Alaska Department of Environmental Conservation
Air Permits Program

TECHNICAL ANALYSIS REPORT

For the terms and conditions of
Minor Permit AQ0109MSS01 Revision 2

Issued to Golden Valley Electric Association (GVEA)
For the Zehnder Facility

Preliminary – September 20, 2024

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1. INTRODUCTION

This Technical Analysis Report (TAR) provides the Alaska Department of Environmental Conservation's (Department's) basis for issuing Minor Permit AQ0109MSS01 Revision 2 to Golden Valley Electric Association (GVEA) for the Zehnder Facility. On September 8, 2017, the US Environmental Protection Agency (EPA) reclassified the Fairbanks North Star Borough (FNSB) area as a Serious Nonattainment Area (NAA) effective June 9, 2017, with regard to nonattainment of the 2006 24-hour $PM_{2.5}$ National Ambient Air Quality Standards (NAAQS).[6] According to 40 C.F.R. 51.1010, the state shall identify, adopt, and implement best available control measures (BACM) and best available control technology (BACT) on sources of direct $PM_{2.5}$ emissions and sources of emissions of $PM_{2.5}$ plan precursors (NO_x, SO_2, NH_3, VOCs) located in any Serious $PM_{2.5}$ nonattainment area. Major stationary sources[7] are subject to site-specific review for BACT. Those emission sources that are not classified as major stationary sources and subject to BACT are subject to BACM requirements.

The Zehnder Facility is a major stationary source located within the FNSB. As an alternative to BACT proposal, GVEA proposed to limit SO_2 emissions from the Zehnder Facility to less than 70 TPY in place of BACT for SO_2, which is a precursor to $PM_{2.5}$, thus avoiding classification as a major source for SO_2. The Department initially accepted this approach and required GVEA to submit a Title I application for the ORLs to be enforceable, which resulted in the original issuance of Minor Permit AQ0109MSS01 on March 15, 2021, under 18 AAC 50.508(5).

On October 20, 2023, the Department sent GVEA a notice of intent to revoke and reissue Minor Permit AQ0109MSS01 under AS 46.14.280(a)(2). With the re-issuance of Minor Permit AQ0109MSS01 Rev. 1, the Department also changed the basis for the permit issuance from 18 AAC 50.508(5) to AS 46.14.130(c)(2), because the Department found that public health or air quality effects provide a reasonable basis to regulate the stationary source. This finding is contained in the State Air Quality Control Plan adopted on November 19, 2019, with amendments adopted on November 18, 2020.

The Department is preparing a new comprehensive State Implementation Plan (SIP) to address the FNSB NAA with a new determination that SO_2 BACT limits for major stationary sources are, at this point, not required to satisfy the State's obligations under the Clean Air Act requirements for stationary sources in the NAA. This new determination is predicated on the SO_2 precursor demonstration allowed under 40 C.F.R. 51.1010(a)(2)(iii).

Given that the Department originally issued Minor Permit AQ0109MSS01 for the sole purpose of limiting the potential-to-emit of the Zehnder Facility to avoid classification as a major source of SO_2 emissions in a NAA under 40 C.F.R. 51.165 and 18 AAC 50.311, and to avoid a corresponding SO_2 BACT determination, the Department later found no underlying basis for issuing such permit. Additionally, the EPA's *Air Plan Partial Approval and Partial Disapproval; AK, Fairbanks North Star Borough; 2006 24-hour $PM_{2.5}$ Serious Area and 189(d) Plan*[8] published in the *Federal Register* on December 5, 2023 (88 *Fed. Reg.* 84658) disapproved

[6] Background and detailed information regarding Fairbanks $PM_{2.5}$ State Implementation Plan (SIP) can be found at http://dec.alaska.gov/air/anpms/communities/fbks-pm2-5-serious-sip/.

[7] Per 40 C.F.R. 51.165(a)(1)(iv)(A)(1)(vii) and (viii), a major stationary source in any serious nonattainment area for $PM_{2.5}$ is any stationary source with emissions at least 70 TPY of $PM_{2.5}$ or any individual $PM_{2.5}$ precursor. SO_2 is a precursor to $PM_{2.5}$.

[8] The EPA's Air Plan Partial Approval and Partial Disapproval; AK, Fairbanks North Star Borough; 2006 24-hour $PM_{2.5}$ Serious Area and 189(d) Plan can be found at https://www.regulations.gov/document/EPA-R10-OAR-2022-0115-0426.

the lack of monitoring, recordkeeping, and reporting (MR&R) initially proposed by the Department for $PM_{2.5}$ emissions from the Zehnder Facility.

