

**Application to Revise
Minor Permit No.
AQ0264MSS06**

for

**The United States Air Force
Eielson Air Force Base**

Submitted To:

Alaska Department of Environmental Conservation
Division of Air Quality, Air Permits Program

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- Attachment A: Stationary Source Identification Form
- Attachment B: Current Permit AQ0264MSS06 and TAR
- Attachment C: 2006 Rock Crusher Ambient Analysis
- Attachment D: ADEC Letter (Jan. 27, 2014) and NOx Source Test (Nov. 27, 2013)
- Attachment E: Revised Emission Unit Inventory and List of EUs to Remove
- Attachment F: TAR to AQ0264CP03
- Attachment G: Emergency Engine Operating Hours 2021-2022
- Attachment H: JP-8 Tank Throughputs 2021-2022

MS Excel Documents Included on Enclosed Compact Disc

- Attachment I: Emissions Summary

Trinity TankESP Output Files:

- Att J.1_EAFB_Actual VOC HAP_TankESP,
- Att J.2__EAFB_ORL VOC HAP_TankESP, and
- Att J.3_EAFB_PTE VOC HAP_TankESP.

1.0 Introduction

Eielson Air Force Base (EAFB) is an existing stationary source owned and operated by the United States Department of the Air Force. The stationary source is located approximately 23 miles southeast of Fairbanks, Alaska. The base provides forward air control for joint United States Air Force (USAF) and United States Army contingencies in overall Alaska military operations, and in support of United States Air Force Pacific Air Forces. It operates under AQ0264TVP02, Rev. 5, issued by Alaska Department of Environmental Conservation (hereafter referred to as “ADEC” or “the Department”).

This application contains five requests to revise or rescind terms of Minor Permit No. AQ0264MSS06. We kindly request the following changes:

- 1.) Revise the emission unit inventory by removing the specific make/model and capacity ratings from crusher equipment listed in this permit, and instead convert the descriptions to generalizations. The aim is to pre-authorize the installation of crushers and ancillary equipment that fits within specific parameters, but which can be supplied to the base by third-party contractors. The specific make, model, and capacity of each item in a given crusher circuit may change from season to season or project to project, but the combined total capacity of each type of equipment will be capped to establish the PTE for the group. This request includes adding monitoring, recordkeeping, and reporting (MR&R) to the minor permit to ensure that third party-supplied equipment fits the parameters established in this permit. Finally, EAFB is retaining EU IDs 82-84, but they are now treated as nonroad engines. The ORL in Condition 17 should therefore be removed.
- 2.) Revise Condition 7.b of AQ0264MSS06 by increasing the power output limit given in that condition. In 2013, EAFB performed a NO_x emissions source test and determined that compliance with the BACT limit is achieved even when operating EU IDs 20-23 at 1,425 kW each. ADEC acknowledged this in a letter dated January 27, 2014 and has allowed EAFB to operate these engines in excess of the limit ever since. Given that this BACT requirement contains both a limit to the emission rate (10.8 grams/horsepower hour (g/hp-hr)), and a power output limit (1,125 kilowatts (kW) per each engine), it is appropriate to revise the BACT limit for kW to reflect the results of the source test.
- 3.) Update the emission unit inventory. Most changes addressed in this application are minor corrections, but there are some replacements and removals that are also addressed herein. Updated emission calculations are included to reflect these changes.
- 4.) Rescind Condition 10 from AQ0264MSS06, which established a 200-hour operating limit for EU IDs 24-80, all of which are emergency engines. The limit was established in 2004 to allow the facility to exclude emissions from consuming the

NOx increment. This limit is no longer needed because actual operating records, accrued over the past several years, demonstrate that the assumption taken for estimating the emergency engine Potential to Emit (PTE) is correct.

- 5.) Rescind Condition 12 from AQ0264MSS06, which limits fuel throughput through EU IDs 104 and 105 (JP-8 tanks) to 18 million gallons per 12-month rolling period. This limit was imposed to ensure that excessive fuel throughput to these tanks would not result in a change to the project classification. This application takes a most conservative assumption for maximizing tank throughputs to demonstrate that an ORL is not needed to ensure project classification.

2.0 Permit Applicability and Application Requirements

This application is being submitted under Alaska Administrative Code for Air Quality 18 AAC 50.508(6). A Stationary Source ID Form (SSID) is included in Attachment A, per 18 AAC 50.540(b). All information required under 18 AAC 50.540(k) is included herein.

In accordance with §50.540(k)(1), a copy of the current Title I permit AQ0264MSS06 is included in Attachment B, along with the Technical Analysis Report (TAR) for this permit.

In accordance with §50.540(k)(4), none of the actions proposed herein will change the current permit classification.

The remaining information required by §50.540(k)(2) and §50.540 (k)(3)(A)-(D) is presented individually for each request in the sections below. Where appropriate, the requirements of 18 AAC 50.225(h) are also addressed.

The USAF understands that fees will be charged on a time and materials basis, as indicated in §50.400(h).

3.0 Revision to Crusher Equipment Descriptions and Capacities

EAFB requests to revise its emission unit inventory to remove the specific details associated with rock crusher equipment (EU IDs 86-103) in the permit, generalizing their descriptions, but ensuring that the PTE from this equipment does not trigger new permitting requirements. The goal is to obtain pre-authorization to install and operate third-party crusher equipment supplied to the base on contract, but to enable greater operational flexibility and ensure that the procured equipment will not cause reclassification of the facility or trigger a new minor permit under 18 AAC 50.502(b).

EAFB added portable rock crushers and associated diesel engines in 2007, the purpose of which is to process recycled asphalt recovered on the base. While the base has historically used its own equipment, EAFB is transitioning to contractor-supplied crusher equipment. The base-owned crushers and ancillary equipment are being decommissioned due to prohibitive maintenance and operating costs.

The engines (EU IDs 82-84) that were previously dedicated to the operation of these crushers are being retained, but they are being repurposed as nonroad engines (NREs). These units have been in cold storage (not operated) for several years. If they are used again on the base, they will be put into temporary service on an as-needed basis. As with other NREs used on base, the operation, location, and residence time that each of these units is in use, will be recorded for the purposes of monitoring NRE status. Because emissions from NREs are not subject to permitting, Condition 17 of AQ0264MSS06 can be rescinded.

EAFB would like to ensure that this pre-authorization includes enough capacity to accommodate any number of foreseeable needs. The existing permit includes two crushers (150 tph, each), a feed or dump point for the primary crusher (150 tph), screening and fines screening (150 and 100 tph, respectively), and a sum total of 13 conveyor transfer points (1,350 tph, combined), each identified with a separate EU ID number.

The proposed approach will generalize the descriptions of crushing equipment listed in the permit, with the understanding that contractor-supplied crushers, screens, and drop points will fit within a certain set of parameters:

- Truck unloading to primary/secondary crusher(s) up to 1,500 tph, combined;
- Primary/Secondary crusher(s) up to 1,500 tph, combined;
- Tertiary crusher(s) up to 500 tph, combined;
- Screen(s) up to 1,500 tph;
- Fines screen(s) up to 500 tph;
- Up to 13 conveyor transfer points with a combined capacity of 1,500 tph.

The proposed approach assumes that any contractor-supplied equipment will be operated using nonroad engines (as defined in 1068.30) or high line power.

This application proposes retaining the language in Conditions 18-20 of AQ0264MSS06, except that references to EU IDs 82-84 (engines) should be removed. This application further proposes to add a condition to record make, model, and combined rating of equipment operated under EU IDs 86-103 to ensure that the combined operation of equipment in use on the base at any one time fits within the described characteristics in the emission unit inventory table. This approach will ensure that assumptions taken for PTE purposes remain accurate, and ambient modeling analyses performed in the past remain representative of the facility.

3.1 Reason for the Request

In the past, EAFB has installed and operated its own crusher equipment and performed its own maintenance activities in-house using the equipment described in the permit. Today, the equipment listed in the permit has been placed out of operation due to the prohibitive costs of maintenance and repairs. EAFB is transitioning toward using third-party contractors to supply crushing equipment on an as-needed basis. Because EAFB operates as a Title V source, contractors are prohibited from operating rock crushers under their own MG9 permits within the boundaries of EAFB.

As such, it is necessary to ensure that third-party equipment provided by future contractors is pre-authorized to operate at EAFB. EAFB already has crushing equipment in its emission unit inventory and has an existing structure within its permit to ensure compliance with siting requirements and fugitive dust control. This application proposes to simply generalize the equipment descriptions and set upper limits or specified maximum capacities to the already-authorized crushers, screens, and conveyor drop points. This will give EAFB operational flexibility to bring in third-party supplied crushers associated with this equipment. This change will not cause an increase in regulated air pollutants, and it will not trigger a new permitting requirement.

3.2 Effect on Emissions

EAFB has prepared emission PTE calculations for the fugitive dust (PM-10) emissions from the proposed crusher inventory (generalized) and compared the result to the PTE that appears in the TAR to AQ0264MSS06. These results are summarized in Table 1, below. Detailed calculations are included in the enclosed MS Excel spreadsheet, included in electronic format.

Table 1: PM-10 PTE from Proposed Crushers and Ancillary Equipment

EU ID	Description	Rating (tph, max combined)	Total Product (tpy)	PM-10 (tpy)
86	Tertiary Crushing	500	1,825,000	0.49
89	Screen	1,500	5,475,000	2.03
93	Fines Screening	500	1,825,000	2.01
97	Truck Unloading	1,500	5,475,000	0.04
101	Primary/Secondary Crushing	1,500	5,475,000	0.00
Misc.	Conveyor Transfer Points	1,500	5,475,000	0.13
Proposed New PTE:				4.70
PTE from EU IDs 86-103 in TAR to AQ0264MSS06:				16.09
Total PTE for Crusher Sources in 2003 Modeling Demonstration:				4.30

The proposed PTE from generalized crushers and ancillary components is based on the existing inventory and adopts certain assumptions that were taken previously by ADEC. Other assumptions were changed, as follows:

- 1) The proposed application includes the same number of crushers, screens, and drop points as what is included in AQ0264MSS06. Feed rates, crusher ratings and screen ratings are increased to allow greater operational flexibility. The vision is to allow more than one crusher or screen to provide services at EAFB in a given season, but the combined throughput rate of these crushers cannot exceed the throughput listed in the emission unit inventory table when operating simultaneously on the base.
- 2) For drop points, the combined feed rate is assumed to be the same as what is currently listed in the permit.
- 3) The proposed inventory retains “fines screening” and “tertiary crushing.” This doesn’t mean that these activities will necessarily occur in any given year, but it does include the possibility for such occurrence. AP-42 Table 11.19.2 describes *tertiary crushing* as “typically about 0.50 to 2.5 centimeters (3/16th to 1 inch).” *Fines* are described as having “a maximum size of 0.50 centimeters (3/16th inch).” By retaining these equipment classes, this application includes an allocation of PM-10 toward the PTE for such crushing activities, if they are ever needed in the future.
- 4) This application assumes 3,650 hours of operation per year for PTE calculation purposes, in accordance with the PTE calculation guidance in the MG-9 permit application. Previous applications for EAFB have assumed 8,760 hours operation. Today, ADEC recognizes that rock crushers and ancillary equipment typically operate only in the summer season since they are typically not compatible with Alaska’s freezing temperatures. Because EAFB will be hiring mobile crusher

operations to serve their needs on base, the same PTE assumption that these operators use for their MG-9 applications should rightfully apply when operated on EAFB.

3.3 Effect on Other Permit Terms

The crushers and ancillary equipment described in AQ0264MSS06 are regulated by Conditions 17-20, which includes provisions for location, signage, and maintenance. This application proposes additional conditions to aid in ensuring that installed crusher equipment fits within the scope of the pre-authorization requested herein. Please see Section 3.5, below.

3.4 Effect on Ambient Analysis

As part of EAFB's original application to install rock crushers and ancillary equipment, Hoeffler Consulting Group prepared an ambient air quality analysis for fugitive emissions from rock crushers installed at this facility. The analysis was submitted to ADEC via email on October 6, 2006. The impact analysis and PTE calculations provided to the Department in that correspondence are included in Attachment C.

The 2006 analysis states, "The fugitive PM-10 emission units were modeled as volume sources." The PTE provided to the Department for these sources was 4.3 TPY of fugitive PM-10 emissions. The PTE for the new proposed emission unit inventory totals to 4.25 TPY. Furthermore, the PTE from the equipment and throughputs described in the proposed inventory is similar to the equipment specified in ADEC's own modeling conducted for the MG-9 permit. As such, this application posits that there is no need to conduct a new modeling demonstration to support this change because it is unlikely to produce significant impacts to air quality beyond those shown in previous modeling conducted in support of this permit, nor in modeling conducted previously by the Department in support of the MG-9 permit.

3.5 Effect on Compliance Monitoring

The USAF recognizes ADEC's interest in ensuring that air quality protections are in place consistent with the rock crusher permitting requirements in 18 AAC 50.502(b)(3). While this provision in the regulations requires that a minor permit be issued before installing a rock crusher sized 5 tons per hour or greater, "a permit is not required under this section...before relocation if the stationary source is already allowed by permit to operate at the new location" [§§502(a)(3)]. The USAF's aim is to pre-authorize the use of rock crushers and ancillary equipment as a generalization, so that any combination of procured equipment may operate on the base provided it fits within the boundaries of the assumptions made herein. With that, this application proposes adding to the minor permit an additional requirement for MR&R as follows:

Condition 21. EUs 86-103 Recordkeeping for Installed Crusher Equipment

21.1. Record the maximum rated capacity and equipment type for each crusher and screen installed at the facility in each semiannual period, and the maximum combined capacity of all crushers of each type (i.e.: primary/secondary or tertiary), the combined capacity of screens of each type (i.e.: standard screening or fines screening). Record the total number of conveyor drop points installed in each semiannual period.

21.2 Document the power source for each of EU IDs 86-103 (i.e: highline power, nonroad engine).

21.3 Report in the semiannual operating report required under Condition X, the records taken under condition 21.1 and 21.2, and whether the combined capacity of each equipment type exceeded the thresholds shown in Table 1 to this permit.

4.0 Revision to Operating Load Limit for EU IDs 20-23

Condition 7 of AQ0264MSS06 conveys BACT requirements pertaining to EU IDs 20-23. (Note that EU ID 23A was installed as a like-and-kind replacement for EU ID 23 in November 2024).¹ The condition includes both a limit to the NOx emission rate for these units of 10.8 grams/horsepower-hour, and a limit to the power output capacity to not exceed 1,125 kW for each of these Onan generator sets.

In 2014, based upon the results of a recent NOx source test, the ADEC granted a request to increase the power output limit to 1,425 kW. The approval letter dated January 27, 2014 and NOx source test dated November 27, 2013 are included in Attachment D.² (The source test appendices have been excluded from Attachment D to decrease the volume of this application).

4.1 Reason for the Request

This request updates the maximum power output limit in the Minor Permit Condition 7.b and brings the Department's 2014 determination into parity with the enforceable terms of the permit.

¹ EU ID 23, which previously served as the engine for the Onan #4 Genset, was decommissioned and removed due to a breakdown in early 2024. The replacement engine, EU ID 23A, was installed in November 2024 on the existing location, electrical generator, and air pollution control system (oxidation catalyst) of the removed EU ID 23. The replacement EU ID 23A is of the same manufacturer and model number, and a similar horsepower rating as the removed EU ID 23.

² The 2013 NOx source test is the most recent NOx source test for EU IDs 20-23 because these units have operated less than 400 hour per year, each, in each of the years following the 2013 source test. Therefore, no subsequent NOx source test has been required (under Condition 19.5.b of the Title V permit).

4.2 Effect on Emissions

Based on the 2013 NO_x source test results for EU ID 21 (the unit with the higher emission rates of the two engines tested), the Onan generator sets can produce 42.33 tpy NO_x when operating at 1,125 kW each and combusting a combined maximum of 173,800 gallons per year (gpy) of diesel fuel as limited by Condition 19.3 of the current Title V permit. At 1,425 kW each and a combined 173,800 gpy of fuel, the Onans can produce 44.52 TPY NO_x. This represents an increase of 2.19 tpy NO_x. This is a nominal increase in NO_x PTE, which does not rise above the minor permit threshold of 18 AAC 50.502(c)(3) (i.e.: 10 tpy). The remaining pollutant increases remain below the corresponding minor permit thresholds.

When operating at the higher power output level, the Onan generator sets remain below the NO_x emission rate limit of 10.8 g/hp-hr (BACT). Therefore, revising the power output limit will neither cause the facility to violate the BACT limit, nor cause the facility to exceed a permitting requirement.

4.3 Effect on Other Permit Terms

There are no impacts to other permit terms and conditions.

4.4 Effect on Ambient Analysis

This request does not impact the underlying ambient analysis because it does not result in a substantial increase in the emission rate or volume of pollutants emitted from the Onan generator sets.

4.5 Effect on Compliance Monitoring

This request will cause no change to the compliance monitoring prescribed in the current permit.

5.0 Updating the Emission Unit Inventory

Over the course of the last several years, EAFB has replaced several pieces of equipment and has made improvements to its equipment information records. The USAF is requesting to update the emission unit inventory in the minor permit as shown in Table 1 to Attachment E. Changes or additions to the inventory are shown in yellow highlight for the Department's convenience. Deletions are included in Table 2 to Attachment E.

5.1 Reason for the Request

In accordance with §50.540(k)(2), the reason the emission unit inventory is being updated is to ensure that information in the minor permit is the same as that in the Title V operating

permit. Many changes have occurred through Off Permit Change Notifications which should be diligently incorporated into both permit documents. Other changes include: designating EU 109 Corrosion Control Paint Booth as insignificant (due to EAFB being an Area Source and not subject to Aerospace NESHAP GG Major Source Rule after rescinding of the Once-In-Always-In Policy); addition of EU 19A; designating JP-8 tanks EUs 104-105 and 106-107 as insignificant; revising crusher descriptions, as requested in this application, and removing EU IDs 82-84 (due to repurposing these units as NREs). Parity between the two Emission Unit Inventory Tables in the permits enhances the quality and efficiency of compliance assurance efforts.

5.2 Effect on Emissions

In accordance with §50.540(k)(3)(A), the potential to emit (PTE) will not change drastically because of the updates to the emission unit inventory requested in this minor permit application. The PTE is summarized in Table 2. Although notable differences do exist between the PTE in Table 2 below versus PTE totals in the AQ0264MSS06 TAR, these differences are largely due to updating of emission factors and operating assumptions rather than changes to the emission unit inventory. See Attachment I for specific explanations of PTE changes as compared to the AQ0264MSS06 TAR. Detailed calculations are provided in the MS Excel file included with the Title V application addendum being submitted concurrently with this minor permit application.

