

NO_x Emissions = [(6.9 g/hp-hr)*(3,285 hp)*(500 hr/yr)/(453.6 g/lb)]*(0.0005 tons/lb)

SO₂ Emissions = [(1.52E-03 lb/MMBtu)*(23.7 MMBtu/hr)*(500 hr/yr)*(0.0005 tons/lb)]

Diesel Fuel Storage Tank

Capacity: 1,250 Gallons

VOC = 3.33 lb/yr, from Tanks 4.0.9d

V. Existing Air Quality

The facility is located in the SW 1/4 of Section 9, Township 22 N, Range 59 E in Richland County, Montana. The air quality of this area is classified as either Better than National Standards or unclassifiable/attainment for the National Ambient Air Quality Standards (NAAQS) for criteria pollutants.

VI. Ambient Air Impact Analysis

DEQ determined that there will be negligible impacts from this permitting action because this permitting action is for an administrative amendment.

Therefore, DEQ believes this action will not cause or contribute to a violation of any ambient air quality standard.

VII. Taking or Damaging Implication Analysis

As required by 2-10-105, MCA, DEQ conducted the following private property taking and damaging assessment.

YES	NO	
X		1. Does the action pertain to land or water management or environmental regulation affecting private real property or water rights?
	X	2. Does the action result in either a permanent or indefinite physical occupation of private property?
	X	3. Does the action deny a fundamental attribute of ownership? (ex.: right to exclude others, disposal of property)
	X	4. Does the action deprive the owner of all economically viable uses of the property?
	X	5. Does the action require a property owner to dedicate a portion of property or to grant an easement? [If no, go to (6)].
		5a. Is there a reasonable, specific connection between the government requirement and legitimate state interests?
		5b. Is the government requirement roughly proportional to the impact of the proposed use of the property?
	X	6. Does the action have a severe impact on the value of the property? (consider economic impact, investment-backed expectations, character of government action)
	X	7. Does the action damage the property by causing some physical disturbance with respect to the property in excess of that sustained by the public generally?
	X	7a. Is the impact of government action direct, peculiar, and significant?
	X	7b. Has government action resulted in the property becoming practically inaccessible, waterlogged or flooded?
	X	7c. Has government action lowered property values by more than 30% and necessitated the physical taking of adjacent property or property across a public way from the property in question?
	X	Takings or damaging implications? (Taking or damaging implications exist if YES is checked in response to question 1 and also to any one or more of the following questions: 2, 3, 4, 6, 7a, 7b, 7c; or if NO is checked in response to questions 5a or 5b; the shaded areas)

Based on this analysis, DEQ determined there are no taking or damaging implications associated with this permit action.

VIII. Environmental Assessment

An environmental assessment was not required by the Montana Environmental Policy Act because it is considered an administrative amendment.

Analysis Prepared By: Troy Burrows

Date: 6/2/2023