Therefore, with the reissuance of Minor Permit AQ0109MSS01 Rev. 1, the Department has rescinded all of the ORLs related to SO_2 in Section 3 of the original permit, AQ0109MSS01, and replaced that section with the $PM_{2.5}$ requirements from Table 7.7-14 of the State Air Quality Control Plan Vol. II: III.D.7.07 - Control Strategies Chapter and from the Final Zehnder BACT Determination[9] (located on PDF pages 2,090 through 2,097 of Part 4 of Appendix III.D.7.07 Control Strategies Chapter), adopted November 19, 2019, amendments adopted November 19, 2020. In light of the EPA's disapproval comments, the Department also included additional MR&R requirements to make the SIP requirements enforceable. These additional MR&R requirements will be included in the Department's upcoming SIP submittal as an appendix to the control strategies chapter.

With the issuance of Minor Permit AQ0109MSS01 Rev. 1, the Zehnder Facility's potential SO_2 emissions reverted to the levels in place before the issuance of Minor Permit AQ0109MSS01. The Department did not consider this change to be a potential or actual emissions increase under 18 AAC 50.502(c)(3), or a potential or net emissions increase under 40 C.F.R. 52.21(b).

After on-going discussions between the Department and EPA Region 10 regarding the FNSB NAA SIP requirements, on August 23, 2024, EPA's NAA Project Lead Matt Jentgen sent the Department a letter recommending certain requirements be contained in the Department's NAA minor permit for the Zehnder Facility in order to satisfy certain Clean Air Act requirements. The EPA letter recommended that Minor Permit AQ0109MSS01 Rev. 1 be revised to contain conditions to ensure that the reporting obligations of the minor permit are independent of the operating permit. Therefore, the Department sent GVEA a notice of intent to revoke and reissue Minor Permit AQ0109MSS01 Rev. 1 under AS 46.14.280(a)(2) on August 29, 2024.

The re-issuance of Minor Permit AQ0109MSS01 Rev. 2 is under AS 46.14.130(c)(2), because the Department still finds that public health or air quality effects provide a reasonable basis to regulate the stationary source. This finding is contained in the State Air Quality Control Plan adopted on November 19, 2019, with amendments adopted on November 18, 2020. In light of the EPA's disapproval comments, the Department has also included additional MR&R requirements to make the SIP requirements enforceable. Section 3 of this minor permit will be incorporated into the Department's upcoming final SIP submittal as an appendix to the Control Strategies Chapter.

2. STATIONARY SOURCE DESCRIPTION

The Zehnder Facility is an electric utility owned and operated by GVEA and is classified under SIC code 4911 - Electric Services. The stationary source consists of two diesel fuel-fired combustion turbines (EU IDs 1 and 2) to provide power to the GVEA grid, two diesel generators (electro motive diesels (EMDs), EU IDs 3 and 4) used for emergency power and also serve as black start engines for the GVEA generation system, and two oil-fired boiler heaters (EU IDs 10 and 11). It also operates a number of small fuel oil- and natural gas-fired boilers and heaters, and fuel storage tanks. The primary fuel is stored in two 50,000-gallon aboveground storage tanks. Turbine startup fuel and EMDs primary fuel are stored in one 12,000-gallon aboveground storage tank.

[9] Background and detailed information regarding Fairbanks $PM_{2.5}$ State Implementation Plan (SIP) can be found at http://dec.alaska.gov/air/anpms/communities/fbks-pm2-5-serious-sip/.

The Zehnder Facility currently operates under Title V Operating Permit AQ0109TVP04 Rev. 1.

3. APPLICATION DESCRIPTION

The Department is processing Minor Permit AQ0109MSS01 Rev. 2 under the Department's revoke and reissuance procedures under AS 46.14.280(a)(2), and therefore no permit application was submitted by the Permittee. The Department sent GVEA a notice of intent to revoke and reissue Minor Permit AQ0109MSS01 Rev. 1 under AS 46.14.280(a)(2), on August 29, 2024.

4. CLASSIFICATION FINDINGS

The Department finds that:

1. Minor Permit AQ0109MSS01 Revision 2 is classified under AS 46.14.130(c)(2) because of a finding by the Department that public health or air quality effects provide a reasonable basis to regulate the stationary source. This finding is contained in the State Air Quality Control Plan adopted on November 19, 2019.[10]

5. EMISSIONS SUMMARY AND PERMIT APPLICABILITY

Table 5 shows the emissions summary and permit applicability with assessable emissions from the stationary source. Emission factors and detailed calculations are provided in Appendix A.

A summary of the potential to emit (PTE) and assessable PTE, as determined by the Department, is shown in Table 5 below.

Table 5 - Emissions Summary and Permit Applicability, tons per year (TPY)

Description	PTE, TPY					
	NOx	CO	$PM_{2.5}/PM_{10}$[1]	SO_2	VOC	Total[2]
Upon AQ0109MSS01 Rev. 1 issuance						
Stationary Source PTE	2,115	20.9	30.4	580	2.6	**2,748.9**
Assessable Emissions	2,115	20.9	30.4	580	2.6[3]	**2,748.9**
Upon AQ0109MSS01 Rev. 2 issuance						
Stationary Source PTE	2,115	20.9	30.4	580	2.6	**2,748.9**
Assessable Emissions	2,115	20.9	30.4	580	2.6[3]	**2,748.9**

Notes:
1 $PM_{2.5}$ and PM_{10} emissions are conservatively estimated to be equal to total PM emissions.
2 Note that with the issuance of Minor Permit AQ0109MSS01 Rev. 2, there is no change in the source's PTE.