Table 2: EAFB Potential to Emit Summary

	NO _x ^b	CO ^c	PM-10/ PM-2.5 ^d	SO ₂ ^e	VOC
Significant Emission Units^a					
Coal Boilers	367.39	393.91	15.09	312.48	4.80
Liquid Fuel Boilers	76.83	19.21	12.68	81.82	1.04
Propane Fired Heaters	18.32	10.57	0.99	2.11	1.17
IC Engines	120.16	37.93	4.37	1.37	6.34
Hush House	19.73	15.76	1.06	1.05	0.14
Crusher	0.00	0.00	4.70	0.00	0.00
Storage Tanks	0.00	0.00	0.00	0.00	0.57
Coal Prep Plant	0.00	0.00	0.05	0.00	0.00
Total, Significant:	602.43	477.38	38.92	398.84	14.06
Insignificant Emission Units^a					
Liquid Fuel Boilers	0.00	0.00	0.00	0.00	0.00
Fire Training	0.40	1.08	0.67	0.11	1.22
Storage Tanks	0.00	0.00	0.00	0.00	1.63
Aircraft Corrosion Control Facility	0.00	0.00	0.13	0.00	2.91

Table 2: EAFB Potential to Emit Summary

	NO _x ^b	CO ^c	PM-10/ PM-2.5 ^d	SO ₂ ^e	VOC
WWTP & Flare	0.08	0.00	0.02	0.00	0.00
Incinerator	0.01	0.09	0.14	0.00	0.07
Coal Pile	0.00	0.00	2.08	0.00	0.00
Misc Chemicals	0.00	0.00	0.00	0.00	4.00
Total, Insignificant:	0.49	1.17	3.03	0.11	9.83
New Assessable PTE, Grand Total:	602.91	478.55	41.95	398.95	23.89
Previous Assessable PTE from AQ0264MSS06 TAR:	615.50	183.00	244.45	464.30	29.60
Change in PTE:	-12.59	295.55	-202.50	-65.35	-5.71
18 AAC 50.502(c)(3) minor permit threshold for PTE increase:	10	N/A	10	10	N/A
502(c)(3) applicable?	No	N/A	No	No	N/A

Notes:

- a. Calculations of PTE for significant and insignificant emission units are sourced from the emission calculations for the Eielson AFB Title V application addendum, expected submittal in January 2025.
- b. See Attachment I for notes regarding changes in NO_x PTE from the AQ0264MSS06 TAR.
- c. See Attachment I for notes regarding changes in CO PTE from the AQ0264MSS06 TAR.
- d. See Attachment I for notes regarding changes in PM-10/PM-2.5 PTE from the AQ0264MSS06 TAR.
- e. See Attachment I for notes regarding changes in SO₂ PTE from the AQ0264MSS06 TAR.

5.3 Effect on Other Permit Terms

In accordance with §50.540(k)(3)(B), the permit conditions are generally unaffected by changes to the emission unit inventory, except the EU references may need to be updated throughout the permit.

5.4 Effect on Ambient Analysis

In accordance with §50.540(k)(3)(C), the changes to the emission unit inventory will not have a significant impact on any underlying ambient analyses.

5.5 Effect on Compliance Monitoring

In accordance with §50.540(k)(3)(D), there is no compliance monitoring associated with the emission unit inventory. The changes listed in Attachment E will have no impact on other compliance monitoring terms.

6.0 Request to Rescind Emergency Engine Operating Hour Limits

EAFB proposes to rescind Condition 10 of AQ0264MSS06, which limits each of the emergency engines (EU 24-80) to 200 hours of operation per 12-month period. This limit originates from AQ0264CP03. In the TAR to AQ0264CP03, ADEC explains that the limit was established to allow the facility to exclude contributions from these engines in the *increment* analysis (see page 6 of Attachment F: TAR to AQ0264CP03). The emergency engine operating hour limits have been in place ever since they were created in 2004, and EAFB has demonstrated compliance with these limits throughout the years.

The USAF is not asking to change the way these engines are operated, to de-restrict them, or to use them in a manner that is inconsistent with other regulatory definitions of “emergency” engines (40 CFR 63 Subpart ZZZZ, 40 CFR 60 Subpart IIII). Rescinding Condition 10 from AQ0264MSS06 will not change the physical and operational design of the engines, nor will it result in any change to the method of operation of this equipment. This request will not result in any increase in the operation of the engines above normal routine maintenance and readiness checks and the expected operations that may occur in an emergency. This request will not change the increment analysis or the ambient air quality impacts determined during the 2004 permitting exercise, but it will significantly ease the burden of MR&R for the permittee.

In a pre-application meeting held in February 2023, ADEC agreed that removing the ORL does not change the assumptions that formed the basis for the permitting decisions made in 2004. In accordance with ADEC’s instruction, this application includes the last three years of emergency engine operating data, which demonstrates that the 200-hour assumption is still a good assumption to make about the projected annual operation of the emergency engines. The data is included in Attachment G. As demonstrated in this data set, monthly rolling 12-month operating hours rarely exceed 50 hours per year, and in instances of higher operating hours, emergencies very rarely exceed 100 hours per incident. This has remained true for well over 10 years, with operating data provided to ADEC in each semiannual facility operating report. This demonstrates a record on which to base the assumption for calculating PTE and relieves the Department’s concern for impacting the NOx increment, which was the impetus for this ORL in 2003.

The burden created by this MR&R does not result in a measurable net benefit to the environment. Lifting this requirement will ease the regulatory burden to EAFB without compromising air quality.

6.1 Reason for the Request

In accordance with §50.540(k)(2), this change will reduce the burden of MR&R associated with this condition, without producing any environmental risk or changing underlying assumptions that drove permitting decisions made in relation to AQ0264CP03 and subsequent permits. The request aligns the treatment of this facility's emergency engines with emergency engines across facilities in Alaska by acknowledging the regulatory framework for handling emergency engines that is in place today.

Emergency engines are not physically designed for continual operation. EPA has long acknowledged that short-term operation is a component of the physical and operational design of an emergency engine. Likewise, ADEC has long accepted the guidance from EPA on the calculation of emergency engine PTE. EPA states in a 1995 memorandum (underlines added):³

The EPA believes that 500 hours is an appropriate default assumption for estimating the number of hours that an emergency generator could be expected to operate under worst-case conditions. Alternative estimates can be made on a case-by-case basis where justified by the source owner or permitting authority (for example, if historical data on local power outages indicate that a larger or smaller number would be appropriate).

The operational data provided in Attachment G demonstrates that the 200-hour assumption for estimating PTE for these engines is reasonable based on historical data.

More recently, EPA has promulgated regulations that further limit the operation of emergency engines for non-emergency purposes, specifically in the context of the New Source Performance Standards (NSPS) for Stationary Compression Ignition Internal Combustion Engines [(40 CFR 60.4211(f)] and the National Emission Standards for Hazardous Air Pollutants (NESHAP) for Stationary Reciprocating Internal Combustion Engines [40 CFR 63.6640(f)]. These regulations mirror one another, and can be summarized as follows:

- There is no limit to emergency operations,
- Maintenance and readiness checks are limited to 100 hours per year, and
- Other non-emergency operations can occur up to 50 hours per year, but those hours count toward the 100 hour annual total stated above.

This produces a federally enforceable limit on emergency engine operation for non-emergency purposes that did not exist in 2003 and compels the USAF to monitor and record the operating hours and nature of the operation (i.e.: emergency, maintenance/readiness,

³ Seitz, John S., Office of Air Quality Planning and Standards, US EPA, September 6, 1995

non-emergency) in accordance with these rules, as applicable. The USAF complies with these monitoring and recordkeeping obligations and will continue to do so after Condition 10 is rescinded.

New emergency engines certified by the engine manufacturer must bear a permanent label identifying them as emergency engines, per 40 CFR 60.4210(f). This is another enforceable regulatory requirement that distinguishes emergency engines from non-emergency engines. Such labels are found on new, EPA certified emergency engines.

6.2 Effect on Emissions

In accordance with §50.540(k)(3)(a), the PTE will remain the same for all emergency engines in this group because the assumed number of operating hours for each engine (200 annually) will remain the same. PTE calculations are included in the attached MS Excel spreadsheet in electronic format.

6.3 Effect on Other Permit Terms

In accordance with §50.540(k)(3)(b), the removal of Condition 10 from the minor permit will not impact any other terms or conditions of the permit. There is a parallel condition in the current Title V operating permit AQ0264TVP02 Rev. 4, Conditions 10.4 and 24. Removal of these conditions will be addressed in a separate Title V application addendum. There will be no other effect on other permit terms and conditions.

6.4 Effect on Ambient Analyses

In accordance with §50.540(k)(3)(c), there will be no significant impact on the ambient air quality analysis performed in 2004 that results from the removal of Condition 10.

The TAR to AQ0263CPT03 makes it clear that emergency engine emissions were *excluded* from the increment analysis. A limit may have been perceived by the Department as a reasonable and necessary way of ensuring that emergency engine emissions would remain *de minimus* and could therefore be excluded from the increment analysis. Since 2004, EAFB has collected many consecutive years of operational data that proves this assumption to be accurate. So, there is little cause to continue with this rigorous compliance assurance program, especially when considering that federally enforceable terms defining *emergency* have since been promulgated. Therefore, because the underlying operational assumptions are not changing, this change will not impact the underlying ambient air quality analysis.

6.5 Effect on Compliance Monitoring

In accordance with §50.540(k)(3)(d), the USAF will continue to record operating hours on all emission units, as this information is used for several other air quality-related reasons:

assessable emissions estimates, triennial point source emission inventory, NSPS and NESHAP compliance, etc. The data is also used for internal maintenance and operational reasons: ensuring that engine maintenance is conducted in accordance with manufacturer's written instructions and ensuring that equipment is operated in accordance with good engineering practices.

After studying the historical basis for this condition, and considering the regulatory framework in place today, it seems that this ORL does not result in a measurable net benefit to the environment. Rescinding the ORL will not change the physical and operational design of the engines, nor will it result in any change to the method of operation of this equipment. It will not result in any increase in the operation of the engines above normal routine maintenance and readiness checks and the expected operations that may occur in an emergency. Therefore, removal of this ORL will reduce unnecessary regulatory burden relating to Condition 10 without producing any environmental or regulatory concerns.

6.6 Terms for Rescinding an ORL

When an ORL is rescinded, 18 AAC 50.225(h) requires that a permittee obtain the permit that was avoided or implement a new limit that allows the facility to avoid permit classification. This term applies only to ORLs issued under 18 AAC 50.225. The ORL in Condition 10 was not issued under 18 AAC 50.225. However, removing the limits in the permit will not result in a newly-applicable permit classification because the assumed number of hours that applies to the engines in this condition will not change.

7.0 Request to Rescind Fuel Tank Loading Limit (EU 104 and 105)

The USAF requests to rescind Condition 12 of AQ0264MSS06, a fuel tank loading ORL that restricts EUs 104 and 105 to no more than 18 million gallons of JP-8 fuel throughput, combined total, per 12-month rolling period. This limit originates from AQ0264CPT03.

The TAR to AQ0264CPT03 states on page 7 (underlines added for emphasis): “The proposed limit ensures annual Volatile Organic Compounds (VOC) emissions from the new storage tanks will not exceed the emissions calculated to determine project classification.” In the original application materials, it seems that the applicant did assume 18 million gallons of annual JP-8 fuel throughput to these tanks to prepare VOC emission calculations, which (using calculation methods that were the norm at the time) found that these tanks would produce 0.2 tpy of VOC annually. ADEC enshrined this assumption into an ORL, presumably based on the assumption that these tanks could potentially experience infinite turnovers in the absence of an enforceable limit. Thus, the project could become classified as a PSD Major Modification if VOCs exceeded 40 TPY annually.⁴ It is not reasonable to assume infinite tank turnovers for any facility, even one as large and

⁴ A PSD Major Modification is triggered when there is a significant emissions increase and a significant net emissions increase of 40 TPY VOC [40 CFR 52.21(b)(23)(i)].

complex as EAFB. This begs the question: What is a reasonable basis for calculating PTE from these tanks?

This application proposes that a reasonable (albeit conservative) assumption is to assume all JP-8 flowing to EAFB annually flows through these two tanks. This assumption is sufficiently conservative because the number of JP-8 tanks on base ensures that this situation will realistically never happen, but it is an assumption that is based on operational records and would allow the USAF to distribute any amount of fuel through these tanks in response to their need, rather than restricting their use of these tanks under a limit.

In 2022, EAFB received approximately 65 million gallons of JP-8 from its fuel supplier, Petro Star, base-wide. For context, roughly 11 million gallons of this JP-8 was delivered to EUs 104 and 105 in the same year. It is very unlikely that a scenario would occur in which all of EAFB's JP-8 flows through only these two tanks. However, to demonstrate that the current ORL is not necessary to ensure project classification, the USAF used tank emissions modeling software to calculate the amount of VOC emissions that would result from running 67 million gallons of JP-8 through EUs 104 and 105. In doing so, the USAF determined that removing the limit would result in VOC emissions that are well below the major source modification threshold of 40 TPY. When the newly calculated tank VOC emission data is placed in the context of the 2004 permit applicability table (Table 4), PSD permitting for VOC is not triggered – therefore, the ORL is not necessary.

In order to understand the impact of this request, one must acknowledge that two significant changes have occurred since the issuance of this ORL in 2003: 1) EPA stopped supporting the software application Tanks 4.09d around 2009; and 2) EPA revised AP-42 Chapter 7 tank emission calculation methods in March 2020. These two circumstances mean that re-opening the 2003 analysis necessitates a review of the original permitting decision using a modern tank emissions modeling software application that employs the updated calculation methods in EPA's AP-42 chapter 7. This application uses Trinity's TankESP software on ADEC's recommendation.

ADEC indicated that removal of the ORL will require addressing the requirements of 18 AAC 50.225(h). The information required in 18 AAC 50.540(k) and §50.225(h) are included in the sections below.

7.1 Reason for the Request

In accordance with §50.540(k)(2), EAFB would benefit from de-restricting the annual throughput to EUs 104 and 105 to allow operational flexibility across the facilities' fuel storage and distribution system because it would make EUs 104 and 105 useful in the event of an emergency involving tanks elsewhere on base. Furthermore, it would reduce unnecessary and burdensome MR&R associated with this condition.

7.2 Effect on Emissions

In accordance with §50.540(k)(3)(A), the ORL is not necessary to ensure that tank VOC emissions will remain below the PSD Major Modification threshold for VOC (40 tpy). Using Trinity's TankESP software, this application re-calculates VOC emissions from EUs 104 and 105 for the 2022 actual throughput to these tanks (~11 million gallons), the ORL (18 million gallons), and the PTE (67 million gallons). The result of this analysis is presented in Table 3. The TankESP output files are included in this submittal as MS Excel workbooks with the file names:

- Att J.1_EAFB_Actual VOC HAP_TankESP,
- Att J.2__EAFB_ORL VOC HAP_TankESP, and
- Att J.3_EAFB_PTE VOC HAP_TankESP.

Please refer to the enclosed compact disc for these files.

Table 3: Tank ESP Results

Throughput (gallons)	VOC (TPY)	HAP (TPY)
2022 Actual: 11,750,203	0.03	4.75E-04
Existing ORL: 18,000,000	0.05	5.80E-04
Assumed PTE: 67,000,000	0.18	1.46E-03

As explained previously, this analysis assumes 67 million gallons of JP-8 throughput as a basis for calculating PTE. This assumption is sufficiently conservative because it exceeds the actual annual JP-8 consumed base-wide and assumes that all fuel flows through these two tanks. The actual JP-8 delivered to EAFB's tanks is summarized in Attachment H.

In 2004, EPA's Tanks 4.09d software application yielded 0.2 tpy VOC, when using 18 million gallons of JP-8 throughput (Figure 1). Table 4 places the new results in context of the 2003 permit applicability analysis.

Although ADEC determined that the ORL was necessary to ensure project classification, annual fuel supply data shows otherwise. Lifting the ORL will have the effect of giving the USAF regulatory relief from the MR&R associated with this condition by having this condition removed from the permit in its entirety, while ensuring that the project classification does not change.

For this project to exceed the PSD review threshold, the base would need to increase their fuel consumption tenfold, and all fuel would need to flow through only these two tanks. The likelihood of either of these scenarios occurring is extremely low. Therefore, this

analysis selects a sufficiently conservative basis for establishing PTE and that this proves that the ORL can be safely lifted without sacrificing air quality.

Removing this ORL does not cause concern for triggering a minor permit because there is no VOC threshold in 18 AAC 50.502(c)(3).

Figure 1: Project Emissions, as Shown in the TAR to AQ0264CPT03, Page 4

3.1.2 Project Emissions					
	NOX	SO₂	PM	CO	VOC
Engines	5.75	0.51	0.23	3.02	0.92
Large Boilers	28.33	38.17	6.38	9.58	0.05
Small Boilers	1.15	1.23	0.20	0.29	0.03
Tanks	0	0	0	0	0.2
Total (TPY)	35.22	39.90	6.81	12.89	1.20
PSD (YES NO)	No	No	No	No	No

Table 4: Impact of Newly-Calculated VOC on the 2004 Applicability Analysis

Project Emissions (TPY)	NOx	SO₂	PM	CO	VOC
Engines	5.75	0.51	0.23	3.02	0.92
Large Boilers	28.33	38.17	6.38	9.58	0.05
Small Boilers	1.15	1.23	0.20	0.29	0.03
Tanks New Calc. Method 67 MM gallon throughput	-	-	-	-	0.18
Total (TPY)	35.22	39.90	6.81	12.89	1.18
PSD Significant Increase 40 CFR 52.21 (b)(23)	40	40	25	100	40
PSD (Yes/No)	No	No	No	No	No

7.3 Effect on Other Permit Terms

In accordance with §50.540(k)(3)(B), removing this ORL will have no effect on other permit terms and conditions in the permit.

7.4 Effect on Ambient Analysis

In accordance with §50.540(k)(3)(C), there will be no effect on underlying ambient analyses that results from this change.

7.5 Effect on Compliance Monitoring

In accordance with §50.540(k)(3)(D), removing this ORL will significantly decrease the permittee’s compliance burden and allow EAFB greater operational flexibility when deciding where, and how much, JP-8 fuel to store at any given time. It will also relieve the USAF of a regulatory burden for which there is no clear benefit.

7.6 Terms for Rescinding an ORL

When an ORL is rescinded, 18 AAC 50.225(h) requires that a permittee obtain the permit that was avoided or implement a new limit that allows the facility to avoid permit classification. This term applies only to ORLs issued under 18 AAC 50.225. The ORL in Condition 12 was not issued under 18 AAC 50.225. However, the above analysis indicates that the ORL was not necessary to avoid permit classification. Therefore, rescinding this limit will not result in a newly-applicable permit classification.

There is no realistic scenario in which EAFB’s JP-8 consumption would reach a level that would cause EAFB to exceed 40 TPY VOC. Therefore, there is no concern that the PTE

from these tanks would ever threaten to exceed the PSD major modification threshold. No new permitting is required as a result of this change.

Attachment A: Stationary Source Identification Form

**Alaska Department of Environmental Conservation
Air Quality Minor Permit Application**



STATIONARY SOURCE IDENTIFICATION FORM

Section 1 Stationary Source Information

Name: United States Department of the Air Force			SIC: 9711		
Project Name (if different): 2025 EAFB Minor Permit Rev.		Contact: Jamie Martin			
Physical Address: 23 Road Miles Southeast of Fairbanks 354 Broadway Street Unit 19A		City: Eielson AFB		State: AK	Zip: 99702
		Telephone: 907-377-1815			
		E-Mail Address: jamie.martin.8@us.af.mil			
UTM Coordinates (m) or Latitude/Longitude:		Northing: 64° 41' North		Easting: 147° 05' West	Zone:
		Latitude:		Longitude:	

Section 2 Legal Owner

Section 3 Operator (if different from owner)

Name: United States Department of the Air Force			Name: United States Department of the Air Force		
Mailing Address: Same as above			Mailing Address: Same as above		
City:	State:	Zip:	City:	State:	Zip:
Telephone #:			Telephone #:		
E-Mail Address:			E-Mail Address:		

Section 4 Designated Agent (for service of process)

Section 5 Billing Contact Person (if different from owner)

Name:			Name: Jamie Martin		
Mailing Address: 354 FW/JA 354 Broadway Street Unit 2B Eielson Air Force Base, AK 99702			Mailing Address: Same as above		
City	State:	Zip:	City:	State:	Zip:
Telephone #:			Telephone #:		
E-Mail Address:			E-Mail Address: jamie.martin.8@us.af.mil		

Section 6 Application Contact

Name: Jamie Martin				
Mailing Address: Same as above		City:	State:	Zip:
		Telephone:		
		E-Mail Address: jamie.martin.8@us.af.mil		

Section 7 Desired Process Method (Check only one – see 18 AAC 50.542(a) for process descriptions and restrictions)

- Fast track for a permit classification under 18 AAC 50.502 [18 AAC 50.542(b)]
 Public comment [18 AAC 50.542(d)]

STATIONARY SOURCE IDENTIFICATION FORM

Section 8 Source Classification(s) (Check all that apply)

[18 AAC 50.502(b)]

- Asphalt Plant [≥ 5 ton per hour]
- Thermal Soil Remediation Unit [≥ 5 ton per hour]
- Rock Crusher [≥ 5 ton per hour]
- Incinerator(s) [total rated capacity ≥ 1000 lb/hour]
- Coal Preparation Plant
- Port of Anchorage Facility

If you checked any of the above, is (are) the emission unit(s) new, relocated*, or existing?

