Technical Analysis Report

For the terms and conditions of
Minor Permit AQ0236MSS03

Issued to U.S. Army Garrison

For the USAG Alaska Fort Wainwright

Alaska Department of Environmental Conservation
Air Permits Program

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Preliminary – May 7, 2021

1. INTRODUCTION

This Technical Analysis Report (TAR) provides the Alaska Department of Environmental Conservation's (Department's) basis for issuing Minor Permit AQ0236MSS03 to U.S. Army Garrison for the USAG Alaska Fort Wainwright. requests the permit under AS 46.14.130(c)(2) because the Department 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.[1]

The designation of the Fairbanks North Star Borough (FNSB) nonattainment area as "Serious" with regard to nonattainment of the 2006 24-hour PM-2.5 National Ambient Air Quality Standards (NAAQS) was published in Federal Register Vol. 82, No. 89, May 10, 2017, pages 21703-21706. CAA section 189(b)(1)(B) and 40 C.F.R. § 51.1010 describe the Serious area attainment plan requirements for best available control measures (BACM). Large stationary sources are a subgroup of emissions sources that are given special attention in the required BACM analysis. Per federal requirement, the Department evaluated all point sources with emissions greater than 70 tpy of PM-2.5 or for any individual PM-2.5 precursor (NOx, SO_2, NH_3, VOCs). The conditions contained in this permit are those required in Table 7.7-11 of the Amendments to: State Air Quality Control Plan Vol II: III.D.7.7 Control Strategies document; adopted November 19, 2019.[1]

2. STATIONARY SOURCE DESCRIPTION

Fort Wainwright is federally owned facility managed by the U.S. Army Garrison Alaska. It is located on the eastern edge of Fairbanks, within the North Star Borough, in interior Alaska. The installation includes the main post, a range complex, and two maneuver areas. The emission units (EUs) covered by this permit are owned and operated by the permittee, U.S. Army Garrison Alaska (FWA). The EUs located within the military installation include units such as boilers and generators that are owned and operated by the FWA. The FWA Central Heating and Power Plant (CHPP), also located within the installation footprint, is owned and operated by a private utility company, Doyon Utilities, LLC (DU). The two entities, DU and FWA, comprise a single stationary source operating under two permits.

3. APPLICATION DESCRIPTION

FWA submitted their application on June 8, 2020 to comply with the State Air Quality Control Plan adopted on November 19, 2019. The requested changes are as follows:

- To modify Condition 1 of AQ0236MSS02. FWA requests that ADEC adds the emission unit no. 23, 24, 26 through 40, 50 through 65, unpaved roads, and paved roads listed in the current Title V AQ0236TVP03 Revision 3. FWA also, requests that ADEC adds emergency generators at buildings 2121 and 3007 to the emission unit inventory.

- The addition of the emission units mentioned above to the Title I permit AQ0236MSS02 will not trigger 18 AAC 50.502(c)(3) as these emission units have been part of the same

[1] 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/.

stationary source, but were operated by Doyon Utilities under a separate Title I permit. Fort Wainwright obtained these units back from Doyon Utilities at the end of CY2018.

- To modify Condition 2 of AQ0236MSS02 to include the emission units added to Condition 1.
- To modify Condition 3 of AQ0236MSS02 to include the emission units added to Condition 1.
- To modify Condition 4.2(a) of AQ0236MSS02 to enforce EU IDs 8 through 13 to combust only ULSD with sulfur content at or less than 15 ppmw.
- To add Condition 4.3(a) for EU IDs 26 through 40, 50 through 65, and emergency generators at building 2121, 3007 to combust only ULSD with sulfur content at or less than 15 ppmw.
- To add Condition 4.3(b) to establish compliance requirements for Condition 4.3(a).

4. CLASSIFICATION FINDINGS

Based on the review of the application, the Department finds that:

1. Minor Permit AQ0236MSS03 is classified under AS 46.14.130(c)(2) because the Department 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.