6. REVISIONS TO PERMIT CONDITIONS

Table 6 below lists the requirements carried over from Minor Permit AQ0109MSS01 Rev. 1 into Minor Permit AQ0109MSS01 Rev. 2.

Table 6 – Comparison of AQ0109MSS01 Rev. 1 to AQ0109MSS01 Rev. 2 Conditions[11]

Permit AQ0109MSS01 Condition No.	Description of Requirement	Permit AQ0109MSS01 Rev. 1 Condition No.	How Condition was Revised
Section 2	Fee Requirements	Section 2	No change

[10] Background and detailed information regarding Fairbanks $PM_{2.5}$ State Implementation Plan (SIP) can be found at http://dec.alaska.gov/air/anpms/communities/fbks-pm2-5-serious-sip/..
[11] This table does not include all standard and general conditions.

5	SIP Requirements: $PM_{2.5}$ Limits on EU IDs 1 and 2	5	Same requirements; referenced specific condition numbers included in the permit for operating, ACC, and excess emissions/permit deviations reports, as well as general source test requirements to satisfy additional SIP inclusion conditions recommended by EPA Region 10 in a letter dated August 23, 2024.
6	SIP Requirements: $PM_{2.5}$ Limits on EU IDs 3 and 4	6	Referenced specific condition numbers included in the permit for operating and excess emissions/permit deviations reports. Replaced references to NESHAP Subpart ZZZZ requirements in the operating permit with good combustion practices in Condition 6.1a and non-emergency engine hour limits in Conditions 6.1b and associated MR&R to ensure that the reporting obligations of the minor permit are independent of the operating permit. These changes were made to satisfy additional SIP inclusion conditions recommended by EPA Region 10 in a letter dated August 23, 2024.
7	SIP Requirements: $PM_{2.5}$ Limits on EU IDs 10 and 11	7	Corrected the emissions limit in Table 4 for boiler EU IDs 10 and 11 from 0.012 lb/MMBtu, which was used in the previous SIP, to 0.016 lb/MMBtu for the upcoming SIP submittal because these boilers are considered “commercial” under EPA’s AP-42 Table 1.3-7 and not “industrial” under Table 1.3-6. Referenced specific condition included in the permit for excess emissions/permit deviations reports. Replaced references to NESHAP Subpart JJJJJJ requirements in the operating permit with good combustion practices in Condition 7.1a and associated MR&R to ensure that the reporting obligations of the minor permit are independent of the operating permit. These changes were made to satisfy additional SIP inclusion conditions recommended by EPA Region 10 in a letter dated August 23, 2024.
None	SPC III – Excess Emissions and Permit Deviations	10	Included SPC III – Excess Emissions and Permit Deviations, as new Condition 10 to add reporting requirements into the minor permit to satisfy additional SIP inclusion conditions recommended by EPA Region 10 in a letter dated August 23, 2024.
None	SPC VII – Operating Reports	11	Included SPC VII – Operating Reports, as new Condition 11to add reporting requirements into the minor permit to satisfy additional SIP inclusion conditions

			recommended by EPA Region 10 in a letter dated August 23, 2024.
None	Annual Compliance Certification	12	Included the annual compliance certification condition from the Department's Title V template as new Condition 12 to add reporting requirements into the minor permit to satisfy additional SIP inclusion conditions recommended by EPA Region 10 in a letter dated August 23, 2024
None	General Source Test Requirements	Section 6	Included the general source test requirement conditions from the Department's Title V template as new Conditions 19 through 26 to add source testing requirements into the minor permit to satisfy additional SIP inclusion conditions recommended by EPA Region 10 in a letter dated August 23, 2024.
None	Notification Form	Section 8	Included the notification form that goes along with SPC III – Excess Emissions and Permit Deviations to add reporting requirements into the minor permit to satisfy additional SIP inclusion conditions recommended by EPA Region 10 in a letter dated August 23, 2024.

7. PERMIT ADMINISTRATION

Minor Permit AQ0109MSS01 Rev. 2 contradicts conditions in the Title V Operating Permit AQ0109TVP04 Rev. 1 issued to the Zehnder Facility. Therefore, GVEA may not operate under the terms and conditions of Minor Permit AQ0109MSS01 Rev. 2 until Operating Permit AQ0109TVP04 Rev. 2 becomes effective.

8. PERMIT CONDITIONS

The bases for the standard and general conditions imposed in Minor Permit AQ0109MSS01 Rev. 2 are described below.