[18 AAC 50.502(c)(1)]

New or relocated* stationary source with potential emissions greater than:

- 40 tons per year (tpy) NOx
- 40 tpy SO₂
- 15 tpy PM-10
- 10 tpy PM-2.5
- 0.6 tpy lead
- 100 tpy CO in a nonattainment area

[18 AAC 50.502(c)(2)]

Construction or relocation* of a:

- Portable oil and gas operation
- ≥ 10 MMBtu/hr fuel burning equipment in a SO₂ special protection area

* Relocation does NOT include moving equipment from one place to another within your current stationary source boundary.

Section 9 Modification Classification(s) (Check all that apply)

[18 AAC 50.502(c)(3)]

- NOx Increase > 10 tpy [and existing PTE > 40 tpy]
- SO₂ Increase > 10 tpy [and existing PTE > 40 tpy]
- PM-10 Increase > 10 tpy [and existing PTE > 15 tpy]
- PM-2.5 Increase > 10 tpy [and existing PTE > 10 tpy]
- CO Increase > 100 tpy [and existing PTE > 100 tpy in a nonattainment area]

[18 AAC 50.502(c)(4)]

- NOx Increase > 40 tpy [and existing PTE ≤ 40 tpy]
- SO₂ Increase > 40 tpy [and existing PTE ≤ 40 tpy]
- PM-10 Increase > 15 tpy [and existing PTE ≤ 15 tpy]
- PM-2.5 Increase > 10 tpy [and existing PTE ≤ 10 tpy]
- CO Increase > 100 tpy [and Existing PTE ≤ 100 tpy in a nonattainment area]

Basis for calculating modification:

- Projected actual emissions minus baseline actual emissions
- New potential emissions minus existing potential emissions

Section 10 Permit Action Request (Check all that apply)

[18 AAC 50.508]

- Establish Plant-wide Applicability Limitation (PAL)
- Establish emission reductions to offset nonattainment pollutant
- Owner Requested Limit* (ORL)
- Revise or Rescind Title I Permit Conditions *
Permit Number: AQ0264MSS06 Conditions 7, 10, 12, 17-20, and EU Inventory
Date Effective: 27 May 2020

*Which to use? See <http://www.dec.state.ak.us/air/ap/docs/orlrtc.pdf>

Section 11 Existing Permits and Limits

For an existing stationary source, do you have an existing: (Check all that apply)

- Air quality permit Number(s)*: AQ0264MSS05
AQ0264MSS06
AQ0264TVP02 Rev 5

- Owner Requested Limit(s) Permit Number(s):
- Pre-Approved Emission Limit (PAEL) Number(s)**:

* All active construction, Title V, and minor permit numbers.

**Optional. Please provide this number if possible.

<http://dec.alaska.gov/Applications/Air/airtoolsweb/>

STATIONARY SOURCE IDENTIFICATION FORM

Section 12 Project Description

Provide a short narrative describing the project. Discuss the purpose for conducting this project, what emission units/activities will be added/modified under this project (i.e., project scope), and the project timeline. If the project is a modification to an existing stationary source, describe how this project will affect the existing process. Include any other discussion that may assist the Department in understanding your project or processing your application. Include a schedule of construction.

Please use additional copies of this sheet if necessary.

This application contains five requests to revise or rescind terms of Minor Permit No. AQ0264MSS06. We kindly request the following changes:

- 1.) Revise the emission unit inventory by removing the specific make/model and capacity ratings from crusher equipment listed in this permit, and instead convert the descriptions to generalizations. The aim is to pre-authorize the installation of crushers and ancillary equipment that fits within specific parameters, but which can be supplied to the base by third-party contractors. The specific make, model, and capacity of each item in a given crusher circuit may change from season to season or project to project, but the combined total capacity of each type of equipment will be capped to establish the PTE for the group. This request includes adding monitoring, recordkeeping, and reporting (MR&R) to the minor permit to ensure that third party-supplied equipment fits the parameters established in this permit. Finally, EAFB is retaining EU IDs 82-84, but they are now treated as nonroad engines. The ORL in Condition 17 should therefore be removed.
- 2.) Revise Condition 7.b of AQ0264MSS06 by increasing the power output limit given in that condition. In 2013, EAFB performed a NO_x emissions source test and determined that compliance with the BACT limit is achieved even when operating EU IDs 20-23 at 1,425 kW each. ADEC acknowledged this in a letter dated January 27, 2014 and has allowed EAFB to operate these engines in excess of the limit ever since. Given that this BACT requirement contains both a limit to the emission rate (10.8 grams/horsepower hour (g/hp-hr)), and a power output limit (1,125 kilowatts (kW) per each engine), it is appropriate to revise the BACT limit for kW to reflect the results of the source test.
- 3.) Update the emission unit inventory. Most changes addressed in this application are minor corrections, but there are some replacements and removals that are also addressed herein. Updated emission calculations are included to reflect these changes.
- 4.) Rescind Condition 10 from AQ0264MSS06, which established a 200-hour operating limit for EU IDs 24-80, all of which are emergency engines. The limit was established in 2004 to allow the facility to exclude emissions from consuming the NO_x increment. This limit is no longer needed because actual operating records, accrued over the past several years, demonstrate that the assumption taken for estimating the emergency engine Potential to Emit (PTE) is correct.
- 5.) To rescind Condition 12 from AQ0264MSS06, which limits fuel throughput through EU IDs 104 and 105 (JP-8 tanks) to 18 million gallons per 12-month rolling period. This limit was imposed to ensure that excessive fuel throughput to these tanks would not result in a change to the project classification. This application takes a most conservative assumption for maximizing tank throughputs to demonstrate that an ORL is not needed to ensure project classification.

STATIONARY SOURCE IDENTIFICATION FORM

Section 12 Project Description Continued

For **ORLs under Section 10** of this application [18 AAC 50.540(j)], include:

A description of each proposed limit, including for each air pollutant a calculation of the effect the limit will have on the stationary source's potential to emit and the allowable emissions [18 AAC 50.225(b)(4)];

NA-This application does not seek a new or revised ORL under 18 AAC 50.225.

A description of a verifiable method to attain and maintain each limit, including monitoring and recordkeeping requirements [18 AAC 50.225(b)(5)];

NA-This application does not seek a new or revised ORL under 18 AAC 50.225.

Citation to each requirement that the person seeks to avoid, including an explanation of why the requirement would apply in the absence of the limit and how the limit allows the person to avoid the requirement [18 AAC 50.225(b)(6)];

NA-This application does not seek a new or revised ORL under 18 AAC 50.225.

A statement that the owner or operator of the stationary source will be able to comply with each limit [18 AAC 50.225(b)(8)];

NA-This application does not seek a new or revised ORL under 18 AAC 50.225.

STATIONARY SOURCE IDENTIFICATION FORM

Section 13 Other Application Material

The information listed below must be included in your air quality control minor permit application. *Note: These must be attached in order for your application to be complete.*

If required to submit an analysis of ambient air quality under 18 AAC 50.540(c)(2), or if otherwise requested by the Department:

- Attached are maps, plans, and/or aerial photographs as necessary to show the locations and distances of
 - emissions units, buildings, emitting activities and boundaries of the associated with the stationary source, and
 - nearby or adjacent residences, roads, other occupied structures and general topography within 15 kilometers.

(Indicate compass direction and scale on each.)

- Attached is a document (e.g., spreadsheet) showing coordinates and elevations of each modeled unit, along with parameters necessary to characterize each unit for dispersion modeling.

- Attached is an electronic copy of all modeling files.

NA-None attached because there is no revised ambient air dispersion modeling.

Section 14 Certification

This certification applies to the Air Quality Control Minor Permit Application for the United States Department of the Air Force
 submitted to the Department on: _____ (Stationary Source Name)

Type of Application

- Initial Application
- Change to Initial Application

The application is **NOT** complete unless the certification of truth, accuracy, and completeness on this form bears the signature of a **Responsible Official**. Responsible Official is defined in 18 AAC 50.990. (18 AAC 50.205)

CERTIFICATION OF TRUTH, ACCURACY, AND COMPLETENESS

“Based on information and belief formed after reasonable inquiry, I certify that the statements and information in and attached to this document are true, accurate, and complete.”

Signature: TOWNSEND.PAUL.P :1046678199	Digitally signed by TOWNSEND.PAUL.P:1046678199 Date: 2025.02.18 16:00:18 -09'00'	Date: 06-Feb-25
Printed Name: PAUL P. TOWNSEND, Colonel USAF	Title: Commander	

Section 15 Attachments

- Attachments Included. List attachments:
 - Application Narrative
 - A: SSID Form
 - B: Current Permit AQ0264MSS06 and TAR
 - C: 2006 Rock Crusher Ambient Analysis
 - D: ADEC Letter (Jan. 27, 2014) and NOx Source Test (Nov. 27, 2013)
 - E: Revised Emission Unit Inventory and List of EUs to Remove
 - (Continued on next page)

STATIONARY SOURCE IDENTIFICATION FORM

F: TAR to AQ0264CP03

G: Emergency Engine Operating Hours 2021-2022

H: JP-8 Tank Throughputs 2021-2022

MS Excel Electronic Files:

I: Revised Emission Calculations Spreadsheet

J.1-J.3: Trinity TankESP Output Files

Section 16 Mailing Address

Submit the minor permit application to the Permit Intake Clerk in the Department's Anchorage office. Submitting to a different office will delay processing. The mailing address and phone number for the Anchorage office is:

Alaska Department of Environmental Conservation
Air Permit Program
555 Cordova Street
Anchorage, Alaska 99501
(907) 269-4718

Attachment B: AQ0264MSS06 Permit and TAR

DEPARTMENT OF ENVIRONMENTAL CONSERVATION
AIR QUALITY CONTROL MINOR PERMIT

Minor Permit: AQ0264MSS06 **Final Date – May 27, 2020**

Recinds Permit: AQ0264MSS04

The Alaska Department of Environmental Conservation (Department), under the authority of AS 46.14 and 18 AAC 50, issues Air Quality Control Minor Permit AQ0264MSS06 to the Permittee listed below.

Permittee: **United States Air Force**
354 Broadway St. Unit 19A
Eielson Air Force Base, AK 99702-1899

Stationary Source: **Eielson Air Force Base**

Location: Latitude: 64° 41' North; Longitude: 147° 05' West

Project: Revisions To Permit AQ0264MSS04

Permit Contact: Heidi Young
(907)377-1815
heidi.young.6@us.af.mil

The Permittee submitted an application for Minor Permit AQ0264MSS06 under 18 AAC 50.508(6) in order to revise the terms and conditions of a Title I permit.

This permit satisfies the obligation of the Permittee to obtain a minor permit under 18 AAC 50. As required by AS 46.14.120(c), the Permittee shall comply with the terms and conditions of this permit.



for: James R. Plosay, Manager
Air Permits Program

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Abbreviations and Acronyms

AAC.....	Alaska Administrative Code	NESHAPs.....	National Emission Standards for Hazardous Air Pollutants [as contained in 40 C.F.R. 61 and 63]
ADEC.....	Alaska Department of Environmental Conservation	NOx.....	nitrogen oxides
AOS.....	Air Online Services	NRE.....	nonroad engine
AS.....	Alaska Statutes	NSPS.....	New Source Performance Standards [as contained in 40 C.F.R. 60]
ASTM.....	American Society for Testing and Materials	O & M.....	operation and maintenance
BACT.....	best available control technology	O ₂	oxygen
bhp.....	brake horsepower	PAL.....	plantwide applicability limitation
CDX.....	Central Data Exchange	PM-10.....	particulate matter less than or equal to a nominal 10 microns in diameter
CEDRI.....	Compliance and Emissions Data Reporting Interface	PM-2.5.....	particulate matter less than or equal to a nominal 2.5 microns in diameter
C.F.R.	Code of Federal Regulations	ppm.....	parts per million
CAA.....	Clean Air Act	ppmv, ppmvd.....	parts per million by volume on a dry basis
CO.....	carbon monoxide	psia.....	pounds per square inch (absolute)
Department.....	Alaska Department of Environmental Conservation	PSD.....	prevention of significant deterioration
dscf.....	dry standard cubic foot	PTE.....	potential to emit
EPA.....	US Environmental Protection Agency	SIC.....	Standard Industrial Classification
EU.....	emissions unit	SIP.....	State Implementation Plan
gr/dscf.....	grain per dry standard cubic foot (1 pound = 7000 grains)	SPC.....	Standard Permit Condition or Standard Operating Permit Condition
gph.....	gallons per hour	SO ₂	sulfur dioxide
HAPs.....	hazardous air pollutants [as defined in AS 46.14.990]	The Act.....	Clean Air Act
hp.....	horsepower	TPH.....	tons per hour
ID.....	emissions unit identification number	tpy.....	tons per year
kPa.....	kiloPascals	VOC.....	volatile organic compound [as defined in 40 C.F.R. 51.100(s)]
LAER.....	lowest achievable emission rate	VOL.....	volatile organic liquid [as defined in 40 C.F.R. 60.111b, Subpart Kb]
MACT.....	maximum achievable control technology [as defined in 40 C.F.R. 63]	vol%.....	volume percent
MMBtu/hr.....	million British thermal units per hour	wt%.....	weight percent
MMscf.....	million standard cubic feet	wt% _{S_{fuel}}	weight percent of sulfur in fuel
MR&R.....	monitoring, recordkeeping, and reporting		

Section 1 Emissions Unit Inventory

Emissions Unit (EU) Authorization. The Permittee is authorized to install and operate the EUs listed in Table 1 in accordance with the minor permit application and the terms and conditions of this permit. The information in Table 1 is for identification purposes only, unless otherwise noted in the permit. The specific EU descriptions do not restrict the Permittee from replacing an EU identified in Table 1.

Table 1 – EU Inventory

EU ID	Emission Unit Name	Emission Unit Description	Rating/Size	Bldg. No.	Install Date
Coal Fired Boilers					
1	CH&PP Main Boiler #1	Springfield Boiler	160 MMBtu/hr	6203	1952
1A	CH&PP Main Replacement Boiler #1	--TBD; Not Installed--	160 MMBtu/hr	6203	TBD
2	CH&PP Main Boiler #2	Springfield Boiler	160 MMBtu/hr	6203	1952
2A	CH&PP Main Replacement Boiler #2	--TBD; Not Installed--	160 MMBtu/hr	6203	TBD
3	CH&PP Main Boiler #3	Springfield Boiler	160 MMBtu/hr	6203	1952
4	CH&PP Main Boiler #4	Springfield Boiler	160 MMBtu/hr	6203	1952
4A	CH&PP Main Replacement Boiler #4	--TBD; Not Installed--	160 MMBtu/hr	6203	TBD
5A	CH&PP Main Boiler #5	Indeck Keystone Energy Boiler	160 MMBtu/hr	6203	2016
6A	CH&PP Main Boiler #6	Indeck Keystone Energy Boiler	160 MMBtu/hr	6203	2014
Liquid Fuel Fired Boilers					
7	Auxiliary Heating Plant Boiler #1	Cleaver Brooks Boiler	60.712 MMBtu/hr	3351	2002
8	Auxiliary Heating Plant Boiler #2	Cleaver Brooks Boiler	60.712 MMBtu/hr	3351	2002
9	Missile Storage Boiler #1	Cleaver Brooks Boiler	3.3 MMBtu/hr	1316	1991
10	Missile Storage Boiler #2	Cleaver Brooks Boiler	2.9 MMBtu/hr	1316	1993
11	Alert Hangar Boiler #1	Cleaver Brooks Boiler	6.0 MMBtu/hr	1300	2008
12	Alert Hangar Boiler #2	Cleaver Brooks Boiler	6.0 MMBtu/hr	1300	2008
13	Waste Water Treatment Boiler #1 ²	Cleaver Brooks Boiler	6.7 MMBtu/hr	2081	2012
14	Waste Water Treatment Boiler #2	Cleaver Brooks Boiler	6.7 MMBtu/hr	2081	2012
15	Auxiliary Heating Plant II Boiler #1	--TBD; Not Installed--	98 MMBtu/hr	B1342	TBD
16	Auxiliary Heating Plant II Boiler #2	--TBD; Not Installed--	98 MMBtu/hr	B1342	TBD
Propane Fired Heaters					
17	Corrosion Control Heater #1	Weather Rite Burner	14.7 MMBtu/hr	1348	1987
18	Corrosion Control Heater #2	Weather Rite Burner	14.7 MMBtu/hr	1348	1987
Diesel and Gasoline Fired Internal Combustion Engines					
19	CH&PP Main Auxiliary Generator	EMD Diesel Engine	2,500 kW	6203	1998
19A	CH&PP Main Auxiliary Generator Candidate #1	Caterpillar C-175-16	4,376 bhp	6203	TBD
20	CH&PP Auxiliary Power Generator #1	Cummins Onan KTTA50-G2 Diesel Engine	2,250 bhp	6203	1998
21	CH&PP Auxiliary Power Generator #2	Cummins Onan KTTA50-G2 Diesel Engine	2,250 bhp	6203	1998
22	CH&PP Auxiliary Power Generator #3	Cummins Onan KTTA50-G2 Diesel Engine	2,250 bhp	6203	1998
23	CH&PP Auxiliary Power Generator #4	Cummins Onan KTTA50-G2 Diesel Engine	2,250 bhp	6203	1998
24	Waste Water Treatment Generator	Caterpillar Diesel Engine	728 bhp	2316	1994
25	Central Avenue (Clinic) Generator	Cummins Diesel Engine	470 bhp	3349	2006
26	Refueling Station Generator-Oscar Row	Onan Diesel Engine	1,135 bhp	1245	1994
28	Alert Hangar Generator	Komatsu Diesel Engine	241.4 bhp	1300	1985
29	Power Plant Fire Pump	Caterpillar Diesel Engine	196 hp	6203	1987