5. APPLICATION REVIEW FINDINGS

Based on the review of the application, the Department finds that:

1. U.S. Army Garrison's minor permit application for the USAG Alaska Fort Wainwright contains the elements listed in 18 AAC 50.540.
2. Submittal of the application on June 9, 2020 satisfies the requirements from Table 7.7-11 of the Amendments to: State Air Quality Control Plan Vol II: III.D.7.7 Control Strategies document; adopted November 19, 2019.
3. The emission units obtained by U.S. Army Garrison from Doyon Utilities do not trigger 18 AAC 50. 502(c)(3) as these units have been at the stationary source but operated by Doyon Utilities under a separate Title I permit. The Department confirms that Fort Wainwright obtained EUs 23, 24, 26 through 40, 50 through 65, unpaved roads, and paved roads from Doyon Utilities at the end of CY2019. Therefore, the Department added the EUs to Table 1.
4. The Department did not include modifications to previous minor permits with the issuance of this permit, therefore, modifications to Conditions 1 through 3 of AQ0236MSS02 were not included in this permit action. The Department finds that the Fairbanks Serious $PM_{2.5}$ Nonattainment Area restrictions contained in the State Air Quality Control Plan adopted on November 19, 2019 are subject to re-evaluation as early as 2023/2024, resulting in measures being removed or added to the plan, depending on the outcome of the analysis. To streamline future permit actions, the Department finds that the restrictions imposed by AQ0236MSS03 should pertain only to the decisions contained in Table 7.7-11 of the

Amendments to: State Air Quality Control Plan Vol II: III.D.7.7 Control Strategies document; adopted November 19, 2019.

6. EMISSIONS SUMMARY AND PERMIT APPLICABLITY

Table 2 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 2 below.

Table 2 – Emissions Summary and Permit Applicability, tons per year (tpy)

Parameter	NOx	CO	VOC	PM-2.5	PM-10	SO_2
Current PTE [a]	76.92	28.35	15.83	49.28	49.28	109.66
PTE after June 9, 2021	76.87	28.31	15.83	49.28	49.28	5.16
Change in PTE	-0.04	-0.05	0	0	0	-104.5
Assessable Emissions [c] [d]	77	28	16	49	49	5
Total Assessable[e]	170					

Table Notes:

[a] – Current PTE (before modification) is from the application for minor permit AQ0236MSS03

[b] – Assessable emissions include fugitive emissions.

[c] – Assessable emissions include any pollutant greater than or equal to 10 tpy.

[d] – PM-10 emissions include PM-2.5 emissions. Therefore, PM-2.5 is not counted in total assessable emissions.

7. PERMIT CONDITIONS

The bases for the standard and general conditions imposed in Minor Permit AQ0236MSS03 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.

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.

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 incorporated this requirement as Condition 3.

Section 3: State Implementation Plan (SIP) Requirements

Conditions 4 - 7, SO_2 BACT Requirements

Conditions 4 through 7 provide enforceable terms and conditions intended to satisfy the requirements from Table 7.7-11 of the Amendments to: State Air Control Plan Vol II:III.D.7.7 Control Strategies document; adopted November 19, 2020.

Condition 4 contains a limit beginning no later than June 9, 2021 that requires EUs 8 through 13, 26 through 39, and 50 through 65 to combust only ultra-low sulfur diesel (ULSD) with sulfur content equal to or less than 15 ppmw. Conditions 4.1 through 4.5 include Monitoring, Recordkeeping, and Reporting (MR&R) requirements for the sulfur limit.

Condition 5 contains a limit of 600 cumulative operating hours per year for EUs 8 through 10 to ensure compliance with the SO_2 BACT requirement. Conditions 5.1 through 5.3 include MR&R requirements for the sulfur limit.

Condition 6 contains a limit of 600 cumulative operating hours per year for EUs 11 through 13 to ensure compliance with the SO_2 BACT requirement. Conditions 6.1 through 6.3 include MR&R requirements for the sulfur limit.

Condition 7 contains a limit of 100 non-emergency hours of operation for EUs 26 through 39 and 55 through 65 to ensure compliance with the SO_2 BACT requirement. Conditions 7.1 through 7.4 include MR&R requirements for the sulfur limit.