Cover Page

18 AAC 50.544(a)(1) requires the Department to identify the stationary source, Permittee, and contact information. The Department provided this information on the cover page of the permit. This permit section will be included in the Department's upcoming SIP submittal as an additional appendix to the control strategies chapter.

Section 1: Emissions Unit Inventory

The EUs authorized and/or restricted by this permit are listed in Table 1 of the permit. Unless otherwise noted in the permit, the information in Table 1 is for identification purposes only. Condition 1 is a general requirement to comply with AS 46.14 and 18 AAC 50 when installing a replacement EU. This permit section will be included in the Department's upcoming SIP submittal as an additional appendix to the control strategies chapter.

Section 2: Fee Requirements

18 AAC 50.544(a)(2) requires the Department to include a requirement to pay fees in accordance with 18 AAC 50.400 – 18 AAC 50.499 in each minor permit issued under 18 AAC 50.542. The Department used the Standard Permit Condition (SPC) I language for Minor Permit AQ0109MSS01 Revision 2. However, the Department modified the condition by removing the requirement to only pay for emissions of each air pollutant in quantities of 10 tons per year or greater, to be consistent with the updates to the emission fees in 18 AAC 50.410(a) that went into effect September 7, 2022. The Department is in the process of incorporating these updates into SPC I.

Section 3: State Implementation Plan (SIP) Requirements

Conditions 5 through 7 provide enforceable terms and conditions intended to satisfy the requirements from Table 7.7-14 of the State Air Quality Control Plan Vol II: III.D.7.7 Control Strategies document and from the Final Zehnder BACT Determination[12] (located on PDF pages 2,090 through 2,097 of Part 4 of Appendix III.D.7.07 Control Strategies Chapter), adopted November 19, 2019, amendments adopted November 19, 2020. Note that the emissions limit in Table 4 for boiler EU IDs 10 and 11 has been corrected from 0.012 lb/MMBtu, which was used in the previous SIP, to 0.016 lb/MMBtu in the upcoming SIP submittal because these boilers are considered "commercial" under EPA's AP-42 Table 1.3-7 and not "industrial" under Table 1.3-6. In light of the EPA's disapproval comments, the Department has also included additional MR&R requirements to make the SIP requirements enforceable. This permit section will be included in the Department's upcoming SIP submittal as an additional appendix to the control strategies chapter.

Condition 5 and Table 2 provide the $PM_{2.5}$ BACT control and emissions limit identified in the SIP for the simple cycle gas turbine EU IDs 1 and 2. This includes an emissions limit of 0.012 lb/MMBtu over a 3-hour averaging period, the requirement to combust only low ash (distillate) fuel, and the requirement to maintain good combustion practices at all times the EUs are in operation. The Department included a one-time source test on at least one of EU IDs 1 and 2 in Condition 5.1a to demonstrate compliance with the $PM_{2.5}$ emissions limit in Table 2, as well as, to establish combustion settings that demonstrate compliance with the BACT $PM_{2.5}$ emissions limit. The combustion settings parameters would include, but not limited to, average CO and O_2 concentrations in the flue gas, that may be used as compliance bases for good combustion practices by comparing results of the portable handheld combustion analyzer for CO and O_2 concentrations in the flue gas during normal operations. Condition 5.1b requires the Permittee to report the compliance status with the $PM_{2.5}$ emissions limit in Table 2 with each annual compliance certification described in Condition 12. Condition 5.1c includes MR&R requirements to demonstrate compliance with the requirement to combust only low ash (distillate) fuel. Condition 5.1d requires the Permittee to perform regular maintenance according to the manufacturer's or the operator's maintenance procedures, keep records of the maintenance performed, and report a summary of the maintenance performed. The Department included additional reporting in Condition 5.1d beyond Standard Permit Condition 6 – Good Air pollution Control, in order to satisfy additional SIP requirements requested by EPA. In addition, the Permittee is also required to operate the EUs consistent with manufacturer's

[12] Background and detailed information regarding Fairbanks $PM_{2.5}$ State Implementation Plan (SIP) can be found at http://dec.alaska.gov/air/anpms/communities/fbks-pm2-5-serious-sip/.

recommended combustion settings (such as maximum CO and excess air in flue gas) or those established during the source test conducted to demonstrate compliance with the BACT emissions limit. Under the good combustion practices requirements of Condition 5.1d, the Department included a requirement to check and report the CO and O_2 concentrations in the flue gas using a portable handheld combustion analyzer, as CO and O_2 concentrations are key operational parameters set during combustion equipment tuning that affects PM emissions. The condition requires CO and O_2 monitoring frequency of at least once during or within 30 days after the end of a calendar quarter that the EU operates. The 30-day allowance after the end of a calendar quarter is provided to address the Permittee's concern when an emergency operation at the end of a calendar quarter may occur and timely compliance could present a challenge. Note that for intermittently used EUs, it is not the Department's intent to require the Permittee to start up an EU just to perform CO and O_2 monitoring.