EU ID	Emission Unit Name	Emission Unit Description	Rating/Size	Bldg. No.	Install Date
30	Missile Maintenance Generator	Onan-Cummins Diesel Engine	307.1 bhp	1302	TBD
31	Control Tower Generator	Onan Diesel Engine	207 bhp	1216	2005
32	Telephone Exchange Generator	Cummins-Onan Diesel Engine	207 bhp	3110	2003
33	Command Post Generator	Cummins Diesel Engine	145 bhp	3112	2009
34	Airfield Lighting Generator	Cummins Diesel Engine	470 bhp	1146	2003
35A	Fire Pump P8 (Thunder Dome #1)	Cummins Diesel Engine	365 bhp	1121	2015
37A	Fire Pump P10 (Thunder Dome #3)	Cummins Diesel Engine	365 bhp	1142	2015
38	Fire Pump P11 (F-16 Hangar Pump #1)	Cummins Diesel Engine	340 bhp	1310	1986
39	Fire Pump P12 (F-16 Hangar Pump #2)	Cummins Diesel Engine	340 bhp	1310	1986
40	Fire Pump P13 (F-16 Hangar Pump #3)	Cummins Diesel Engine	340 bhp	1310	1986
41	Fire Pump P19 (Hog Pen A-10s)	Detroit Diesel Engine	235 bhp	1225	1994
43	Fire Pump P6 – Fire Support	Caterpillar Diesel Engine	121 bhp	1250	1989
44	Fire Pump P5 – Fire Support	Caterpillar Diesel Engine	121 bhp	1235	1990
45	Fire Pump P1 – Fire Support	Caterpillar Diesel Engine	121 bhp	1118	1989
46	Taxi Way #3 Fire Pump	Caterpillar Diesel Engine	121 bhp	1210	1989
47	Pumphouse #3 Fire Pump	Caterpillar Diesel Engine	121 bhp	1170	1989
48	Fire Pump P2	Caterpillar Diesel Engine	121 bhp	1139	1989
49	Communications Squadron Emergency Generator	Onan Diesel Engine	170 bhp	2268	2003
50	Water Treatment Plant Generator	Cummins Diesel Engine	470 bhp	3228	2012
51	Utilidor (Auxiliary Heat Plant) Emergency Generator	Cummins-Onan Diesel Engine	755 bhp	3351	2002
52	E-2 Complex Fuel Tank Emergency Generator	Detroit Diesel Engine	765 bhp	86232	2002
53	Fuel Hydrant System Emergency Generator	Caterpillar Diesel Engine	749 bhp	1211	2002
54	Joint Mobility Complex (JMC) Emergency Generator	Cummins Diesel Engine	1,200 bhp	4370	2002
55	North ILS Generator	Cummins-Onan Diesel Engine	102 bhp	1103	1993
56	DET 460 Generator	Cummins Diesel Engine	145 bhp	1183	2010
57	Conventional Munitions Fire Pump #1	Clarke Firewater Pump	120 hp	6385	1999
58	Conventional Munitions Fire Pump #2	Clarke Firewater Pump	120 hp	6385	1999
59	New Security Forces Facility Generator (CSC)	Cummins Diesel Engine	535 bhp	3134	2005
60	Fire Station No. 1 Generator	Cummins Diesel Engine	170 bhp	1206	2003
61	Base Supply Fire Pump	Cummins Diesel Engine	208 bhp	3426	1993
62	354 Wing MOC Generator	Cummins Diesel Engine	170 bhp	1347	2004
63	F-Well pump	Cummins Diesel Engine	230b hp	3427	2010
64A	A Water Well Pump Generator	Cummins Diesel Engine	145 bhp	1113	2012
64B	B Water Well Pump Generator	Cummins Diesel Engine	145 bhp	1113	2012
65A	Aircraft Arrestor Engine NW	Duetz Diesel Engine	61 bhp	1113	2015
66A	Aircraft Arrestor Engine NE	Duetz Diesel Engine	61 bhp	1113	2015
67A	Aircraft Arrestor Engine ¾ W	Duetz Diesel Engine	61 bhp	1119	2015
68A	Aircraft Arrestor Engine ¾ E	Duetz Diesel Engine	61 bhp	1119	2015
69	Aircraft Arrestor Engine SE	Wisconsin Gas Engine	61 bhp	1265	2010
70A	Aircraft Arrestor Engine SW	Wisconsin Gas Engine	65.9 bhp	1265	2016
71	Loop Refueling (Type III Hydrant) Generator	Cummins Diesel Engine Emergency Generator	685 bhp	1308	2006
72	AH&P Plant II Generator	--TBD; Not Installed--	1810 bhp	TBD	TBD
73	4 Bay Loop Hangar Emergency Generator	Cummins Diesel Engine	250 bhp	1335	2010

EU ID	Emission Unit Name	Emission Unit Description	Rating/Size	Bldg. No.	Install Date
74	8 Bay Loop Hangar Emergency Generator	Cummins Diesel Engine	364 bhp	1338	2010
75	Missile Maintenance Well Pump Emergency Generator	Cummins Diesel Engine	99 bhp	1301	2006
76	E-2 Farm Fire Pump Emergency Generator	John Deere Diesel Engine	130 hp	6247	2005
77	Dining Facility Emergency Generator	Cummins Diesel Engine	364 bhp	2207	2010
78	Red Flag Emergency Generator	Cummins Diesel Engine	145 bhp	1141	2009
79	Tank E-6 Generator	--TBD; Not Installed--	482.8 bhp	TBD	TBD
80	Cooling Pond Generator	Cummins Diesel Engine	755 bhp	6207	2010
Hush House (Jet Engine Test Facility)					
81	Hush House	N/A	N/A	1350	1989
Portable Asphalt/Rock Crusher Diesel Fired Internal Combustion Engines					
82	Recycle Plant Engine	John Deere Diesel Engine	450 hp	N/A	2006
83	Jaw Crusher Engine	John Deere Diesel Engine	450 hp	N/A	2006
84	Hydrascreen Engine	Deutz Diesel Engine	96 hp	N/A	2006
Portable Asphalt/Rock Crusher Fugitives					
86	Crusher #1	Cobra 1000 Recycling Plant	150 TPH	N/A	2007
87	Conveyor Transfer Point #1	Transfer Point (Recycling Plant to Superior Stackable Conveyor)	150 TPH	N/A	2007
88	Conveyor Transfer Point #2	Transfer Point (Superior Stackable conveyor to 683 Hydrascreen)	150 TPH	N/A	2007
89	Screening	Findlay 683 Hydrascreen	150 TPH	N/A	2007
90	Conveyor Transfer Point #3	Transfer Point (683 Hydrascreen to Oversize Return Conveyor Belt)	50 TPH	N/A	2007
91	Conveyor Transfer Point #4	Transfer Point (Oversize Conveyor Belt Return to Cobra 1000 Recycle Plant)	50 TPH	N/A	2007
92	Conveyor Transfer Point #5	Transfer Point (683 Hydrascreen to Second Deck Oversize Return Conveyor Belt)	50 TPH	N/A	2007
93	Fines Screening	683 Hydrascreen Fines Screen	100 TPH	N/A	2007
94	Conveyor Transfer Point #6	Transfer Point (Fines Screen to Fines Belt)	100 TPH	N/A	2007
95	Conveyor Transfer Point #7	Transfer Point (Fines Belt to Superior Radial Stacking Conveyor)	100 TPH	N/A	2007
96	Conveyor Transfer Point #8	Transfer Point (Conveyor Discharge onto Asphalt Pile)	100 TPH	N/A	2007
97	Jaw Crusher Feed	Jaw Crusher Dump Point	150 TPH	N/A	2008
98	Conveyer Transfer Point #9	Transfer Point (Jaw Crusher Screen to Superior Conveyer # 1)	100 TPH	N/A	2008
99	Conveyer Transfer Point #10	Transfer Point (Superior Conveyer # 1 to Superior Conveyer # 2)	100 TPH	N/A	2008
100	Conveyer Transfer Point #11	Transfer Point (Superior Conveyer # 2 discharge on to Asphalt Stockpile)	100 TPH	N/A	2008
101	Crusher #2	Jaw Crusher	150 TPH	N/A	2008
102	Conveyer Transfer Point #12	Transfer Point (Jaw Crusher Conveyer to Recycling Plant Feed Conveyer)	150 TPH	N/A	2008

EU ID	Emission Unit Name	Emission Unit Description	Rating/Size	Bldg. No.	Install Date
103	Conveyer Transfer Point #13	Transfer Point (Jaw Crusher Conveyer to Cobra 1000 Recycling Plant)	150 TPH	N/A	2008
Jet Kerosene (JP-8) Storage Tanks					
104	South Ramp Tank 1317	AST – Internal Floating Roof Tank	420,000 gal	6167	2006
105	South Ramp Tank 1318	AST – Internal Floating Roof Tank	420,000 gal	6268	2006
106	Tanker Row Tank #3241-5	AST – Internal Floating Roof Tank	420,000 gal	3241	2000
107	Tanker Row Tank #3244-6	AST – Internal Floating Roof Tank	420,000 gal	3244	2000
Other Regulated Sources					
109	Aircraft Corrosion Control Facility	Regulated Surface Coating	N/A	1348	1987
110	Sandwich Belt Conveyer and Segment Crusher	Regulated Coal Processing System	N/A	6203	1994
111	Coal Tripper System	Coal Tripper system with 6 identical 2,500 cfm Pulse Jet Collector Bin Vent Filters	150 TPH	6203	2010
Insignificant CI RICE Subject to NESHAP Subpart ZZZZ					
64A	A Water Well Pump Generator	Cummins Diesel Engine	145 bhp	3430	2012
64B	B Water Well Pump Generator	Cummins Diesel Engine	145 bhp	3430	2012
112	North Glideslope Generator	Cummins Diesel Engine	39.3 bhp	1109	2001
113	ASOS/GPS Generator	Cummins-Onan Diesel Engine	68 bhp	1117	2005
114	Base Radio MARS Generator	Cummins-Onan Diesel Engine	56 bhp	4308	2003
115	TACAN South Glideslope Generator	Cummins-Onan Diesel Engine	99 bhp	1259	2005
116	Lift Station Generator	Cummins-Onan Diesel Engine	145 bhp	2212	1991
117	South ILS Generator	Cummins-Onan Diesel Engine	99 bhp	1333	2005
118	Quarry Hill Generator	John Deere Diesel Engine	70 bhp	6402	2004
119	POL Control Generator	Kubota Diesel Engine	48.1 bhp	3240	2010
120	Consolidated Munitions Generator	Cummins-Onan Diesel Engine	38.6 bhp	3462	1999
121	CE Control Generator	Cummins-Onan Diesel Engine	14.5bhp	2258	1985
122	Fire Station #2 Generator	John Deere Diesel Engine	55 kW	4870	1997
124	Emergency Wastewater Pump Engine	John Deere 4045D Diesel Engine	80 bhp	2316	2008
125	Emergency Wastewater Pump Engine	John Deere 4045D Diesel Engine	80 bhp	2316	2008
129	North Slope Relay Generator	Cummins Diesel Engine	145 bhp	6405	2011
Insignificant Gasoline Storage Tanks Subject to NESHAP Subpart CCCCC					
126	Horizontal Gasoline Fuel Tank - UST	N/A	25,948 gallons	1207-3	1987
127	Horizontal Gasoline Fuel Tank - UST	N/A	25,948 gallons	1207-4	1987
128	Horizontal Gasoline Fuel Tank - UST	N/A	25,948 gallons	1207-5	1987

Notes:

^A Unless otherwise noted as *TBD*, all EUs have already been installed at the stationary source and are included in this permit action.

1. The Permittee shall comply with all applicable provisions of AS 46.14 and 18 AAC 50 when installing a replacement EU, including any applicable minor or construction permit requirements.
2. **Verification of Equipment Specifications and Maintenance of Equipment.** The Permittee shall install and maintain the equipment listed in Table 1 according to the manufacturer's or operator's maintenance procedures. Keep a copy of the manufacturer's or operator's maintenance procedure onsite and make records available to the Department personnel upon request. The records may be kept in electronic format.

Section 2 *Fee Requirements*

3. **Fee Requirements.** The Permittee shall pay to the Department all assessed permit fees. Fee rates are set out in 18 AAC 50.400 – 499.

Section 3 State Emission Standards

4. **Visible Emissions for Industrial Process and Fuel-Burning Equipment.** The Permittee shall not cause or allow visible emissions, excluding condensed water vapor, emitted from EUs 7 – 18, 19, 19A, 20 – 80, 82 – 84, 86 – 103, 110 – 126 to reduce visibility through the exhaust effluent by more than 20 percent averaged over any six consecutive minutes
 - 4.1 For EUs 19A and 79 perform an initial Method 9 observation within 60-days of initial startup of each EU.
 - a. Record the date of initial startup of EUs 19A and 79.
 - b. Report the results of the Method 9 observations required by Condition 4.1 in the first operating report due after the observations were performed, required by the applicable operating permit issued to the stationary source under AS 46.14 and 18 AAC 50.
5. **Particulate Matter for Industrial Process and Fuel-Burning Equipment.** The Permittee shall not cause or allow particulate matter emitted from EUs 7 – 18, 19, 19A, 20 – 80, 82 – 84, 86 – 103, 110 – 126 to exceed 0.05 grains per dry standard cubic foot of exhaust gas corrected to standard conditions and averaged over three hours.
6. **Sulfur Compound Emissions.** In accordance with 18 AAC 50.055(c), the Permittee shall not cause or allow sulfur compound emissions, expressed as SO₂, from EUs 7 – 18, 19, 19A, 20 – 80, 82 – 84, 86 – 103, 112 – 125, and 129 to exceed 500 ppm averaged over three hours.

Section 4 Best Available Control Technology Limits

7. **EUs 20 – 23 BACT NO_x Limits.** The Permittee shall not cause or allow the following limits on EUs 20 – 23 to be exceeded:
- a. NO_x emissions shall not exceed 10.8 grams per horsepower-hour¹;
 - b. Maximum power output shall not exceed 1,125 kW for each unit averaged over one hour (the load for which the performance test shows compliance with the NO_x emission limit). After a performance test, the maximum power output, averaged over one hour, may exceed 1,125 kW up to any load for which a performance test shows compliance with Condition 7.a; and
 - c. Fuel consumption shall not exceed a combined cumulative total of 173,800 gallons in any 12 consecutive months.⁵
- 7.1 **Monitoring and Recordkeeping.** The Permittee shall:
- a. Install an engine or generator governor that will limit maximum power output of each unit to no more than power output specified in Condition 7.b for periods when the generators are in operation.
 - b. Monitor and record the monthly and the 12-month rolling fuel consumption for each of EUs 20 – 23. Fuel consumption may be measured either by:
 - (i) Storing fuel in tanks dedicated only to EUs 20 – 23 and directly measuring tank contents to an accuracy of ± 100 gallons; or
 - (ii) Installing and using fuel meters calibrated and certified to be accurate to ± 5 percent.
 - c. Calculate and record the combined 12-month rolling fuel consumption for EUs 20 – 23 on a monthly basis.
- 7.2 **Reporting.** The Permittee shall:
- a. Include in each operating report described in the operating permit issued to the stationary source under AS 46.14.130(b) and 18 AAC 50, the monthly and 12-month rolling total fuel consumption recorded for EUs 20 – 23 as set out by Conditions 7.1a and 7.1c for each month covered by the report.
 - b. Report as excess emissions and permit deviation as described by the applicable operating permit issued for the source under AS 46.14.130(b) and 18 AAC 50, should EUs 20 – 23 exceed any of the limits set out in Condition 7.

¹ The condition was carried over from Permit 9831-AC019

Section 5 ORLs to Avoid Permit Classifications

8. **Fuel Sulfur Limit.** The Permittee shall comply with following fuel sulfur content limit to protect ambient air:
 - 8.1 For EUs 7 – 18, 19, 19A, 20 – 80, 112 – 125, and 129, the maximum sulfur content of diesel or distillate fuel burned shall not exceed 0.15 percent by weight²; and
 - 8.2 Monitor, record, and report as described in the operating permit issued for the source under AS 46.14.130(b) and 18 AAC 50.
 - 8.3 Report as excess emissions and permit deviation described in the operating permit issued for the source under AS 46.14.130(b) and 18 AAC 50, any time the fuel sulfur content exceeds the limit in Condition 8.1.
9. **EUs 7 and 8 Hourly Operations Limit.** The Permittee shall limit the cumulative hours of operation of EUs 7 and 8 to 4,464 hours per consecutive 12-month period³.
 - 9.1 Monitoring and Recordkeeping. The Permittee shall monitor and record the cumulative monthly and the cumulative 12-month rolling combined total hours of operation for EUs 7 and 8.
 - 9.2 Reporting. The Permittee shall:
 - a. Include in the operating report described in the operating permit issued for the source under AS 46.14.130(b) and 18 AAC 50, the monthly and consecutive 12-month total combined hours of operation for EUs 7 and 8 for each month of the reporting period.
 - b. Report as excess emissions and permit deviation described in the operating permit issued for the source under AS 46.14.130(b) and 18 AAC 50, if the consecutive 12-month cumulative hours of operation of EUs 7 and 8 for any given month exceed the limit in Condition 9.
10. **Emergency Engine Hourly Operations Limit.** The Permittee shall not operate any of EUs 24 – 80 for greater than 200 hours per 12-month rolling period⁴.
 - 10.1 Monitoring and Recordkeeping. The Permittee shall:
 - a. Monitor and record the hours of operation of each unit at least once per month.
 - b. Calculate and record the total monthly and the consecutive 12-month period total hours of operation for each unit.
 - 10.2 Reporting. The Permittee shall:

² This condition was carried over from Permits 9831-AC019, 264CP03 and 264CP04 to protect the ambient air quality.

³ This condition was carried over from Permit 264CP02 to avoid PSD modification for NO_x and CO

⁴ This condition was carried over from Permit 264CP03 for the EUs authorized under that permit to protect ambient air quality. Additional EUs installed and proposed to be installed in this permit action were added to the 200 hour limit at the Permittee's request.

- a. Include in the operating report described in the operating permit issued for the source under AS 46.14.130(b) and 18 AAC 50, the consecutive 12-month total hours of operation for each of EUs 24 – 80 and 122 for each of the months covered by the report.
 - b. Report as excess emissions and permit deviation described in the operating permit issued for the source under AS 46.14.130(b) and 18 AAC 50, if the consecutive 12-month total hours of operation of any of EUs 24 – 80 for a given month exceed the limit in Condition 10.
11. **EUs 15 and 16 Fuel Limit.** The Permittee shall limit combined fuel consumption of EUs 15 and 16 to no greater than 3,583,851 gallons fuel per 12-month rolling period⁵.
 - 11.1 Monitoring and Recordkeeping. The Permittee shall
 - a. Record daily fuel consumption in accordance with the reporting and recordkeeping requirements of 40 C.F.R. 60.48c (NSPS Subpart Dc).
 - b. Calculate and record the cumulative monthly 12-month rolling total gallons of fuel consumed by EUs 15 and 16.
 - 11.2 Reporting. The Permittee shall:
 - a. Include in the operating report described in the operating permit issued for the source under AS 46.14.130(b) and 18 AAC 50, the cumulative 12-month total fuel consumption for EUs 15 and 16 for each of the months covered by the report.
 - b. Report as excess emissions and permit deviation described in the operating permit issued for the source under AS 46.14.130(b) and 18 AAC 50, if the cumulative 12-month total fuel consumption for a given month exceeds the limit of Condition 11.
12. **EUs 104 and 105 Fuel Tank Loading Limit.** For EUs 104 and 105, the Permittee shall not load greater than 18 million gallons of JP-8 fuel from fuel tanks, combined total per 12-month rolling period.⁶
 - 12.1 Monitoring and Recordkeeping. The Permittee shall:
 - a. For each tank, record total gallons of fuel loaded each month.
 - b. Once per month, calculate and record monthly combined-total and 12-month rolling combined-total gallons loaded.
 - 12.2 Reporting. The Permittee shall:

⁵ This condition was carried over from Permit 264CP03. The limit was to protect the ambient air quality and to avoid PSD major modification for NO_x and SO₂.

⁶ This condition is an Owner Requested Limit carried over from Permit 264CP04.