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. This requirement is reiterated as a standard permit condition in 18 AAC 50.345(j). Minor Permit AQ0236MSS03 uses the standard condition language, but also expands it by allowing the Permittee to provide electronic signatures.

Condition 9, Submittals

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

8: Standard Permit Conditions

Conditions 10 – 15, 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 minor permit-related standard conditions of 18 AAC 50.345 in Minor Permit AQ0236MSS03. The Department incorporated these standard conditions as follows:

- 18 AAC 50.345(c)(1) and (2) is incorporated as Condition 10 of 8 (Standard Permit Conditions);

- 18 AAC 50.345(d) through (h) is incorporated as Conditions 11 through 15, respectively, of 8 (Standard Permit Conditions);

8. PERMIT ADMINISTRATION

Minor Permit AQ0236MSS03 does not contradict any conditions in the Title V operating permit issued to USAG Alaska Fort Wainwright. U.S. Army Garrison may therefore operate in accordance with Minor Permit AQ0236MSS03 upon issuance.

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.

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

EU ID	Unit ID/ Description	Maximum Rating or Capacity	Operating Limits	SO_2		June 9, 2021 Operating Limits	SO_2	
				EF[1]	PTE (tpy)		EF	PTE (tpy)
8	Backup Diesel-Fired Boiler 1	19 MMBtu/hr	600 hr/yr combined	42.600 lbs/1000 gal[2]	1.73	600 hours combined	0.2 lbs/1000 gal[6]	0.874
9	Backup Diesel-Fired Boiler 2	19 MMBtu/hr		42.600 lbs/1000 gal[2]	1.73		0.2 lbs/1000 gal[6]	0.874
10	Backup Diesel-Fired Boiler 3	19 MMBtu/hr		42.600 lbs/1000 gal[2]	1.73		0.2 lbs/1000 gal[6]	0.874
11	Backup Diesel-Electric Generator 1	900 kW	600 hr/yr combined	0.002 lb/hp-hr[3]	0.88	600 hours combined	1.2E-05 lb/hp-hr[7]	0.389
12	Backup Diesel-Electric Generator 2	900 kW		0.002 lb/hp-hr[3]	0.88		1.2E-05 lb/hp-hr[7]	0.389
13	Backup Diesel-Electric Generator 3	900 kW		0.002 lb/hp-hr[3]	0.88		1.2E-05 lb/hp-hr[7]	0.389
26	Emergency Generator Building 2132	324 hp	500 hr/yr[4]	0.002 lb/hp-hr[8]	0.17	500 hr/yr	0.002 lb/hp-hr[8]	0.087
27	Emergency Generator Building 1580	67 hp	500 hr/yr[4]	0.002 lb/hp-hr[8]	0.03	500 hr/yr	0.002 lb/hp-hr[8]	0.018
28	Emergency Generator Building 3406	398 hp	500 hr/yr[4]	0.002 lb/hp-hr[8]	0.20	500 hr/yr	0.002 lb/hp-hr[8]	0.107
29	Emergency Generator Building 3567	47 hp	500 hr/yr[4]	0.002 lb/hp-hr[8]	0.02	500 hr/yr	0.002 lb/hp-hr[8]	0.013
30	Fire Pump Building 2089	275 hp	500 hr/yr[4]	0.002 lb/hp-hr[8]	0.14	500 hr/yr	0.002 lb/hp-hr[8]	0.074
31	Fire Pump #1 Building 1572	235 hp	500 hr/yr[4]	0.002 lb/hp-hr[8]	0.12	500 hr/yr	0.002 lb/hp-hr[8]	0.063
32	Fire Pump #2 Building 1572	235 hp	500 hr/yr[4]	0.002 lb/hp-hr[8]	0.12	500 hr/yr	0.002 lb/hp-hr[8]	0.063