Condition 6 and Table 3 provide the $PM_{2.5}$ BACT control and emissions limit identified in the SIP for the emergency diesel engine generators EU IDs 3 and 4. This includes an emissions limit of 0.32 g/hp-hr over a 3-hour averaging period, the requirement to limit each engine to no more than 100 hours per year of non-emergency operations, and the requirement to maintain good combustion practices at all times the EUs are in operation. In order to satisfy additional SIP inclusion conditions recommended by EPA Region 10 in a letter dated August 23, 2024, the Department included new good combustion practices in Condition 6.1a and non-emergency engine hour limits Conditions 6.1b and associated MR&R to ensure that the reporting obligations of the minor permit are independent of the operating permit.

Condition 7 and Table 4 provide the $PM_{2.5}$ BACT control and emissions limit identified in the SIP for the diesel-fired boilers EU IDs 10 and 11. This includes an emissions limit of 0.016 lb/MMBtu over a 3-hour averaging period, and the requirement to maintain good combustion practices at all times the EUs are in operation. In order to satisfy additional SIP inclusion conditions recommended by EPA Region 10 in a letter dated August 23, 2024, the Department included new good combustion practices in Condition 7.1a and associated MR&R to ensure that the reporting obligations of the minor permit are independent of the operating permit.

Section 4: General Recordkeeping, Reporting, and Certification Requirements

Condition 8, Certification

18 AAC 50.205 requires the Permittee to certify any permit application, report, affirmation, or compliance certification submitted to the Department. The Department used the language in Standard Permit Condition (SPC) XVII. This requirement is reiterated as a standard permit condition in 18 AAC 50.345(j).

Condition 9 Submittals

Condition 9 clarifies where the Permittee should send their reports, certifications, and other submittals required by the permit. The Department used the language in SPC XVII. The Department included this condition from a practical perspective rather than a regulatory obligation.

Condition 10 and Section 8, Excess Emission and Permit Deviation Reports and Notification Form

This condition reiterates the notification requirements in 18 AAC 50.235(a)(2) and 18 AAC 50.240 regarding unavoidable emergencies, malfunctions, and excess emissions.

Also, the Permittee is required to notify the Department when emissions or operations deviate from the requirements of the permit. The Department used the language in SPCs III and IV, except as follows:

The Department has modified Condition 10.3 and the Notification Form in Section 8 to reflect the electronic submittal requirements in 18 AAC 50.270 using the Department's online form to submit notification of excess emissions and permit deviations beginning September 7, 2023. The electronic notification form is found at the Division of Air Quality's Air Online Services (AOS) system webpage http://dec.alaska.gov/applications/air/airtoolsweb using the Permittee Portal option. Submittal through other methods may be allowed only upon written Department approval. Beyond as noted, the Department has determined that the standard conditions adequately meet the requirements of 40 C.F.R. 71.6(a)(3).

The Department included Condition 10 in order to add reporting requirements into the minor permit to satisfy additional SIP inclusion conditions recommended by EPA Region 10 in a letter dated August 23, 2024.

Condition 11, Operating Reports

The Department mostly used the SPC VII language for the operating report condition. However, the Department modified or eliminated the Title V only aspects in order to make the language applicable for a minor permit. The Department included Condition 11 in order to add reporting requirements into the minor permit to satisfy additional SIP inclusion conditions recommended by EPA Region 10 in a letter dated August 23, 2024.

Condition 12, Annual Compliance Certification

This condition specifies the periodic compliance certification requirements and specifies a due date for the annual compliance certification. No format is specified. The Permittee may provide one report certifying compliance with each permit term or condition for each of the effective permits during the certification period, or may choose to provide two reports: one certifying compliance with permit terms and conditions from January 1 until the date of expiration of the old permit, and a second report certifying compliance with terms and conditions in effect from the effective date of the renewal permit until December 31.

The Permittee is required to submit to the Department an annual compliance certification report. The Permittee may submit the required report electronically at their discretion.

The Department included Condition 12 in order to add reporting requirements into the minor permit to satisfy additional SIP inclusion conditions recommended by EPA Region 10 in a letter dated August 23, 2024.

Section 5: Standard Permit Conditions

Conditions 13 – 18, Standard Permit Conditions

18 AAC 50.544(a)(5) requires each minor permit issued under 18 AAC 50.542 to contain the standard permit conditions in 18 AAC 50.345, as applicable. 18 AAC 50.345(a) clarifies that subparts (c)(1) and (2), and (d) through (o), may be applicable for a minor permit.