- a. Include in the operating report described in the operating permit issued for the source under AS 46.14.130(b) and 18 AAC 50, the 12-month rolling combined total loading operations of EUs 104 and 105 for each month of the reporting period.
 - b. Report as excess emissions and permit deviation described in the operating permit issued for the source under AS 46.14.130(b) and 18 AAC 50, if the tanks load fuel that exceeds the limit of Condition 12.
13. **EU 81 Hush House Jet Engine Test Limit.** The Permittee shall limit combined total F-16 engine tests to no greater than 70 tests per 12-month rolling period⁶.
 - 13.1 Monitoring and Recordkeeping. The Permittee shall:
 - a. For each test, record the date and type of engine tested.
 - b. For each month, calculate and record the 12-month totals of F-16 engine tests.
 - 13.2 Reporting. The Permittee shall:
 - a. Include in the operating report described in the operating permit issued for the source under AS 46.14.130(b) and 18 AAC 50, the 12-month rolling total of F-16 engine tests for each month of the reporting period.
 - b. Report as excess emissions and permit deviation described in the operating permit issued for the source under AS 46.14.130(b) and 18 AAC 50, if the limit of Condition 13 is exceeded.
14. **EU 19 Annual Fuel Limit.** Prior to EU 19 being decommissioned, the Permittee shall limit EU 19 fuel consumption to no greater than 157,000 gallons fuel per 12-month rolling period and load to no greater than 1,800 kW⁷.
 - 14.1 Monitoring and Recordkeeping. The Permittee shall:
 - a. Install an engine or generator governor that will limit maximum power output of EU 19 to no more than 1,800 kW when in operation.
 - b. Install a continuous fuel consumption monitoring device accurate to ± 5 percent.
 - c. Calculate and record monthly fuel consumption no later than the end of the following month for each month the the unit operated.
 - d. Calculate and record monthly 12-month rolling period gallons of fuel consumed by August 1 for the period January 1 to June 30 of the current year and by February 1 for the period July 1 to December 31 of the previous year.
 - 14.2 Reporting. The Permittee shall:
 - a. Include in the operating report described in the operating permit issued for the source under AS 46.14.130(b) and 18 AAC 50, the monthly 12-month rolling period fuel consumption.

⁷ This condition is a revision to 182,000 gallons limit in Permit 264CP04.

- b. Report as excess emissions and permit deviation described in the operating permit issued for the source under AS 46.14.130(b) and 18 AAC 50, if fuel consumption exceeds the limit of Condition 14.
15. **EU 19 NO_x Emission Limit.** Prior to EU 19 being decommissioned, the Permittee shall limit NO_x emissions from EU 19 to no greater than 22.0 tons per 12-month rolling period,⁸
- 15.1 Monitoring, Recordkeeping, and Reporting. The Permittee shall:
- a. Operate EU 19 with Fuel Injection Timing Retard (FITR).
 - b. Ensure compliance with the NO_x annual limit by complying with the fuel limit and monitoring, recordkeeping and reporting requirements in Condition 14.
16. **EU 19 Replacement.** Upon replacement of EU 19 with non-emergency engine, EU 19A, Conditions 14 and 15 will no longer apply. The Permittee shall:
- 16.1 Decommission⁹ EU 19 no more than 30 days after commissioning¹⁰ EU 19A. Report in the first operating report required by the applicable operating permit issued to the stationary source under AS 46.14 and 18 AAC 50, subsequent to decommissioning EU 19 and commissioning EU 19A:
- a. The date that EU 19A is commissioned; and
 - b. The date that EU 19 is decommissioned.
- 16.2 Restrict concurrent operation: do not concurrently operate EU 19 and EU 19A.
- a. Report as an excess emission and permit deviation, as required by the applicable operating permit issued to the source under AS 46.14 and 18 AAC 50 if EU 19 and EU 19A are concurrently operated.
- 16.3 Verify initial compliance with EPA Tier 4 exhaust emission standards under 40 CFR Part 1039 within 30 days of commissioning EU 19A by:
- a. Obtaining a certified manufacturer's guarantee that EU 19A will comply with the emission standards. Submit the emissions data to the Department in the operating report required by the applicable operating permit issued to the stationary source under AS 46.14 and 18 AAC 50 after EU 19A becomes fully operational¹¹;
 - b. Obtaining a certificate of conformity as described under 40 CFR 60.4204; or
 - c. Conducting an initial source test in accordance with Section 8 for NO_x.
- 16.4 Maintain engine certifications, performance test results, or manufacturer data onsite that shows EU 19A complies with the corresponding Tier level and emission

⁸ This condition is carried over from Permit 264CP02 after removing the source testing requirement.

⁹ For the purposes of this permit, *decommission* means to permanently disconnect fuel lines to EU 19 until it is physically removed.

¹⁰ For the purposes of this permit, *commissioning* means the period of time after the initial start-up of the emission unit and throughout testing of the engine performance during the start-up period. This period includes fine tuning of SCR/engine controls and possible run-in period of the engine.

¹¹ *Fully operational* is defined as completing all testing and commissioning requirements after unit installation.

standard in Condition 16.3. Make the certifications, test results, or data available to Department personnel upon request. The records may be kept in electronic format.

16.5 Report as excess emissions and permit deviation as described by the applicable operating permit issued to the stationary source under AS 46.14 and 18 AAC 50 if any of Conditions 16.1 through 16.4 were not met.

17. **Asphalt/Rock Crusher Engine Operations Limits.**¹² The Permittee shall:

- a. Limit EUs 82 and 84 to 4,000 hours per 12 consecutive months, each, for PSD modification avoidance; and
- b. Limit EU 83 to 4,000 hours per 12 consecutive months for PSD modification avoidance and to avoid minor permit classification under 18 AAC 50.502(c)(3).

17.2 Monitoring and Recordkeeping. The Permittee shall:

- a. Install and operate a dedicated continuous monitoring system for recording operating hours for each unit that is accurate to ± 5 percent.
- b. Monitor and record monthly the operating hours for each unit separately.
- c. No later than the end of the following month, the monthly operating hours for each EUs 82, 83, and 84 to the total for the previous 11 months, to get the 12 month total for each unit.

17.3 Reporting. The Permittee shall:

- a. Include the records and calculations required under Conditions 17.2b and 17.2c in the operating report described in the operating permit issued for the source under AS 46.14.130(b) and 18 AAC 50.
- b. Report as excess emissions and permit deviation described in the operating permit issued for the source under AS 46.14.130(b) and 18 AAC 50, if the 12 month total in Condition 17.2c exceeds 4,000 hours for any of the EUs 82, 83, or 84.

18. **Asphalt/Rock Crusher Location.** The Permittee shall not operate the asphalt/rock crusher at a location:

- a. within 400 feet of any occupied building that can be accessed by the general public;¹³
- b. within 1,000 feet of a building used for residential or temporary lodging purposes; or
- c. within 1,000 ft of any access road that constitutes ambient air.

¹² This condition was established in Permit AQ0264MSS03 to avoid Minor Permit for NOx.

¹³ In this permit "general public" includes families and guests of base personnel.

18.2 Monitoring, Recordkeeping, and Reporting. The Permittee shall:

- a. Apply wet suppression methods (i.e. spray nozzles) to EUs 86 – 103. Monitor using visual observations to ensure that dust is continuously controlled (i.e. apply more water rock crusher operations are generating dust at any time).
- b. For operations in locations other than the following locations at Eielson Air Force Base described in Appendix E of the application for Minor Permit AQ0264MSS03, including: asphalt pile, Mullins Pit, and Cathers Lake, the Permittee shall:
 - (i) provide notice to the Department at least 10 days in advance of the move of any crusher operation by using the Location Change Form in Section 10 of this permit; and
 - (ii) give adequate consideration to siting issues as described in Condition 18.2c when operating or changing locations of a crusher permitted to operate under this permit.
- c. In addition to complying with Condition 18, if the operator selects a location near residences or other occupied structures that can be accessed by the general public¹³ and this location selection results in complaints concerning the air emissions, the Department will investigate the complaints. These investigations could result in:
 - (i) the operator being required to prove, by air quality dispersion modeling or other means, that emissions from the crusher are not harmful to the neighbors by conducting an ambient air quality investigation under 18 AAC 50.201;
 - (ii) the requirement to reduce emissions or implement another control strategy to reduce the ambient impact of those emissions as necessary to ensure that the concentration of air pollutants in the ambient air does not exceed the ambient air quality standards, maximum allowable ambient concentrations or the limitations of 18 AAC 50.110;
 - (iii) air quality monitoring investigations; and
 - (iv) the requirement to obtain a site-specific permit with requirements tailored to the exact operation contemplated.
- d. Operators must be aware that if additional dispersion modeling, an investigation under 18 AAC 50.201, or a site-specific permit is needed, these requirements could result in significant delays and expenses.

19. **Asphalt/Rock Crusher Signage.**¹² The Permittee shall erect signs at locations that are 400 feet or more away from the asphalt/rock crusher while operating, indicating that:
 - 19.1 the Eielson Air Force Base Commander has ordered that only personnel that are either operating or supporting the crusher can proceed beyond the signs,
 - 19.2 any person who proceeds beyond the sign will be escorted from the area by crusher operators; and
 - 19.3 personnel who continue to violate the crusher exclusion zone will be escorted from the area by Air Force Security Forces.

20. **Asphalt/Rock Crusher Maintenance.** For EUs 82 – 84 and 86 – 103, the Permittee shall:
 - 20.1 perform regular maintenance considering the manufacturer’s or the operator’s maintenance procedures;
 - 20.2 keep records of any maintenance that would have a significant effect on emissions; the records may be kept in an electronic format; and
 - 20.3 keep a copy of either manufacturer’s or the operator’s maintenance procedures.

21. **EUs 17, 18, 63, 64A, 64B, 75 – 78, 80 and 123 – 129 Maintenance.** For EUs 17, 18, 63, 64A, 64B, 75 – 78, 80, and 123 – 129, the Permittee shall:
 - 21.1 perform regular maintenance considering the manufacturer’s or the operator’s maintenance procedures;
 - 21.2 keep records of any maintenance that would have a significant effect on emissions; the records may be kept in an electronic format; and
 - 21.3 keep a copy of either manufacturer’s or the operator’s maintenance procedures.

Section 6 Recordkeeping, Reporting, and Certification Requirements

22. **Certification.** The Permittee shall certify any permit application, report, affirmation, or compliance certification submitted to the Department and required under the permit by including the signature of a responsible official for the permitted stationary source following the statement: “*Based on information and belief formed after reasonable inquiry, I certify that the statements and information in and attached to this document are true, accurate, and complete.*” Excess emissions reports must be certified either upon submittal or with an operating report required for the same reporting period. All other reports and other documents must be certified upon submittal.
- 22.1 The Department may accept an electronic signature on an electronic application or other electronic record required by the Department if
- a. A certifying authority registered under AS 09.25.510 verifies that the electronic signature is authentic; and
 - b. The person providing the electronic signature has made an agreement with the certifying authority described in Condition 22.1a that the person accepts or agrees to be bound by an electronic record executed or adopted with that signature.
23. **Submittals.** Unless otherwise directed by the Department or this permit, the Permittee shall submit reports, compliance certifications, and/or other submittals required by this permit, via the Department’s AOS System at <http://dec.alaska.gov/applications/air/airtoolsweb> using the Permittee Portal option.
- 23.1 Upon approval by the Department, the Permittee can submit reports by alternative methods, certified in accordance with Condition 22, and submitted by email under a cover letter using dec.aq.airreports@alaska.gov; or by letter, or form if the Permittee does not have the technical ability to submit the records using the Department’s website.
24. **Information Requests.** The Permittee shall furnish to the Department, within a reasonable time, any information the Department requests in writing to determine whether cause exists to modify, revoke, reissue, or terminate the permit or to determine compliance with the permit. Upon request, the Permittee shall furnish to the Department copies of records required to be kept by the permit. The Department may require the Permittee to furnish copies of those records directly to the federal administrator.

Section 7 Standard Permit Conditions

25. The Permittee must comply with each permit term and condition. Noncompliance with a permit term or condition constitutes a violation of AS 46.14, 18 AAC 50, and, except for those terms or conditions designated in the permit as not federally enforceable, the Clean Air Act, and is grounds for
 - 25.1 an enforcement action; or
 - 25.2 permit termination, revocation and reissuance, or modification in accordance with AS 46.14.280.
26. It is not a defense in an enforcement action to claim that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with a permit term or condition.
27. Each permit term and condition is independent of the permit as a whole and remains valid regardless of a challenge to any other part of the permit.
28. The permit may be modified, reopened, revoked and reissued, or terminated for cause. A request by the Permittee for modification, revocation and reissuance, or termination or a notification of planned changes or anticipated noncompliance does not stay any permit condition.
29. The permit does not convey any property rights of any sort, nor any exclusive privilege.
30. The Permittee shall allow the Department or an inspector authorized by the Department, upon presentation of credentials and at reasonable times with the consent of the owner or operator to
 - 30.1 enter upon the premises where an emissions unit subject to this permit is located or where records required by the permit are kept;
 - 30.2 have access to and copy any records required by this permit;
 - 30.3 inspect any stationary source, equipment, practices, or operations regulated by or referenced in the permit; and
 - 30.4 sample or monitor substances or parameters to assure compliance with the permit or other applicable requirements.

Section 8 General Source Test Requirements

31. **Requested Source Tests.** In addition to any source testing explicitly required by this permit, the Permittee shall conduct source testing as requested by the Department to determine compliance with applicable permit requirements.
32. **Operating Conditions.** Unless otherwise specified by an applicable requirement or test method, the Permittee shall conduct source testing
 - 32.1 at a point or points that characterize the actual discharge into the ambient air; and
 - 32.2 at the maximum rated burning or operating capacity of the emissions unit or another rate determined by the Department to characterize the actual discharge into the ambient air.
33. **Reference Test Methods.** The Permittee shall use the following references for test methods when conducting source testing for compliance with this permit:
 - 33.1 Source testing for the reduction in visibility through the exhaust effluent must be conducted in accordance with the procedures set out in 40 C.F.R. 60, Appendix A, Reference Method 9. The Permittee may use the form in Attachment 1 of this permit to record data.
 - 33.2 Source testing for emissions of total particulate matter, sulfur compounds, nitrogen compounds, carbon monoxide, lead, volatile organic compounds, fluorides, sulfuric acid mist, municipal waste combustor organics, metals and acid gases must be conducted in accordance with the methods and procedures specified in 40 C.F.R. 60, Appendix A.
 - 33.3 Source testing for emissions of PM-10 and PM-2.5 must be conducted in accordance with the procedures specified in 40 C.F.R. 51, Appendix M, Methods 201 or 201A and 202.
 - 33.4 Source testing for emissions of any contaminant may be determined using an alternative method approved by the Department in accordance with 40 C.F.R. 63 Appendix A, Method 301.
34. **Test Deadline Extension.** The Permittee may request an extension to a source test deadline established by the Department. The Permittee may delay a source test beyond the original deadline only if the extension is approved in writing by the Department's appropriate division director or designee.
35. **Test Plans.** Before conducting any source tests, the Permittee shall submit a plan to the Department. The plan must include the methods and procedures to be used for sampling, testing, and quality assurance and must specify how the emissions unit will operate during the test and how the Permittee will document that operation. The Permittee shall submit a complete plan within 60 days after receiving a request under Condition 31 and at least 30 days before the scheduled date of any test unless the Department agrees in writing to some other time period. Retesting may be done without resubmitting the plan.

36. **Test Notification.** At least 10 days before conducting a source test, the Permittee shall give the Department written notice of the date and time the source test will begin.
37. **Test Reports.** Within 60 days after completing a source test, the Permittee shall submit one certified copy of the results in the format set out in the *Source Test Report Outline*, adopted by reference in 18 AAC 50.030. The Permittee shall certify the results in the manner set out in Condition 22. If requested in writing by the Department, the Permittee must provide preliminary results in a shorter period of time specified by the Department.
38. **Test Exemption.** The Permittee is not required to comply with Conditions 35, 36 and 37 when the exhaust is observed for visible emissions by Method 9 Plan or Smoke/No Smoke Plan.

Section 9 *Permit Documentation*

Date

November 18, 2019

Document Details

Application Received

Section 10 Crusher Location Change Form

Submit the information specified below to the Department's Air Permit Program Compliance Section, 610 University Avenue, Fairbanks, Alaska 99709-3643 *ten* days before moving the plant to any new location, and report the exact date before startup by telephone, fax, e-mail or letter.

Name of Firm: _____ Permit Number: _____

Make and model of the Equipment/Facility to be relocated: _____

Contact Person: _____ Telephone: _____

New plant location (street address, milepost number etc.; include site maps): _____

Approximate start-up and shut-down dates: _____

Distance from plant boundary to nearest inhabited structure _____ yards.

Nearest inhabited structures are on (check one) ___ flat or ___ elevated terrain.

Attach approvals or conditional use permits from Borough where plant is to be located.

Comments: _____

I hereby certify that the information contained in this notification to the best of my knowledge and belief, is true, complete, and accurate. I have taken the information in Condition 18 into account in the site selection for this plant relocation.

Signature: _____ Printed Name: _____

Title: _____ Telephone: _____

State of Alaska, City of _____, Borough of _____

On this _____ day of _____, 20____ before me personally appeared _____

Whose identity was proved to me on the basis of satisfactory evidence to be the person whose name is subscribed to this instrument, and acknowledged that he (she) executed the same.

Notary Public

My Commission Expires on

Section 11 Complaint Form

COMPLAINT FORM

Date _____ Time: _____

Activities Involved:

Provide a description of reported complaint. Attach sheets as necessary.

If applicable, operational conditions which contributed to the complaint:

If applicable, ambient conditions which contributed to the complaint:

If applicable, describe measures taken to immediately address the complaint.

If applicable, describe measures taken to address preventing the condition which generated the complaint.

If applicable, describe any reason that you feel the complaint may not be a violation:

Based on information and belief formed after reasonable inquiry, I certify that the statements and information in and attached to this document are true, accurate and complete.

Printed Name

Signature

Date

Attachment 1 – Visible Emissions Form

VISIBLE EMISSION OBSERVATION FORM

This form is designed to be used in conjunction with EPA Method 9, “Visual Determination of the Opacity of Emissions from Stationary Sources.” Temporal changes in emission color, plume water droplet content, background color, sky conditions, observer position, etc. should be noted in the comments section adjacent to each minute of readings. Any information not dealt with elsewhere on the form should be noted under additional information. Following are brief descriptions of the type of information that needs to be entered on the form: for a more detailed discussion of each part of the form, refer to “Instructions for Use of Visible Emission Observation Form.”

- Source Name: full company name, parent company or division or subsidiary information, if necessary.
- Address: street (not mailing or home office) address of facility where VE observation is being made.
- Phone (Key Contact): number for appropriate contact.
- Source ID Number: number from NEDS, agency file, etc.
- Process Equipment, Operating Mode: brief description of process equipment (include type of facility) and operating rate, % capacity, and/or mode (e.g. charging, tapping, shutdown).
- Control Equipment, Operating Mode: specify type of control device(s) and % utilization, control efficiency.
- Describe Emission Point: for identification purposes, stack or emission point appearance, location, and geometry; and whether emissions are confined (have a specifically designed outlet) or unconfined (fugitive).
- Height Above Ground Level: stack or emission point height relative to ground level; can use engineering drawings, Abney level, or clinometer.
- Height Relative to Observer: indicate height of emission point relative to the observation point.
- Distance from Observer: distance to emission point; can use rangefinder or map.
- Direction from Observer: direction plume is traveling from observer.
- Describe Emissions and Color: include physical characteristics, plume behavior (e.g., looping, lacy, condensing, fumigating, secondary particle formation, distance plume visible, etc.), and color of emissions (gray, brown, white, red, black, etc.). Note color changes in comments section.
- Visible Water Vapor Present?: check “yes” if visible water vapor is present.
- If Present, is Plume...: check “attached” if water droplet plume forms prior to exiting stack, and “detached” if water droplet plume forms after exiting stack.
- Point in Plume at Which Opacity was Determined: describe physical location in plume where readings were made (e.g., 1 ft above stack exit or 10 ft. after dissipation of water plume).
- Describe Plume Background: object plume is read against, include texture and atmospheric conditions (e.g., hazy).
- Background Color: sky blue, gray-white, new leaf green, etc.
- Sky Conditions: indicate cloud cover by percentage or by description (clear, scattered, broken, overcast).
- Wind Speed: record wind speed; can use Beaufort wind scale or hand-held anemometer to estimate.
- Wind Direction From: direction from which wind is blowing; can use compass to estimate to eight points.
- Ambient Temperature: in degrees Fahrenheit or Celsius.
- Wet Bulb Temperature: can be measured using a sling psychrometer
- RH Percent: relative humidity measured using a sling psychrometer; use local US Weather Bureau measurements only if nearby.
- Source Layout Sketch: include wind direction, sun position, associated stacks, roads, and other landmarks to fully identify location of emission point and observer position.
- Draw North Arrow: to determine, point line of sight in direction of emission point, place compass beside circle, and draw in arrow parallel to compass needle.
- Sun’s Location: point line of sight in direction of emission point, move pen upright along sun location line, mark location of sun when pen’s shadow crosses the observer’s position.
- Observation Date: date observations conducted.
- Start Time, End Time: beginning and end times of observation period (e.g., 1635 or 4:35 p.m.).
- Data Set: percent opacity to nearest 5%; enter from left to right starting in left column. Use a second (third, etc.) form, if readings continue beyond 30 minutes. Use dash (-) for readings not made; explain in adjacent comments section.
- Comments: note changing observation conditions, plume characteristics, and/or reasons for missed readings.
- Range of Opacity: note highest and lowest opacity number.
- Observer’s Name: print in full.
- Observer’s Signature, Date: sign and date after performing VE observation.
- Organization: observer’s employer.
- Certified By, Date: name of “smoke school” certifying observer and date of most recent certification.

ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION AIR QUALITY DIVISION - VISIBLE EMISSIONS OBSERVATION FORM							Page No. _____		
Source Name	Type of Source		Observation Date	Start Time		End Time			
Address	City	State	Zip	Sec	0	15	30	45	Comments
				Min	1				
Phone # (Key Contact)	Source ID Number			2					
Process Equipment	Operating Mode			3					
Control Equipment	Operating Mode			4					
Describe Emission Point				5					
Height above ground level	Height relative to observer	Inclinometer Reading			6				
Distance From Observer	Direction From Observer			7					
	Start	End		8					
Describe Emissions & Color				9					
Start	End			10					
Visible Water Vapor Present? If yes, determine approximate distance from the stack exit to where the plume was read				11					
No	Yes			12					
Point in Plume at Which Opacity Was Determined				13					
Describe Plume Background			Background Color		14				
Start	End			15					
Sky Conditions: Start				16					
End				17					
Wind Speed	Wind Direction From			18					
	Start	End		19					
Ambient Temperature	Wet Bulb Temp	RH percent		20					
NOTES: 1 Stack or Point Being Read 2 Wind Direction From				21					
3 Observer Location	4 Sun Location	5 North Arrow	6 Other Stacks	22					
				23					
				24					
				25					
				26					
				27					
				28					
				29					
				30					
Range of Opacity									
Minimum			Maximum						
I have received a copy of these opacity observations			Print Observer's Name						
Print Name:			Observer's Signature	Date					
Signature:									
Title	Date		Organization						
			Certified By:	Date					

Attachment 2 - ADEC Notification Form

Excess Emissions and Permit Deviation Reporting
State of Alaska Department of Environmental Conservation
Division of Air Quality

<u>Eielson Air Force Base</u>	<u>AQ0264MSS06</u>
Stationary Source Name	Air Quality Permit
<u>United States Air Force</u>	
Company Name	Date

When did you discover the Excess Emissions/Permit Deviation?

Date: _____ / _____ / _____ Time: _____ : / _____

When did the event/deviation?

Begin Date: _____ / _____ / _____ Time: _____ : _____ (Use 24-hr clock.)

End Date _____ / _____ / _____ Time: _____ : _____ (Use 24-hr clock.)

What was the duration of the event/deviation? _____ : _____ (hrs:min) or _____ days
(total # of hrs, min, or days, if intermittent then include only the duration of the actual emissions/deviation)

Reason for notification: (please check only 1 box and go to the corresponding section)

- Excess Emissions Complete Section 1 and Certify
 Deviation from permit conditions complete Section 2 and certify
 Deviation from COBC, CO, or Settlement Agreement Complete Section 2 and certify

Section 1. Excess Emissions

(a) **Was the exceedance** Intermittent or Continuous

(b) **Cause of Event (Check one that applies):**

- Start Up/Shut Down Natural Cause (weather/earthquake/flood)
 Control Equipment Failure Scheduled Maintenance/Equipment Adjustments
 Bad fuel/coal/gas Upset Condition Other

(c) **Description**

Describe briefly, what happened and the cause. Include the parameters/operating conditions exceeded, limits, monitoring data and exceedance.

(d) Emission unit(s) Involved:

Identify the emission units involved in the event, using the same identification number and name as in the permit. Identify each emission standard potentially exceeded during the event and the exceedance.

EU ID	EU Name	Permit Condition Exceeded/Limit/Potential Exceedance

(e) Type of Incident (please check only one):

- Opacity % Venting (gas/scf) Control Equipment Down
 Fugitive Emissions Emission Limit Exceeded Record Keeping Failure
 Marine Vessel Opacity Failure to monitor/report Flaring
 Other:

(f) Unavoidable Emissions:

- Do you intend to assert that these excess emissions were unavoidable? YES NO
Do you intend to assert the affirmative defense of 18 AAC 50.235? YES NO

Certify Report (go to end of form)

Section 2. Permit Deviations

(a) **Permit Deviation Type** (check only one box corresponding with the section in the permit)

- Emission Unit Specific
- General Source Test/Monitoring Requirements
- Recordkeeping/Reporting/Compliance Certification
- Standard Conditions Not Included in Permit
- Generally Applicable Requirements
- Reporting/Monitoring for Diesel Engines
- Insignificant Emission Unit
- Stationary Source-Wide
- Other Section: (title of section and section # of your permit)

(b) **Emission unit(s) Involved:**

Identify the emission unit involved in the event, using the same identification number and name as in the permit. List the corresponding Permit condition and the deviation.

<u>EU</u>	<u>Emission Unit Name</u>	<u>Permit Condition /Potential Deviation</u>

(c) **Description of Potential Deviation:**

Describe briefly, what happened and the cause. Include the parameters/operating conditions and the potential deviation.

(d) **Corrective Actions:**

Describe actions taken to correct the deviation or potential deviation and to prevent future recurrence.

Certification:

Based on information and belief formed after reasonable inquiry, I certify that the statements and information in and attached to this document are true, accurate, and complete.

Printed Name: _____ Title: _____ Date: _____

Signature: _____ Phone Number: _____

NOTE: *This document must be certified in accordance with 18 AAC 50.345(j)*

To submit this report:

1. Department's Air Online Services using the Permittee Portal option:

<http://dec.alaska.gov/applications/air/airtoolsweb>

If submitted online, report must be submitted by an authorized E-Signer for the stationary source.

Or

2. Fax to: 907-451-2187

Or

3. Email to: DEC.AQ.Airreports@alaska.gov

Or

4. Mail to: ADEC
Air Permits Program
610 University Avenue
Fairbanks, AK 99709-3643

Or

5. Phone Notifications: 907-451-5173

Phone notifications require a written follow-up report.

**Technical Analysis Report
For the terms and conditions of
Minor Permit AQ0264MSS06**

Issued to United States Air Force

For the Eielson Air Force Base

**Alaska Department of Environmental Conservation
Air Permits Program**

Prepared by Grace Petersen

Reviewed by Aaron Simpson

Final – May 27, 2020

1. INTRODUCTION

This Technical Analysis Report (TAR) provides the Alaska Department of Environmental Conservation's (Department's) basis for issuing Minor Permit AQ0264MSS06 to United States Air Force (USAF) for the Eielson Air Force Base. USAF requested the permit under 18 AAC 50.508(6) in order to revise terms or conditions previously established in a Title I Permit. Minor Permit AQ0264MSS06 rescinds minor permit AQ0264MSS04.

2. STATIONARY SOURCE DESCRIPTION

The Eielson Air Force Base is an existing stationary source owned and operated by the United States Department of the Air Force. The stationary source is located approximately 23 miles southeast of Fairbanks, Alaska. The base provides forward air control for joint United States Air Force and United States Army contingencies in overall Alaska military operations, and in support of United States Air Force Pacific Air Forces. The 354th Fighter Wing has been the host military unit of the base since 1993.

Eielson Air Force Base, like many other military installations, differs from most industrial facilities in that the base hosts and supports a wide variety of functions and activities not normally associated with an industrial site. Eielson Air Force Base consists of an operational air field, residential housing, office buildings, gas stations, utilities, military police and fire departments, public schools, chapels, hospital facilities, retail stores, recreational facilities, and more.

The emissions units (EUs) at the Eielson Air Force Base that have specific monitoring, recordkeeping, and reporting requirements are listed in Table 1 of Minor Permit AQ0264MSS06. These EUs are predominantly associated with either primary or back up heating or power generation. Primary heating and power generation was originally accomplished with six large coal-fired boilers (EUs 1-6A) and associated steam and generating equipment. Minor Permit AQ0264MSS05 authorized the installation of five replacement coal-fired boilers. Two replacement coal-fire boilers have already been installed: EU 6A replaced EU 6 in October 2014 and EU 5A replaced EU 5 in October 2016. Backup heating and power are provided via distillate-fired boilers and generators. Other significant sources of air pollution include jet engine testing and diesel fuel-fired engines and water pumps.

USAF currently operates under Operating Permit AQ0264TVP02, Revision 4.

3. APPLICATION DESCRIPTION

USAF submitted their application on November 18, 2019 to revise and rescind minor permit AQ0264MSS04. The requested changes are as follows:

- Replace an Electromotive Diesel (EMD) generator, EU 19, with EU 19A, a new Tier 4 compliant engine
- Remove Conditions 13 and 14 from AQ0264MSS04 that impose limits of operation to limit oxides of nitrogen (NO_x).

4. CLASSIFICATION FINDINGS

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

1. Minor Permit AQ0264MSS06 is classified under 18 AAC 50.508(6) to revise or rescind terms and conditions of a Title I permit.

5. APPLICATION REVIEW FINDINGS

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

1. USAF's minor permit application for the Eielson Air Force Base contains the elements listed in 18 AAC 50.540.
2. USAF requested to remove EU 19 and replace it with a Tier 4-compliant non-emergency engine, EU 19A, that can be operated at full capacity without triggering Prevention of Significant Deterioration (PSD) permitting requirements that were previously avoided by existing Owner Requested Limits (ORLs) for EU 19.
3. EU 19 was installed in 1987. The unrestricted potential to emit (PTE) was 42.74 tpy NO_x. With unrestricted emissions, EU 19 triggered a Major Modification under the PSD regulations because PTE was over 40 tpy NO_x, however, this unit was installed without conducting the federal New Source Review (NSR) under PSD rules. The Department worked with USAF to remedy this PSD major modification trigger, along with several other facility modifications that occurred between 1982 and 1992. In 2004, the Department issued AQ0264CP04. At that time, USAF chose an ORL to implement a fuel limit of 182,000 gallons per rolling 12-month period, and to incorporate Fuel Injection Timing Retard (FITR) to reduce the engine's emissions to 22.0 tpy. The permit required a source test to be conducted at multiple loads. This limit allowed the unit to retroactively avoid NSR requirements under the Clean Air Act. Based on the results of emissions source testing in 2005, it was determined that additional restrictions would be necessary to retain EU 19 below 22.0 tpy NO_x. The fuel limit was reduced to 157,000 gallons per 12-month rolling period and the engine's operating rate was restricted to 1,800 kWe or less.
4. USAF requested that the ORLs to avoid PSD for NO_x in Conditions 13 and 14 of Minor Permit AQ0264MSS04, be rescinded with the removal of EU 19.
5. Rescinding Conditions 13 and 14 of Minor Permit AQ0264MSS04 **after** the decommissioning of EU 19 and the commissioning of EU 19A will not result in an increase of criteria pollutant emissions that would trigger a PSD modification. EU 19A is required to conduct an initial source test, or submit certified manufacturer's guarantee, or a certificate of conformity that EU 19A will comply with EPA Tier 4 Emission Standards.
6. Calculating PTE for the stationary source required correcting NO_x, VOC, and SO₂ emission factors. Potential operational hour assumptions were also updated for liquid fuel boilers, EUs 9-14. See Appendix A of this TAR for additional information.

6. EMISSIONS SUMMARY AND PERMIT APPLICABILITY

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.

The Department corrected NO_x, VOC, and SO₂ emission factor errors and updated operational limit assumptions for liquid fuel boilers (EUs 9 – 14) while reviewing the PTE for the stationary source. A summary of the 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	NO _x	CO	VOC	PM-10	SO ₂
PTE before Modification[a]	666.3	217	59	30.2	455.2
PTE after Modification	615.5	183	29.6	37.6	464.3
Change in PTE	-50.8	-34	-29.4	7.4	8.1
18 AAC 50.502(c)(3) Permit Thresholds [b]	10	N/A	N/A	10	10
18 AAC 50.502(c)(4) Permit Thresholds [b]	40	N/A	N/A	15	40
502(c)(3) Applicable?	No	N/A	N/A	No	No
Assessable Emissions [c] [d]	616	183	30	38	464
Total Assessable[e]	1,331				

Table Notes:

[a] – PTE before modification is from the Statement of Basis for Operating Permit AQ0264TVP02, Rev. 4

[b] – The thresholds in 18 AAC 50.502(c)(4) applies if source currently under 18 AAC 50.502(c)(1) threshold for that pollutant.

[c] – Assessable emissions include fugitive emissions.

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

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

Table 3 – PSD Permit Applicability, (tpy)

Parameter	NO _x	CO	VOC	PM-10	SO ₂	CO _{2e}
PTE after Modification	31.43	4.56	1.97	1.01	0.21	21,951
Change in PTE	9.43	-5.24	0.67	-0.29	-1.69	1,886
PSD Significant Emission Rates	40	100	40	15	40	75,000
Applicable (Y/N)	No	No	No	No	No	No

Table Notes:

[a] – PSD applicability calculation process is a two-step process: a project emissions increase and a “net emissions increase.” If PSD applicability is avoided at the first step, the second step is not needed. For purposes of this calculation, baseline emissions are assumed to be zero.

[b] – PTE after Modification assumes unlimited operation at full rated capacity for EU 19A

7. REVISIONS TO PERMIT CONDITIONS

Table 4 below lists the requirements from Minor Permit AQ0264MSS04 that were changed in Minor Permit AQ0264MSS06.

Table 4 – Comparison of AQ0264MSS04 to AQ0264MSS06 Conditions¹⁴

Permit AQ0264MSS04 Condition No. / Section No.	Description of Requirement	Permit AQ0264MSS06 Condition No. / Section No.	How Condition was Revised
Section 1	Emission Unit Inventory	Section 1	<ul style="list-style-type: none"> Updated Condition 1 language Updated Table 1: EU descriptions, ratings/sizes, building numbers, and installation dates. Added EU 19A Updated Condition 2 language
Condition 3.1	Visible Emissions	Condition 4.1	Added EU 19A to the initial startup Method 9 observations required for industrial process and fuel-burning equipment.
No equivalent	EU 19 Replacement requirements	Condition 16	The Department added decommissioning notification requirements for EU 19 and commissioning requirements for EU 19A.

8. PERMIT CONDITIONS

The basis for the standard and general conditions imposed in Minor Permit AQ0264MSS06 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 used the Standard Permit Condition (SPC) I language for

¹⁴ This table does not include all standard and general conditions.

Minor Permit AQ0264MSS06. However, the Department included a web address for submitting emission estimates through the Air Online Services (AOS) System. The Department also updated its mailing/delivery addresses. The Department is in the process of incorporating these updates into SPC I.

Section 3: State Emission Standards

Condition 4, Visible Emissions

Visible emissions, excluding condensed water vapor, from an industrial process or fuel-burning equipment may not reduce visibility through the effluent by more than 20 percent averaged over six consecutive minutes, under 18 AAC 50.055(a)(1). Per 18 AAC 50.990(39), “fuel-burning equipment” does not include mobile internal combustion engines (e.g., NREs).

Permits classified under 18 AAC 50.502(c) must include terms and conditions requiring performance tests for emission limits under 18 AAC 50.050-18 AAC 50.090. Department is requiring an initial compliance demonstration within 60 days of startup of the new EU 19A.

For the provisions of this permit to be included in the operating permit as an administrative amendment, the Department has included monitoring, recordkeeping, and reporting requirements to ensure initial and continued compliance with the VE standards.

Diesel fired engines and boilers have the tendency to exceed the VE standards. As such, the Department has included a requirement to perform Method 9 testing as well as recordkeeping and reporting requirements in Condition 4 to demonstrate initial and continued compliance with the standard.

Conditions 5, Particulate Matter (PM)

Particulate Matter emitted from an industrial process or fuel burning equipment may not exceed 0.05 grains per cubic foot of exhaust gas (gr/dscf), averaged over three hours, under 18 AAC 50.055(b).

Experience has shown there is a correlation between opacity and particulate matter. 20 percent visible emissions would normally comply with the 0.05 gr/dscf. As such, compliance with opacity limits is included as a surrogate method of assuring compliance with the PM standards.

Condition 6, Sulfur Compound Emissions

Sulfur compound emissions from an industrial process or fuel burning equipment may not exceed 500 ppm averaged over a period of three hours, under 18 AAC 50.055(c).

Permits classified under 18 AAC 50.502(c) must include terms and conditions requiring performance tests for emission limits under 18 AAC 50.050 – 090.

Calculations show that fuel oil with sulfur content less than 0.74 percent by weight will comply with the state emissions standard. Calculations show that fuel gas with sulfur content less than 4,000 parts per million by volume will comply with the state standards.

Diesel fuel grades that requires less than 0.5 percent fuel sulfur will meet the state emissions standard. Since pipeline quality gas contains less than 100 ppmv, burning pipeline quality gas would comply with the standard. The permit contains appropriate monitoring for compliance with the standard.

Section 4: Best Available Control Technology Limits

Condition 7, Best Available Control Technology Limits

18 AAC 50.544(a)(3) and 18 AAC 50.544(a)(6) require the Department to include conditions to protect air quality, when warranted. The Department determined that conditions are warranted to restrict the annual emissions of NO_x, CO, and SO₂ from EUs 20-23, the diesel-fired boilers. BACT limits for EUs 20-23 were developed in Minor Permit AQ0264MSS04.

Section 5: Owner Requested Limits (ORLs) to Avoid PSD Classification/Modification

Conditions 8 – 21, NO_x, CO, SO₂, and PM-10 Limits

18 AAC 50.544(h) describes the requirements for a permit classified under 18 AAC 50.508(5). This permit describes the ORL, including specific testing, monitoring, recordkeeping, and reporting requirements; it lists all equipment covered by the ORL; and describes the classification that the limit allows the applicant to avoid.

Conditions 8 through 18 incorporate limits developed in Minor Permit AQ0264MSS04. Minor Permit AQ0264MSS04 revised and rescinded conditions from Construction Permit Nos. 9831-AC019, 264CP02, 264CP03, 264CP03, and 264CP04, and Minor Permit AQ0264MSS03. The permit contains ORLs restricting the sulfur content of fuel, hours of operation, limits on fuel tank loading, jet engine testing limits, and asphalt/rock crusher operations limits.

EU 19 was installed in 1987. The unrestricted potential to emit (PTE) was 42.74 tpy NO_x. With unrestricted emissions, EU 19 triggered a Major Modification under the PSD regulations because PTE was over 40 tpy NO_x, however, this unit was installed without conducting the federal New Source Review (NSR) under PSD rules. In 2004, the Department issued AQ0264CP04. At that time, USAF chose an ORL to implement a fuel limit of 182,000 gallons per rolling 12-month period, and to incorporate Fuel Injection Timing Retard (FITR) to reduce the engine's emissions to 22.0 tpy. The permit required a source test to be conducted at multiple loads. This limit allowed the unit to retroactively avoid NSR requirements under the Clean Air Act. Based on the results of emissions source testing in 2005, Condition 14 is an ORL that restricts the Permittee to 157,000 gallons per 12-month rolling period and the engine's operating rate was restricted to 1,800kW or less.