EU ID	Unit ID/ Description	Maximum Rating or Capacity	Operating Limits	SO_2		June 9, 2021 Operating Limits	SO_2	
				EF[1]	PTE (tpy)		EF	PTE (tpy)
33	Fire Pump #3 Building 1572	235 hp	500 hr/yr[4]	0.002 lb/hp-hr[8]	0.12	500 hr/yr	0.002 lb/hp-hr[8]	0.063
34	Fire Pump #4 Building 1572	235 hp	500 hr/yr[4]	0.002 lb/hp-hr[8]	0.12	500 hr/yr	0.002 lb/hp-hr[8]	0.063
35	Fire Pump #1 Building 2080	240 hp	500 hr/yr[4]	0.002 lb/hp-hr[8]	0.12	500 hr/yr	0.002 lb/hp-hr[8]	0.064
36	Fire Pump #2 Building 2080	240 hp	500 hr/yr[4]	0.002 lb/hp-hr[8]	0.12	500 hr/yr	0.002 lb/hp-hr[15]	0.064
37	Fire Pump Building 3498	140 hp	500 hr/yr[4]	0.002 lb/hp-hr[8]	0.07	500 hr/yr	0.002 lb/hp-hr	0.038
38	Fire Pump #1 Building 5009	120 hp	500 hr/yr[4]	0.002 lb/hp-hr[8]	0.06	500 hr/yr	0.002 lb/hp-hr	0.032
39	Fire Pump #2 Building 5009	120 hp	500 hr/yr[4]	0.002 lb/hp-hr[8]	0.06	500 hr/yr	0.002 lb/hp-hr	0.032
40	Boiler BLDG 5007	2.6 MMBtu/hr	8760 hr/yr[4]	42.6 lbs/1000 gal[2]	3.47	8760 hr/yr	0.2 lbs/1000 gal[6]	1.747
50	Emergency Generator #1 Building 1060	762 hp	500 hr/yr[4]	0.004 lb/hp-hr[5]	0.77	500 hr/yr	1.2E-05 lb/hp-hr[7]	0.205
51	Emergency Generator #2 Building 1060	762 hp	500 hr/yr[4]	0.004 lb/hp-hr[5]	0.77	500 hr/yr	1.2E-05 lb/hp-hr[7]	0.205
52	Emergency Generator Building 1193	82 hp	500 hr/yr[4]	0.002 lb/hp-hr[8]	0.04	500 hr/yr	0.002 lb/hp-hr[8]	0.022
53	Emergency Generator Building 1555	587 hp	500 hr/yr[4]	0.002 lb/hp-hr[8]	0.30	500 hr/yr	0.002 lb/hp-hr[8]	0.158
54	Emergency Generator #1 Building 2117	1059 hp	500 hr/yr[4]	0.004 lb/hp-hr[5]	1.07	500 hr/yr	1.2E-05 lb/hp-hr[7]	0.284
55	Emergency Generator #2 Building 2117	212 hp	500 hr/yr[4]	0.002 lb/hp-hr[8]	0.11	500 hr/yr	0.002 lb/hp-hr[8]	0.057
56	Emergency Generator Building 2088	176 hp	500 hr/yr[4]	0.002 lb/hp-hr[8]	0.09	500 hr/yr	0.002 lb/hp-hr[8]	0.047
57	Emergency Generator Building 2296	212 hp	500 hr/yr[4]	0.002 lb/hp-hr[8]	0.11	500 hr/yr	0.002 lb/hp-hr[8]	0.057