The Department included all of the required minor permit-related standard conditions of 18 AAC 50.345 in Minor Permit AQ0109MSS01 Revision 2. The Department incorporated these standard conditions as follows:

- 18 AAC 50.345(c)(1) and (2) is incorporated as Condition 13 of Section 5 (Standard Permit Conditions);
- 18 AAC 50.345(d) through (h) is incorporated as Conditions 14 through 18, respectively, of Section 5 (Standard Permit Conditions);

Section 6: General Source Test Requirements

AS 46.14.180 states that monitoring requirements must be, "based on test methods, analytical procedures, and statistical conventions approved by the federal administrator or the department or otherwise generally accepted as scientifically competent." The Department incorporated this requirement as follows:

- Condition 20 requires the Permittee to conduct their source tests under conditions that reflects the actual discharge to ambient air; and
- Condition 21 requires the Permittee to use specific EPA reference methods when conducting a source test.

Section 6 also includes the previously discussed standard conditions for source testing.

The Department included Section 6 in order to add source testing requirements into the minor permit to satisfy additional SIP inclusion conditions recommended by EPA Region 10 in a letter dated August 23, 2024.

Appendix A. Emissions Calculations

Table A-1 presents details of the EUs, their characteristics, and emissions. Potential emissions are estimated using maximum annual operation for all fuel burning equipment as defined in 18 AAC 50.990(39) subject to any operating limits. For comparison, this table also includes previous PTE values for SO_2 based on the owner requested limits imposed in Minor Permit AQ0109MSS01 that are now rescinded under this Revision 1 to Minor Permit AQ0109MSS01. Note that there is no change in the PTE from with the issuance of AQ0109MSS01 Rev. 2.

Table A-1 –Emissions Summary, in Tons Per Year (TPY)

EU ID	Description	Power Rate / Capacity	Fuel Rate	NOx		CO		PM/ $PM_{2.5}$/PM_{10}[3]		SO_2 (6/9/2021, AQ0109MSS01)[4]		SO_2 (9/2/2022, AQ0109MSS01)[4]		SO_2 (Rev. 1 Issuance)[4]		VOC	
			gal/hr	EF	TPY	EF	TPY	EF	TPY	EF	TPY	EF	TPY	EF	TPY	EF	TPY
Significant EUs																	
1	GE Frame 5 MS 5001-M, Diesel	268 MMBtu/ hr	1,956	8.8 E-01 lb/ MMBtu[2]	1,033	3.3 E-03 lb/ MMBtu[2]	3.87	0.012 lb/ MMBtu[2]	14.1	0.142 lb/gal[5]	64	0.0142 lb/gal[7]	64	0.142 lb/gal[5]	580 stationary source-wide	4.1 E-04 lb/ MMBtu[2]	0.481
2	GE Frame 5 MS 5001-M, Diesel	268 MMBtu/ hr	1,956		1,033		3.87		14.1								0.481
3[1]	GM EMD, Diesel	28 MMBtu/ hr	204	3.2 lb/ MMBtu[9]	22.4	0.85 lb/ MMBtu[9]	5.95	0.1 lb/ MMBtu[9]	0.700	0.142 lb/gal[5]		0.0142 lb/gal[7]		0.142 lb/gal[5]		0.09 lb/ MMBtu[9]	0.630
4[1]	GM EMD, Diesel	28 MMBtu/ hr	204		22.4		5.95		0.700								0.630
10	Weil Mclain H-688 Boiler, HO/Diesel	1.7 MMBtu/ hr	11.8	0.020 lb/gal[10]	1.03	0.005 lb/gal[10]	0.258	0.00238 lb/gal[10]	0.123	0.071 lb/gal[6]		0.0142 lb/gal[7]		0.071 lb/gal[6]		3.4 E-04 lb/gal[10]	0.018
11	Weil Mclain H-688 Boiler, HO/Diesel	1.7 MMBtu/ hr	11.8		1.03		0.258		0.123								0.018
Significant EUs PTE Total					**2,113**		**20.2**		**29.8**		**64**		**64**				**2.26**