Condition 15 restricts EU 19 to 22.0 tpy NO_x and requires the Permittee to operate EU 19 with FITR.

Condition 16 restricts the concurrent operation of EUs 19 and non-emergency engine, EU 19A, and requires the Permittee to decommission EU 19 prior to start-up of EU 19A. When calculating PTE of the project, the Permittee assumed that the two generators would not operate concurrently. Doing so would result in an increase of PTE greater than the thresholds specified under 18 AAC 50.502(c)(3) for NO_x. The Department, therefore, is imposing these conditions to prevent the project from triggering additional minor permit classifications.

Condition 16 also requires the Permittee to verify initial compliance with Tier 4 exhaust emission standards by either manufacturer's guarantee, certificate of conformity (as outlined under 40 CFR 60.4204), or via an initial source test. The Department calculated the emissions for non-emergency engine, EU 19A, using the worst-case, Tier 4 exhaust emission rates and determined that the maximum potential to emit would not exceed the 18 AAC 50.502(c)(3) thresholds for criteria pollutants.

Section 6: General Recordkeeping, Reporting, and Certification Requirements

Condition 22, 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 AQ0264MSS06 uses the standard condition language, but also expands it by allowing the Permittee to provide electronic signatures.

Condition 23, Submittals

Condition 23 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.

Condition 24, Information Requests

AS 46.14.020(b) allows the Department to obtain a wide variety of emissions, design and operational information from the owner and operator of a stationary source. This statutory provision is reiterated as a standard permit condition in 18 AAC 50.345(i). The Department used the standard language in Minor Permit AQ0264MSS06.

Section 7: Standard Permit Conditions

Conditions 25 – 30, 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 AQ0264MSS06. The Department incorporated these standard conditions as follows:

- 18 AAC 50.345(c)(1) and (2) is incorporated as Condition 25 of Section 7 (Standard Permit Conditions);
- 18 AAC 50.345(d) through (h) is incorporated as Conditions 26 through 30, respectively, of Section 7 (Standard Permit Conditions);
- As previously discussed, 18 AAC 50.345(i) is incorporated as Condition 24 and 18 AAC 50.345(j) is incorporated as Condition 22 of Section 6 (Recordkeeping, Reporting, and Certification Requirements); and
- 18 AAC 50.345(k) is incorporated as Condition 31, and 18 AAC 50.345(l) through (o) is incorporated as Conditions 34 through 37, respectively, of Section 8 (General Source Testing Requirements). See the following discussion.

Section 8: 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 32 requires the Permittee to conduct their source tests under conditions that reflects the actual discharge to ambient air; and
- Condition 33 requires the Permittee to use specific EPA reference methods when conducting a source test.

Section 8 also includes the previously discussed standard conditions for source testing.

9. PERMIT ADMINISTRATION

Minor Permit AQ0264MSS06 does not contradict any conditions in the Title V operating permit issued to Eielson Air Force Base. USAF may therefore operate in accordance with Minor Permit AQ0264MSS06 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. Permit limits indicated in **bold**.

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

EU ID	Unit ID/Description	Maximum Rating or Capacity	Operating Limits	NOx		CO		VOC		PM-10		SO ₂	
				EF	PTE (tpy)	EF	PTE (tpy)	EF	PTE (tpy)	EF	PTE (tpy)	PTE (tpy)	
Coal Fired Boilers													
1	CH&PP Boiler #1	120,000 lb/hr	220,000 tons/yr	3.64 ¹ lb/ton coal	400.0	1.04 ³ lb/ton coal	114.3	0.05 ⁴ lb/ton coal	1.60	0.086 ⁵ lb/ton coal	206.9	371.6 ⁸	
2	CH&PP Boiler #2	120,000 lb/hr								0.246 ⁵ lb/ton coal			
3	CH&PP Boiler #3	120,000 lb/hr								0.188 ⁵ lb/ton coal			
4	CH&PP Boiler #4	120,000 lb/hr								0.297 ⁵ lb/ton coal			
5A	CH&PP Boiler #5	120,000 lb/hr								2.02 ² lb/ton coal			0.232 ⁶ lb/ton coal
6A	CH&PP Boiler #6	120,000 lb/hr								1.92 ² lb/ton coal			0.016 ⁷ lb/ton coal
Liquid Fuel Fired Boilers													
7	Auxiliary Heating Plant Boiler #1	60.7 MMBtu/hr	4,464 hr/yr	20.0 lb/10 ³ gal	20.3 ⁹	5.0 lb/10 ³ gal	5.1	0.56 lb/10 ³ gal	0.5	3.3 lb/10 ³ gal	3.3	21.6 ¹⁰	
8	Auxiliary Heating Plant Boiler #2												
9	Missile Storage Boiler #1	3.3 MMBtu/hr	7,400 hr/yr	20.0 lb/10 ³ gal	1.8	5.0 lb/10 ³ gal	5.1	0.56 lb/10 ³ gal	0.04	3.3 lb/10 ³ gal	0.3	1.9	
10	Missile Storage Boiler #2	2.9 MMBtu/hr	8,100 hr/yr		1.8		0.5		0.04		0.3	1.9	
11	Alert Hangar Boiler #1	6.0 MMBtu/hr	4,000 hr/yr		1.8		0.4		0.04		0.3	1.9	
12	Alert Hangar Boiler #2	6.0 MMBtu/hr	4,000 hr/yr	20.0 lb/10 ³ gal	1.8	5.0 lb/10 ³ gal	0.4	0.56 lb/10 ³ gal	0.04	3.3 lb/10 ³ gal	0.3	1.9	
13	Waste Water Treatment Boiler #1	6.7 MMBtu/hr	3,600 hr/yr	20.0 lb/10 ³ gal	1.8	5.0 lb/10 ³ gal	0.5	0.56 lb/10 ³ gal	0.04	3.3 lb/10 ³ gal	0.3	1.9	

EU ID	Unit ID/Description	Maximum Rating or Capacity	Operating Limits	NOx		CO		VOC		PM-10		SO ₂
				EF	PTE (tpy)	EF	PTE (tpy)	EF	PTE (tpy)	EF	PTE (tpy)	PTE (tpy)
14	Waste Water Treatment Boiler #2	6.7 MMBtu/hr	3,600 hr/yr	20.0 lb/10 ³ gal	1.8	5.0 lb/10 ³ gal	0.5	0.56 lb/10 ³ gal	0.04	3.3 lb/10 ³ gal	0.3	1.9
15	Auxiliary Heating Plant II Boiler #1	98.0 MMBtu/hr	3,583,851 gal/yr	15.8 lb/10 ³ gal	28.3 ⁹	5.0 lb/10 ³ gal	9.0	0.56 lb/10 ³ gal	0.9	3.3 lb/10 ³ gal	5.9	38.2
16	Auxiliary Heating Plant II Boiler #2											
Propane Fired Heaters												
17	Corrosion Control Heater #1	14.7 MMBtu/hr	N/A	13.0 ¹¹ lb/mgal	18.3	7.5 ¹¹ lb/mgal	10.6	1.0 ¹¹ lb/mgal	1.18	0.7 ¹¹ lb/mgal	0.98	2.12
18	Corrosion Control Heater #2											
Diesel and Gasoline Fired Internal Combustion Engines												
19A	CH&PP Main Auxiliary Generator Candidate #1	4,376 bhp	8,760 hr/yr	7.18 ¹² lb/hr	31.43	1.04 ¹² lb/hr	4.6	0.45 ¹² lb/hr	1.97	0.23 ¹² lb/hr	1.01	0.21
20	CH&PP Auxiliary Power Generator #1	2,250 bhp	173,800 ¹³ gal	2.18E-02 ¹⁴ lb/hp-hr	34.9	5.50E-03 ¹⁵ lb/hp-hr	8.8	7.05E-04 ¹⁵ lb/hp-hr	0.6	1.55E-04 ¹⁴ lb/hp-hr	0.2	1.8
21	CH&PP Auxiliary Power Generator #2	2,250 bhp										
22	CH&PP Auxiliary Power Generator #3	2,250 bhp										
23	CH&PP Auxiliary Power Generator #4	2,250 bhp										
24	Waste Water Treatment Generator	728 bhp	200 hr/yr	2.40E-02 lb/hp-hr	1.7	5.50E-03 lb/hp-hr	0.4	7.05E-04 lb/hp-hr	0.0	7.00E-04 lb/hp-hr	0.1	0.1

EU ID	Unit ID/Description	Maximum Rating or Capacity	Operating Limits	NOx		CO		VOC		PM-10		SO ₂				
				EF	PTE (tpy)	EF	PTE (tpy)	EF	PTE (tpy)	EF	PTE (tpy)	PTE (tpy)				
25	Central Avenue (Clinic) Generator	470 bhp	200 hr/yr	3.10E-02	lb/hp-hr	1.5	6.68E-03	lb/hp-hr	0.3	2.51E-03	lb/hp-hr	0.1	2.20E-03	lb/hp-hr	0.1	0.1
26	Refueling Station Generator-Oscar Row	1,135 bhp	140 hr/yr	2.40E-02	lb/hp-hr	1.9	5.50E-03	lb/hp-hr	0.4	7.05E-04	lb/hp-hr	0.0	7.00E-04	lb/hp-hr	0.1	0.1
28	Alert Hangar Generator	241.4 bhp	200 hr/yr	3.10E-02	lb/hp-hr	0.7	6.68E-03	lb/hp-hr	0.2	2.51E-03	lb/hp-hr	0.1	2.20E-03	lb/hp-hr	0.1	0.0
29	Power Plant Fire Pump	196 bhp	200 hr/yr	3.10E-02	lb/hp-hr	0.6	6.68E-03	lb/hp-hr	0.1	2.51E-03	lb/hp-hr	0.0	2.20E-03	lb/hp-hr	0.0	0.0
30	Missile Maintenance Generator ¹⁶	207 bhp	200 hr/yr	3.10E-02	lb/hp-hr	0.6	6.68E-03	lb/hp-hr	0.1	2.51E-03	lb/hp-hr	0.1	2.20E-03	lb/hp-hr	0.0	0.0
31	Control Tower Generator ¹⁶	207 bhp	200 hr/yr	3.10E-02	lb/hp-hr	0.6	6.68E-03	lb/hp-hr	0.1	2.51E-03	lb/hp-hr	0.1	2.20E-03	lb/hp-hr	0.0	0.0
32	Telephone Exchange Generator ¹⁶	207 bhp	200 hr/yr	3.10E-02	lb/hp-hr	0.6	6.68E-03	lb/hp-hr	0.1	2.51E-03	lb/hp-hr	0.1	2.20E-03	lb/hp-hr	0.0	0.0
33	Command Post Generator ¹⁶	145 bhp	200 hr/yr	3.10E-02	lb/hp-hr	0.4	6.68E-03	lb/hp-hr	0.1	2.51E-03	lb/hp-hr	0.0	2.20E-03	lb/hp-hr	0.0	0.0
34	Airfield Lighting Generator ¹⁶	470 bhp	200 hr/yr	3.10E-02	lb/hp-hr	1.5	6.68E-03	lb/hp-hr	0.3	2.51E-03	lb/hp-hr	0.1	2.20E-03	lb/hp-hr	0.1	0.1
35 A	Fire Pump P8 (Thunder Dome #1) ¹⁶	365 bhp	200 hr/yr	3.10E-02	lb/hp-hr	0.21	6.68E-03	lb/hp-hr	0.19	2.51E-03	lb/hp-hr	0.09	2.20E-03	lb/hp-hr	0.08	0.0
36 A	Fire Pump P9 (Thunder Dome #2) ¹⁶	365 bhp	200 hr/yr	3.10E-02	lb/hp-hr	0.2	6.68E-03	lb/hp-hr	0.2	2.51E-03	lb/hp-hr	0.1	2.20E-03	lb/hp-hr	0.1	0.0
37 A	Fire Pump P10 (Thunder Dome #3) ¹⁶	365 bhp	200 hr/yr	3.10E-02	lb/hp-hr	0.2	6.68E-03	lb/hp-hr	0.2	2.51E-03	lb/hp-hr	0.1	2.20E-03	lb/hp-hr	0.1	0.0
38	Fire Pump P11 (F-16 Hangar Pump #1) ¹⁶	323 bhp	200 hr/yr	3.10E-02	lb/hp-hr	1.0	6.68E-03	lb/hp-hr	0.2	2.51E-03	lb/hp-hr	0.1	2.20E-03	lb/hp-hr	0.1	0.0
39	Fire Pump P12 (F-16 Hangar Pump #2) ¹⁶	323 bhp	200 hr/yr	3.10E-02	lb/hp-hr	1.0	6.68E-03	lb/hp-hr	0.2	2.51E-03	lb/hp-hr	0.1	2.20E-03	lb/hp-hr	0.1	0.0

EU ID	Unit ID/Description	Maximum Rating or Capacity	Operating Limits	NOx		CO		VOC		PM-10		SO ₂				
				EF	PTE (tpy)	EF	PTE (tpy)	EF	PTE (tpy)	EF	PTE (tpy)	PTE (tpy)				
40	Fire Pump P13 (F-16 Hangar Pump #3) ¹⁶	323 bhp	200 hr/yr	3.10E-02	lb/hp-hr	1.0	6.68E-03	lb/hp-hr	0.2	2.51E-03	lb/hp-hr	0.1	2.20E-03	lb/hp-hr	0.1	0.0
41	Fire Pump P19 (Hog Pen A-10s) ¹⁶	235 bhp	200 hr/yr	3.10E-02	lb/hp-hr	0.7	6.68E-03	lb/hp-hr	0.2	2.51E-03	lb/hp-hr	0.1	2.20E-03	lb/hp-hr	0.1	0.0
43	Fire Pump P6-Fire Support ¹⁶	121 bhp	200 hr/yr	3.10E-02	lb/hp-hr	0.4	6.68E-03	lb/hp-hr	0.1	2.51E-03	lb/hp-hr	0.0	2.20E-03	lb/hp-hr	0.0	0.0
44	Fire Pump P5-Fire Support ¹⁶	121 bhp	200 hr/yr	3.10E-02	lb/hp-hr	0.4	6.68E-03	lb/hp-hr	0.1	2.51E-03	lb/hp-hr	0.0	2.20E-03	lb/hp-hr	0.0	0.0
45	Fire Pump P1-Fire Support ¹⁶	121 bhp	200 hr/yr	3.10E-02	lb/hp-hr	0.4	6.68E-03	lb/hp-hr	0.1	2.51E-03	lb/hp-hr	0.0	2.20E-03	lb/hp-hr	0.0	0.0
46	Taxi Way #4 Fire Pump ¹⁶	121 bhp	200 hr/yr	3.10E-02	lb/hp-hr	0.4	6.68E-03	lb/hp-hr	0.1	2.51E-03	lb/hp-hr	0.0	2.20E-03	lb/hp-hr	0.0	0.0
47	Pumphouse #3 Fire Pump ¹⁶	121 bhp	200 hr/yr	3.10E-02	lb/hp-hr	0.4	6.68E-03	lb/hp-hr	0.1	2.51E-03	lb/hp-hr	0.0	2.20E-03	lb/hp-hr	0.0	0.0
48	Fire Pump P2 ¹⁶	121 bhp	200 hr/yr	3.10E-02	lb/hp-hr	0.4	6.68E-03	lb/hp-hr	0.1	2.51E-03	lb/hp-hr	0.0	2.20E-03	lb/hp-hr	0.0	0.0
49	Comms Squadron Emergency Generator ¹⁶	170 bhp	200 hr/yr	3.10E-02	lb/hp-hr	0.5	6.68E-03	lb/hp-hr	0.1	2.51E-03	lb/hp-hr	0.0	2.20E-03	lb/hp-hr	0.0	0.0
50	Water Treatment Plant Generator ¹⁶	470 bhp	200 hr/yr	3.10E-02	lb/hp-hr	1.5	6.68E-03	lb/hp-hr	0.3	2.51E-03	lb/hp-hr	0.1	2.20E-03	lb/hp-hr	0.1	0.0
51	Utilidor (Auxiliary Heat Plant) Emergency Generator ¹⁵	755 bhp	200 hr/yr	2.40E-02	lb/hp-hr	1.8	5.50E-03	lb/hp-hr	0.4	7.05E-04	lb/hp-hr	0.0	7.00E-04	lb/hp-hr	0.1	0.1
52	E-2 Complex Fuel Tank Emergency Generator ¹⁵	765 bhp	200 hr/yr	2.40E-02	lb/hp-hr	1.8	5.50E-03	lb/hp-hr	0.4	7.05E-04	lb/hp-hr	0.0	7.00E-04	lb/hp-hr	0.1	0.1
53	Fuel Hydrant System Emergency Generator ¹⁵	749 bhp	200 hr/yr	2.40E-02	lb/hp-hr	1.8	5.50E-03	lb/hp-hr	0.4	7.05E-04	lb/hp-hr	0.0	7.00E-04	lb/hp-hr	0.1	0.1

EU ID	Unit ID/Description	Maximum Rating or Capacity	Operating Limits	NOx		CO		VOC		PM-10		SO ₂
				EF	PTE (tpy)	EF	PTE (tpy)	EF	PTE (tpy)	EF	PTE (tpy)	PTE (tpy)
54	Joint Mobility Complex (JMC) Emergency Generator ¹⁵	1,200 bhp	130 hr/yr	2.40E-02	1.9	5.50E-03	0.4	7.05E-04	0.0	7.00E-04	0.1	0.1
55	North ILS Generator ¹⁶	102 bhp	200 hr/yr	3.10E-02	0.3	6.68E-03	0.1	2.51E-03	0.0	2.20E-03	0.0	0.0
56	DET 460 Generator ¹⁶	145 bhp	200 hr/yr	3.10E-02	0.4	6.68E-03	0.1	2.51E-03	0.0	2.20E-03	0.0	0.0
57	Munitions Fire Pump #1 ¹⁶	120 bhp	200 hr/yr	3.10E-02	0.4	6.68E-03	0.1	2.51E-03	0.0	2.20E-03	0.0	0.0
58	Munitions Fire Pump #2 ¹⁶	120 bhp	200 hr/yr	3.10E-02	0.4	6.68E-03	0.1	2.51E-03	0.0	2.20E-03	0.0	0.0
59	New Security Forces Facility Generator (CSC) ¹⁶	535 bhp	200 hr/yr	3.10E-02	1.7	6.68E-03	0.4	2.51E-03	0.1	2.20E-03	0.1	0.1
60	Fire Station No. 1 Generator ¹⁶	170 bhp	200 hr/yr	3.10E-02	0.5	6.68E-03	0.1	2.51E-03	0.0	2.20E-03	0.0	0.0
61	Base Supply Fire Pump ¹⁶	208 bhp	200 hr/yr	3.10E-02	0.6	6.68E-03	0.1	2.51E-03	0.1	2.20E-03	0.0	0.0
62	354 Wing MOC Generator ¹⁶	170 bhp	200 hr/yr	3.10E-02	0.5	6.68E-03	0.1	2.51E-03	0.0	2.20E-03	0.0	0.0
63	F-Well pump ¹⁶	230 bhp	200 hr/yr	3.10E-02	0.7	6.68E-03	0.2	2.51E-03	0.1	2.20E-03	0.1	0.0
64 A	A Water Well Pump - Generator ¹⁶	145 bhp	200 hr/yr	3.10E-02	0.4	6.68E-03	0.1	2.51E-03	0.0	2.20E-03	0.0	0.0
64B	B Water Well Pump - Generator ¹⁶	145 bhp	200 hr/yr	3.10E-02	0.4	6.68E-03	0.1	2.51E-03	0.0	2.20E-03	0.0	0.0
65A	Aircraft Arrestor Engine NW ¹⁶	61 bhp	200 hr/yr	3.10E-02	0.2	6.68E-03	0.0	2.51E-03	0.0	2.20E-03	0.0	0.0