EU ID	Unit ID/ Description	Maximum Rating or Capacity	Operating Limits	SO_2		June 9, 2021 Operating Limits	SO_2	
				EF[1]	PTE (tpy)		EF	PTE (tpy)
58	Emergency Generator Building 3004	71 hp	500 hr/yr[4]	0.002 lb/hp-hr[8]	0.04	500 hr/yr	0.002 lb/hp-hr[8]	0.019
59	Emergency Generator Building 3028	35 hp	500 hr/yr[4]	0.002 lb/hp-hr[8]	0.02	500 hr/yr	0.002 lb/hp-hr[8]	0.009
60	Emergency Generator Building 3407	95 hp	500 hr/yr[4]	0.002 lb/hp-hr[8]	0.05	500 hr/yr	0.002 lb/hp-hr[8]	0.026
61	Emergency Generator Building 3703	50 hp	500 hr/yr[4]	0.002 lb/hp-hr[8]	0.03	500 hr/yr	0.002 lb/hp-hr[8]	0.013
62	Emergency Generator Building 5108	18 hp	500 hr/yr[4]	0.002 lb/hp-hr[8]	0.01	500 hr/yr	0.002 lb/hp-hr[8]	0.005
63	Emergency Generator Building 5108	68 hp	500 hr/yr[4]	0.002 lb/hp-hr[8]	0.03	500 hr/yr	0.002 lb/hp-hr[8]	0.018
64	Emergency Generator Building 1054	274 hp	500 hr/yr[4]	0.002 lb/hp-hr[8]	0.14	500 hr/yr	0.002 lb/hp-hr[8]	0.074
65	Emergency Generator Building 4390	274 hp	500 hr/yr[4]	0.002 lb/hp-hr[8]	0.14	500 hr/yr	0.002 lb/hp-hr[8]	0.074
66	Emergency Generator Building 2121	71 hp	500 hr/yr[4]	0.002 lb/hp-hr[8]	0.04	500 hr/yr	0.002 lb/hp-hr[8]	0.019
67	Emergency Generator Building 3007	274 hp	500 hr/yr[4]	0.002 lb/hp-hr[8]	0.14	500 hr/yr	0.002 lb/hp-hr[8]	0.074
68	Insignificant EUs - boilers	1.0 MMBtu/hr	N/A	N/A	0.08			
Insignificant Emission Units								
Total Potential to Emit					**16.8**			**7.68**

Item

1 EF from AP-42 Tables 3.3-1, 3.4-1 unless otherwise identified

2 SO_2 emissions factor = 142S, where S = weight % sulfur: 142 x 0.3 = 42.6

3 SO_2 emissions factor = 8.09E-03S, where S = weight % sulfur: 8.09E-03 x 0.3 = 0.00243

EU ID	Unit ID/ Description	Maximum Rating or Capacity	Operating Limits	SO_2		June 9, 2021 Operating Limits	SO_2	
				EF[1]	PTE (tpy)		EF	PTE (tpy)

4 EU is limited to 100 hours of non-emergency operation per calendar year, PTE hours were derived from the 500 hour limit in USEPA Memorandum, September 6, 1995, "Calculating Potential to Emit (PTE) for Emergency Generators."

5 SO_2 emissions factor = 8.09E-03S, where S = weight % sulfur: 8.09E-03 x 0.5 = 0.00405

6 SO_2 emissions factor = 142S, where S = weight % sulfur: 142 x 0.0015 = 0.213

7 SO_2 emissions factor for ICE > 447 kW (600 hp) = 8.09E-03S, where S = weight % sulfur: 8.09E-03 x 0.0015 = 1.21E-05

8 SO_2 emissions factor for ICE < 600 hp = 2.05E-03

AP-42 Chapter 1.3, Table 1.3.1 (Distillate)

AP-42 Chapter 3.4, Table 3.4.1 (Diesel)

AP-42 Chapter 3.3, Table 3.3.1 (Diesel)

Mass Balance, assuming a fuel sulfur content of 0.0015 wt% sulfur for engines subject to 40 C.F.R. 60 Subpart IIII, requiring fuel to meet the requirements of 40 C.F.R. 80.510(b)

Mass Balance, assuming the fuel sulfur content of 0.0015 wt% sulfur, as required by the SO2 SIP that beginning June 9, 2021 engines are required to combusted ULSD

Assumptions:

MMBtu/MMscf =	1,040
Gas engine heat rate (Btu/hp-hr) =	8,000
Diesel engine heat rate (Btu/hp-hr) =	7,000
Diesel fuel sulfur content (ppmw) =	15
Diesel fuel density (lb/gal) =	7
Heat content of diesel (Btu/gal) =	137,000
H2S fuel gas content (ppmv) =	100
Molecular weight of SO2 (lb/lb-mole) =	64
Molar volume of gas (scf/lb-mole) =	379
Pounds per ton =	2,000
Assumed bhp of prime mover per rated kWe gen =	1.341
Molar mass of S (g/mol) =	32.01
Molar mass of SO_2 (g/mol) =	64.06