EU ID	Description	Power Rate / Capacity	Fuel Rate	NOx		CO		PM/ $PM_{2.5}$/PM_{10}[3]		SO_2 (6/9/2021, AQ0109MSS01)[4]		SO_2 (9/2/2022, AQ0109MSS01)[4]		SO_2 (Rev. 1 Issuance)[4]		VOC	
			gal/hr	EF	TPY	EF	TPY	EF	TPY	EF	TPY	EF	TPY	EF	TPY	EF	TPY
Insignificant EUs																	
8 & 9	2 Burnham Boilers, HO/Diesel	0.44 MMBtu/ hr each	3.2	0.018 lb/gal[10]	0.504	0.005 lb/gal[11]	0.140	0.0017 lb/gal[10]	0.048	0.071 lb/gal[6]	2.00	0.0142 lb/gal[7]	0.400	0.071 lb/gal[6]	580 stationary source-wide[15]	7.13 E-04 lb/gal[10]	0.020
N/A	2 Burnham Boilers - FE Building, NG	0.61 MMBtu/ hr each	0.59 Mscf/ hr	100 lb/ MMscf[11]	0.520	84 lb/ MMscf[12]	0.438	7.6 lb/ MMscf[11]	0.040	0.6 lb/ MMscf[12]	0.003	0.6 lb/ MMscf[11]	0.003	0.6 lb/ MMscf[12]		5.5 lb/ MMscf[10]	0.029
N/A	Energy Logic Heater (EL-340H), Waste Oil	0.28 MMBtu/ hr	2.25	0.011 lb/gal[12]	0.108	0.0017 lb/gal[13]	0.017	0.064A lb/gal[12]	0.147	0.071 lb/gal[6]	0.700	0.071 lb/gal[8]	0.636	0.071 lb/gal[6]		0.001 lb/gal[10]	0.010
N/A	Energy Logic Heater (EL-350H), Waste Oil	0.35 MMBtu/ hr	2.5	0.011 lb/gal[12]	0.116	0.0017 lb/gal[13]	0.018	0.064A lb/gal[12]	7.0 E-04	0.071 lb/gal[6]	0.746	0.071 lb/gal[8]	0.794	0.071 lb/gal[6]		0.001 lb/gal[11]	0.011
N/A	2 Energy Logic Heaters (EL-200H), Waste Oil	0.20 MMBtu/ hr each	1.4	0.011 lb/gal[12]	0.134	0.0017 lb/gal[13]	0.020	0.064A lb/gal[12, 13]	0.183	0.071 lb/gal[6]	0.871	0.071 lb/gal[8]	0.908	0.071 lb/gal[6]		0.001 lb/gal[11]	0.013
N/A	Lean Bum Inc. Overhead Shop Heater, Waste Oil	0.28 MMBtu/ hr	2.0	0.011 lb/gal[12]	0.096	0.0017 lb/gal[13]	0.015	0.064A lb/gal[12]	0.131	0.071 lb/gal[6]	0.622	0.071 lb/gal[8]	0.636	0.071 lb/gal[6]		0.001 lb/gal[11]	0.009
N/A	Metzger Machine Corp. Boiler, Diesel	0.12 MMBtu/ hr	1.0	0.018 lb/gal[12]	0.079	0.005 lb/gal[11]	0.022	0.0033 lb/ga[10]	0.014	0.071 lb/gal[6]	0.311	0.0142 lb/gal[7]	0.062	0.071 lb/gal[6]		7.13 E-04 lb/gal[10]	0.003
5	C-1 No. 1 Diesel Tank	12,000 gallons	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		AP 42 Sec. 7.1 Equations	0.002[14]
6 & 7	2 No. 2 Diesel Tanks (C-2 & C-3)	50,000 gallons each	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			0.018[14]

EU ID	Description	Power Rate / Capacity	Fuel Rate	NOx		CO		PM/ $PM_{2.5}$/PM_{10}[3]		SO_2 (6/9/2021, AQ0109MSS01)[4]		SO_2 (9/2/2022, AQ0109MSS01)[4]		SO_2 (Rev. 1 Issuance)[4]		VOC	
			gal/hr	EF	TPY	EF	TPY	EF	TPY	EF	TPY	EF	TPY	EF	TPY	EF	TPY
N/A	2 EMD Unit 5 Diesel Day Tanks (C-7 & C-8)	275 gallons each	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			1.01 E-4[14]
N/A	2 Fleet Fueling Tank, C-13 (Diesel) & C-14 (Gasoline)	3,000 gallons each	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A			0.259 [14]
N/A	2 Vehicle Shop Used Oil Tank, C-15 (Addition) and C-33 (Old)	250 gallons each	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		N/A	0
N/A	C-31 Vehicle Shop Addition Heating Oil Tank	8,000 gallons	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		N/A	0
N/A	C-29 Ner1and Building Heating Oil Tank	1,000 gallons	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		N/A	0
N/A	C-32 Heating Oil Day Tank	150 gallons	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A		N/A	0
Insignificant EUs PTE Total					**1.56**		**0.670**		**0. 564**		**5.24**		**3.40**				**0.37**
Stationary Source-wide Total					**2,115**		**20.9**		**30.4**		**69.2**		**67.4**		**580[15]**		**2.6**

Notes:

Conversion Factors:

1 ton = 2,000 pounds (lb) 1 MW = 1kW 1 kW = 1.341 hp

Natural Gas (NG) High Heating Value (HHV) = 1,020 Btu/scf (from AP 42, Table 3.1-1, Footnote c)

Diesel Fuel HHV = 137,000 Btu/gal (from AP 42, Appendix A, Page A-5)

Density of Diesel = 7.1 lb/gal (from AP 42, Table 3.4-1, Footnote a)

1 Potential emissions for the emergency diesel generators EU IDs 3 and 4 assume 500 operating hours per year, in accordance with EPA 1995 Seitz guidance memo.

2 For the diesel-fired turbines, EU IDs 1 and 2, emission factors (EFs) are based on EPA AP-42 Table 3.1-1 (for NO_x and CO) and Table 3.1-2a (for PM(total) and VOC).

3 EFs of $PM_{2.5}$ and PM_{10}, which are part of PM, are conservatively assumed to equal total PM (PM filterable + PM condensable).

4 EFs shown for SO_2 for all diesel fuel-fired emissions units are from mass balance calculations using the corresponding fuel sulfur percent content limit by weight ($wt\%S_{fuel}$), using the following conversion factors:

a. Molar (mol) mass ratio is 32 lb S/mol: 64 lb SO_2/mol; Stoichiometry: 1 mol S = 2 mol SO_2
b. Diesel: Density = 7.1 lb/gal; High heat value (HHV) = 137,000 Btu/gal [AP-42, Appendix A]

SO_2 Emission Factor, lb/gal = (Molar mass ratio, 2 lb SO_2:1 lb S) x (weight % S in fuel) x (density of fuel, lb/gal) / 100%
= 2 lb SO_2/lb S x ($wt\%S_{fuel}$/100) S x 7.1 lb/gal = 0.142($wt\%S_{fuel}$)S lb SO_2/gal

5 For EU IDs 1 – 4, the calculated SO_2 EF from June 9, 2021 through September 1, 2022 and upon issuance of AQ0109MSS01 Rev. 1, is based on the EUs permit limit of 1.0 $wt\%S_{fuel}$ for SO_2 from Permit to Operate No.l 9331-AA006 Amendment 4, which is incorporated into the AQ0109TVP04 as Condition 13. This was also the limit in effect prior to the issuance of AQ0109MSS01. Note that there is no change in the PTE from with the issuance of AQ0109MSS01 Rev. 2.
SO_2 EF = 0.142(1) lb SO_2/gal = 0.142 lb SO_2/gal

6 For all other liquid fuel-burning EUs, except EU IDs 1 – 4, calculated SO_2 EF using the default 0.5 $wt\%S_{fuel}$ compliance equivalent for the 500 ppm SO_2 state standard through September 1, 2022, and upon issuance of AQ0109MSS01 Rev. 1: SO_2 EF = 0.142(0.5) lb SO_2/gal = 0.071 lb SO_2/gal.

7 For all liquid fuel-burning EUs, except for the waste oil-fired heaters, calculated SO_2 EF using the BACM limit of 0.10 $wt\%S_{fuel}$ (1,000 ppmw) for SO_2 PTE from September 1, 2022 until the permit issuance of AQ0109MSS01 Rev. 1: SO_2 EF = 0.142(0.10) lb SO_2/gal = 0.0142 lb SO_2/gal.

8 For all waste oil-fired heaters, calculated SO_2 EF using the default 0.5 $wt\%S_{fuel}$ for SO_2 PTE. The waste oil is generated onsite and is not purchased, so is not subject to the BACM fuel sulfur content requirement.

9 For the diesel fuel-fired emergency generators, EU IDs 3 and 4, EFs for NO_x, CO, PM, and VOCs are based on EPA AP-42, Table 3.4-1. VOCs are assumed nonmethane (91% of the TOC emission factor per note f to AP-42, Table 3.4-1).

10 For all diesel fuel-fired boilers, EFs for NOx, CO, PM, and VOCs are based on the appropriate EFs specified in EPA AP-42, Section 1.3, as follows: Table 1.3-1 for NOx and CO; Table 1.3-3 for VOC; Tables 1.3-2 and 1.3-7 for PM for boilers > 100 MMBtu/hr and Tables 1.3-1 and 1.3-2 for boilers < 100 MMBtu/hr.

11 For the NG-fired boilers, EFs for NO_x, CO, PM, SO_2, and VOCs are based on the appropriate EFs specified in EPA AP-42, Section 1.4, as follows: Table 1.4-1 for NO_x and CO and Table 1.4-2 for PM, SO_2, and VOC.

12 For the waste oil-fired heaters, EFs for NO_x, CO, PM, and VOCs are based on the appropriate EFs specified in EPA AP-42, Section 1.11, as follows: Table 1.11-2 for NO_x and CO and Tables 1.3-1 and 1.11-3 for VOC, and Table 1.11-1 for PM where A stands for weight % ash in fuel (measured at 0.233 % for EL-340H and Lean Burn, and 0.001% for EL-350H determined through testing conducted in December 2016).

13 For the two waste oil-fired heaters, Energy Logic Heaters (EL-200H), there is no weight % ash determined for the units; assumed the higher 0.233% to be conservative.

14 VOC emissions calculations are based on AP-42 EFs, as provided in the renewal application for Title V permit AQ0109TVP04.

15 The stationary source-wide 580 TPY SO_2 PTE is an ORL that originated from Permit to Operate 9331-AA006 and carried over to the Title V permit to

avoid stationary source's classification as a PSD major modification and to protect ambient air quality.