EU ID	Unit ID/Description	Maximum Rating or Capacity	Operating Limits	NOx		CO		VOC		PM-10		SO ₂				
				EF	PTE (tpy)	EF	PTE (tpy)	EF	PTE (tpy)	EF	PTE (tpy)	PTE (tpy)				
66A	Aircraft Arrestor Engine NE ¹⁶	61 bhp	200 hr/yr	3.10E-02	lb/hp-hr	0.2	6.68E-03	lb/hp-hr	0.0	2.51E-03	lb/hp-hr	0.0	2.20E-03	lb/hp-hr	0.0	0.0
67A	Aircraft Arrestor Engine 3/4 West ¹⁶	61 bhp	200 hr/yr	3.10E-02	lb/hp-hr	0.2	6.68E-03	lb/hp-hr	0.0	2.51E-03	lb/hp-hr	0.0	2.20E-03	lb/hp-hr	0.0	0.0
68A	Aircraft Arrestor Engine 3/4 East ¹⁶	61 bhp	200 hr/yr	3.10E-02	lb/hp-hr	0.2	6.68E-03	lb/hp-hr	0.0	2.51E-03	lb/hp-hr	0.0	2.20E-03	lb/hp-hr	0.0	0.0
69	Aircraft Arrestor Engine SE ¹⁶	65.9 bhp	200 hr/yr	3.10E-02	lb/hp-hr	0.1	6.68E-03	lb/hp-hr	0.0	2.51E-03	lb/hp-hr	0.1	2.20E-03	lb/hp-hr	0.0	0.0
70A	Aircraft Arrestor Engine SW ¹⁶	65.9 bhp	200 hr/yr	3.10E-02	lb/hp-hr	0.1	6.68E-03	lb/hp-hr	0.0	2.51E-03	lb/hp-hr	0.1	2.20E-03	lb/hp-hr	0.0	0.0
71	Loop Refueling (Type III Hydrant) Generator ¹⁶	685 bhp	200 hr/yr	3.10E-02	lb/hp-hr	1.6	6.68E-03	lb/hp-hr	0.4	2.51E-03	lb/hp-hr	0.0	2.20E-03	lb/hp-hr	0.0	0.1
72	AH&P-Plant II Generator ¹⁶	1,810 bhp	85 hr/yr	2.40E-02	lb/hp-hr	1.8	5.50E-03	lb/hp-hr	0.4	7.05E-04	lb/hp-hr	0.0	7.00E-04	lb/hp-hr	0.1	0.0
73	4 Bay Loop Emergency Generator ¹⁶	250 bhp	200 hr/yr	3.10E-02	lb/hp-hr	0.8	6.68E-03	lb/hp-hr	0.2	2.51E-03	lb/hp-hr	0.1	2.20E-03	lb/hp-hr	0.1	0.0
74	8 Bay Loop Emergency Generator ¹⁶	364 bhp	200 hr/yr	3.10E-02	lb/hp-hr	1.1	6.68E-03	lb/hp-hr	0.2	2.51E-03	lb/hp-hr	0.1	2.20E-03	lb/hp-hr	0.1	0.0
75	Missile Maintenance Well Pump Emergency Generator ¹⁶	99 bhp	200 hr/yr	3.10E-02	lb/hp-hr	0.3	6.68E-03	lb/hp-hr	0.1	2.51E-03	lb/hp-hr	0.0	2.20E-03	lb/hp-hr	0.0	0.0
76	E-2 Farm Fire Pump Emergency Generator ¹⁶	130 bhp	200 hr/yr	3.10E-02	lb/hp-hr	0.4	6.68E-03	lb/hp-hr	0.1	2.51E-03	lb/hp-hr	0.0	2.20E-03	lb/hp-hr	0.0	0.0

EU ID	Unit ID/Description	Maximum Rating or Capacity	Operating Limits	NOx		CO		VOC		PM-10		SO ₂
				EF	PTE (tpy)	EF	PTE (tpy)	EF	PTE (tpy)	EF	PTE (tpy)	PTE (tpy)
77	Dining Facility Emergency Generator ¹⁶	364 bhp	200 hr/yr	3.10E-02 lb/hp-hr	1.1	6.68E-03 lb/hp-hr	0.2	2.51E-03 lb/hp-hr	0.1	2.20E-03 lb/hp-hr	0.1	0.0
78	Red Flag Emergency Generator ¹⁶	145 bhp	200 hr/yr	3.10E-02 lb/hp-hr	0.4	6.68E-03 lb/hp-hr	0.1	2.51E-03 lb/hp-hr	0.0	2.20E-03 lb/hp-hr	0.0	0.0
79	Tank E-6 Generator ¹⁶	482.8 bhp	200 hr/yr	3.10E-02 lb/hp-hr	1.5	6.68E-03 lb/hp-hr	0.3	2.51E-03 lb/hp-hr	0.1	2.20E-03 lb/hp-hr	0.1	0.0
80	Cooling Pond Generator ¹⁵	755 bhp	200 hr/yr	2.40E-02 lb/hp-hr	1.8	5.50E-03 lb/hp-hr	0.4	7.05E-04 lb/hp-hr	0.0	7.00E-04 lb/hp-hr	0.1	0.0
81	Hush House ^{17,18}	n/a	70 tests/yr		18.3		13.8		0.1		0.8	0.9
Portable Asphalt/Rock Crusher Diesel Fired Internal Combustion Engines												
82	Recycle Plant Engine ¹⁹	450 bhp	840 hr/yr	1.02E-02 lb/hp-hr	1.9	5.76E-03 lb/hp-hr	1.1	2.51E-03 lb/hp-hr	0.4	2.47E-03 lb/hp-hr	0.0	0.2
83	Jaw Crusher Engine ¹⁹	450 bhp	840 hr/yr	1.02E-02 lb/hp-hr	1.9	5.76E-03 lb/hp-hr	1.1	2.51E-03 lb/hp-hr	0.4	2.47E-04 lb/hp-hr	0.0	0.0
84	Hydrascreen Engine ¹⁹	96 bhp	3,500 hr/yr	1.10E-02 lb/hp-hr	1.8	1.37E-03 lb/hp-hr	0.2	2.51E-03 lb/hp-hr	0.4	1.81E-04 lb/hp-hr	0.0	0.2
Fire Training												
85	Fire Training ²⁰	n/a	140,000 gal/yr	5.57E-02 lb/gal fuel	3.9	1.54E-02 lb/gal	1.1	2.40E-02 lb/gal	1.2	9.50E-03 lb/gal	0.7	0.1
Portable Asphalt/Rock Crusher Fugitives												
86	Crusher #1	150 ton/hr	8,760 hr/yr							5.4E-04 lb/ton	1.58	
87	Conveyor Transfer Point #1	150 ton/hr	8,760 hr/yr							4.60E-05 lb/ton	0.72	
88	Conveyor Transfer Point #2	150 ton/hr	8,760 hr/yr							4.60E-05 lb/ton	0.72	
89	Screening	150 ton/hr	8,760 hr/yr							0.000074 lb/ton	5.72	
90	Conveyor Transfer Point #3	50 ton/hr	8,760 hr/yr							4.60E-05 lb/ton	0.24	
91	Conveyor Transfer Point #4	50 ton/hr	8,760 hr/yr							4.60E-05 lb/ton	0.24	

EU ID	Unit ID/Description	Maximum Rating or Capacity	Operating Limits	NOx		CO		VOC		PM-10		SO ₂
				EF	PTE (tpy)	EF	PTE (tpy)	EF	PTE (tpy)	EF	PTE (tpy)	PTE (tpy)
92	Conveyor Transfer Point #5	50 ton/hr	8,760 hr/yr							4.60E-05 lb/ton	0.24	
93	Fines Screening	100 ton/hr	8,760 hr/yr							0.0022 lb/ton	0.72	
94	Conveyor Transfer Point #6	100 ton/hr	8,760 hr/yr							4.60E-05 lb/ton	0.48	
95	Conveyor Transfer Point #7	100 ton/hr	8,760 hr/yr							4.60E-05 lb/ton	0.48	
96	Conveyor Transfer Point #8	100 ton/hr	8,760 hr/yr							4.60E-05 lb/ton	0.48	
97	Jaw Crusher Feed	150 ton/hr	8,760 hr/yr							1.60E-05 lb/ton	0.01	
98	Conveyor Transfer Point #9	100 ton/hr	8,760 hr/yr							4.60E-05 lb/ton	0.48	
99	Conveyor Transfer Point #10	100 ton/hr	8,760 hr/yr							4.60E-05 lb/ton	0.48	
100	Conveyor Transfer Point #11	100 ton/hr	8,760 hr/yr							4.60E-05 lb/ton	0.48	
101	Crusher #2	150 ton/hr	8,760 hr/yr							0.0005 ₄ lb/ton	1.58	
102	Conveyor Transfer Point #12	150 ton/hr	8,760 hr/yr							4.60E-05 lb/ton	0.72	
103	Conveyor Transfer Point #13	150 ton/hr	8,760 hr/yr							4.60E-05 lb/ton	0.72	
Jet Kerosene (JP-8) Storage Tanks												
104	South Ramp 1317 Tank #100 ²²	420,000 gal	18,000,000 gal/yr						2.4			
105	South Ramp 1318 Tank #200 ²²	420,000 gal	18,000,000 gal/yr						0.2			

EU ID	Unit ID/Description	Maximum Rating or Capacity	Operating Limits	NOx		CO		VOC		PM-10		SO ₂	
				EF	PTE (tpy)	EF	PTE (tpy)	EF	PTE (tpy)	EF	PTE (tpy)	PTE (tpy)	
Other Regulated Sources													
109	Aircraft Corrosion Control Facility ²³												
110	Coal Processing System ²⁴											1.4	
111	Coal Tripper Belt System ²⁴										1.7E-03 lb/hr	0.0	
Insignificant CI RICE Subject to NESHAP Subpart ZZZZ													
112	North Glideslope Generator ¹⁶	39.3 bhp	500 hr/yr	3.10E-02 lb/hp-hr	0.3	6.68E-03 lb/hp-hr	0.1	2.51E-03 lb/hp-hr	0.0	2.20E-03 lb/hp-hr	0.0	0.00	
113	ASOS/GPS Generator ¹⁶	68 bhp	500 hr/yr	3.10E-02 lb/hp-hr	0.5	6.68E-03 lb/hp-hr	0.1	2.51E-03 lb/hp-hr	0.0	2.20E-03 lb/hp-hr	0.0	0.02	
114	Base Radio MARS Generator ¹⁶	56 bhp	500 hr/yr	3.10E-02 lb/hp-hr	0.4	6.68E-03 lb/hp-hr	0.1	2.51E-03 lb/hp-hr	0.0	2.20E-03 lb/hp-hr	0.0	0.02	
115	TACAN South Glideslope Generator ¹⁶	99 bhp	500 hr/yr	3.10E-02 lb/hp-hr	0.8	6.68E-03 lb/hp-hr	0.2	2.51E-03 lb/hp-hr	0.1	2.20E-03 lb/hp-hr	0.1	0.03	
116	Lift Station Generator ¹⁶	145 bhp	500 hr/yr	3.10E-02 lb/hp-hr	1.1	6.68E-03 lb/hp-hr	0.2	2.51E-03 lb/hp-hr	0.1	2.20E-03 lb/hp-hr	0.1	0.00	
117	South ILS Generator ¹⁶	99 bhp	500 hr/yr	3.10E-02 lb/hp-hr	0.8	6.68E-03 lb/hp-hr	0.2	2.51E-03 lb/hp-hr	0.1	2.20E-03 lb/hp-hr	0.1	0.03	
118	Quarry Hill Generator ¹⁶	70 bhp	500 hr/yr	3.10E-02 lb/hp-hr	0.5	6.68E-03 lb/hp-hr	0.1	2.51E-03 lb/hp-hr	0.0	2.20E-03 lb/hp-hr	0.0	0.02	
119	POL Control Generator ¹⁶	48.1 bhp	500 hr/yr	3.10E-02 lb/hp-hr	0.4	6.68E-03 lb/hp-hr	0.1	2.51E-03 lb/hp-hr	0.0	2.20E-03 lb/hp-hr	0.0	0.00	
120	Consolidated Munitions Generator ¹⁶	38.6 bhp	500 hr/yr	3.10E-02 lb/hp-hr	0.3	6.68E-03 lb/hp-hr	0.1	2.51E-03 lb/hp-hr	0.0	2.20E-03 lb/hp-hr	0.0	0.00	
121	CE Control Generator ¹⁶	14.5 bhp	500 hr/yr	3.10E-02 lb/hp-hr	0.1	6.68E-03 lb/hp-hr	0.0	2.51E-03 lb/hp-hr	0.0	2.20E-03 lb/hp-hr	0.0	0.00	
122	Fire Station No. 2 Generator ¹⁶	102 bhp	500 hr/yr	3.10E-02 lb/hp-hr	0.8	6.68E-03 lb/hp-hr	0.2	2.51E-03 lb/hp-hr	0.1	2.20E-03 lb/hp-hr	0.1	0.03	

EU ID	Unit ID/Description	Maximum Rating or Capacity	Operating Limits	NOx		CO		VOC		PM-10		SO ₂				
				EF	PTE (tpy)	EF	PTE (tpy)	EF	PTE (tpy)	EF	PTE (tpy)	PTE (tpy)				
124	Emergency Wastewater Pump Engine ¹⁶	80 bhp	500 hr/yr	3.10E-02	lb/hp-hr	0.6	6.68E-03	lb/hp-hr	0.1	2.51E-03	lb/hp-hr	0.0	2.20E-03	lb/hp-hr	0.0	0.0
125	Emergency Wastewater Pump Engine ¹⁶	80 bhp	500 hr/yr	3.10E-02	lb/hp-hr	0.6	6.68E-03	lb/hp-hr	0.1	2.51E-03	lb/hp-hr	0.0	2.20E-03	lb/hp-hr	0.0	0.0
Insignificant Gasoline Storage Tanks Subject to NESHAP Subpart CCCCCC																
126	Fuel Tank Quartermaster station ²²									0.1						
127	Fuel Tank Quartermaster station ²²									0.1						
128	Fuel Tank Quartermaster station ²²									0.1						
129	North Slope Relay Generator ¹⁶	145 bhp	500 hr/yr	3.10E-02	lb/hp-hr	1.1	6.68E-03	lb/hp-hr	0.2	2.51E-03	lb/hp-hr	0.1	2.20E-03	lb/hp-hr	0.1	0.0
Total Potential to Emit						615.5	183.0			29.6		244.45	464.3			

Item

1	Coal-fired NOx emission factors from source test for Boiler 2 (with baghouse) - AM Test, Air Quality, LLC - Final Report, September 2000,
2	NSPS Db Semi-annual Report for the Jan-Jun2017 reporting period, CEMS data, 7/21/2017. Used CEMS average of the 30-day averages for all operating days.
3	Coal-fired CO emission factors from source test for Boiler 2 (with baghouse) - AM Test, Air Quality, LLC - Final Report, September 2000
4	EPA, AP-42, Table 1.1-19
5	Summary of Test Results, Alaska Source Testing, LLC, 10/28/2015. For normal PM, used average of Run 1 and 2; Run 3 was a soot blow run.
6	Summary of Test Results, Alaska Source Testing, LLC, 3/15/2017. For normal PM, used average of Run 1 and 3; Run 2 was a soot blow run.
7	Compliance Summary Report, Alaska Source Testing, LLC, 6/22/2015. For normal used average of three runs.
8	EUs 1-4: Summary Report, Alaska Source Testing, LLC, 11/15/2005 EUs 5A and 6A: NSPS Db Semi-annual Report for the Jan-Jun2017 reporting period, CEMS data, 7/21/2017. Used CEMS average of the 30-day averages for all operating days.

9	<p>Criteria Pollutant Emission Factors from USEPA, AP-42, except as indicated below.</p> <p>NO_x, SO₂, CO: Table 1.3-1 for distillate fired boilers < 100 MMBtu/hr</p> <p>PM-10: Filterable from Table 1.3-1 for distillate fired boilers < 100 MMBtu/hr plus total condensable from Table 1.3-2</p> <p>VOC: Table 1.3-3, TOC for commercial/institutional/residential combusters, distillate oil fired</p> <p>EUs 15 and 16 use the manufacturer emission factor for NO_x (264CP03 Technical Analysis Report, ADEC, March 2004)</p>																								
10	Condition 22 Operating Permit AQ0264TVP02 Revision 4 limits fuel sulfur to 0.15 wt% for EUs 7-63, 71-80, 112-125, and 129.																								
11	EPA, AP-42, Table 1.5-1, AQ0264TVP02 Revision 4 limits fuel sulfur to 0.15 wt% for EUs 7-63, 71-80, 112-125, and 129.																								
12	MFG Site Variation Data, provided in the application to AQ0264MSS06																								
13	EUs 20 - 23 operating hours back-calculated based on fuel limits in Operating Permit AQ0264TVP02 Revision 4 and fuel flow rate: 116 gal/hr																								
14	<p>PM and NO_x emission factors for EUs 20 - 23 (CH&PP Auxiliary Power Generators 1-4) from source tests</p> <p>PM: AMTEST Air Quality LLC, 9/14/2000; NO_x: AST, 11/27/2013</p> <table border="0"> <tr> <td>PM EF :</td> <td>0.233</td> <td>lb/hr @</td> <td>1,125</td> <td>kW</td> <td></td> </tr> <tr> <td>converts to</td> <td>1.55E-04</td> <td>lb/hp-hr</td> <td>assuming</td> <td>1.34</td> <td>hp/kW</td> </tr> <tr> <td>NO_x EF</td> <td>9.9</td> <td>g/bhp-hr @</td> <td>1,425</td> <td>kW</td> <td></td> </tr> <tr> <td>converts to</td> <td>2.18E-02</td> <td>lb/hp-hr</td> <td></td> <td></td> <td></td> </tr> </table>	PM EF :	0.233	lb/hr @	1,125	kW		converts to	1.55E-04	lb/hp-hr	assuming	1.34	hp/kW	NO _x EF	9.9	g/bhp-hr @	1,425	kW		converts to	2.18E-02	lb/hp-hr			
PM EF :	0.233	lb/hr @	1,125	kW																					
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NO _x EF	9.9	g/bhp-hr @	1,425	kW																					
converts to	2.18E-02	lb/hp-hr																							
15	NO _x , CO, PM-10 and VOC for engines >600 hp emission factors from AP-42, Table 3.4-1, except as indicated in table note 14 (for EUs 20 - 23).																								
16	For gasoline engines and engines <600 hp, NO _x , CO, PM-10 and VOC EFs from AP-42, Tables 3.3-1 and 3.3-2 (dated 10/96 and 03/09 for CO) Gasoline and diesel small engine SO ₂ emission factor calculated based on mass balance equation and sulfur content.																								
17	Fuel flow rate and emission factors from "Air Emissions Guide for Air Force Mobile Sources," July 2016. AFIERA. Potential tests after controls and limitations based on limits. Hush House (EU 81) limited to 70 tests per 12-month rolling period, Condition 27, Operating Permit AQ0264TVP02, Revision 4.																								
18	Hush house criteria pollutant emission factors from "Air Emissions Guide for Air Force Mobile Sources," July 2016. AFIERA.																								
19	EUs 82, 83, 84: NO _x , CO, and PM-10 EFs based on Deutz (2012) and John Deere manufacturer data																								
20	Criteria (except SO ₂) emission factors from AFIERA, "Air Emissions Guide for Air Force Stationary Sources" (dated Oct 2014), Section 12, Table 12-1. SO ₂ emission factors from AP-42 Table 1.5-1. Propane sulfur concentration based on Gas Processors Association Engineering Data Book (Ninth Ed, 1972), Figure 15-50 (GPA Liquefied Petroleum Gas Specifications, rev. 1979), Commercial Propane = 15 gr/100 scf, "as S" calculation.																								
21	Crusher operations potential hours operated after control/limitations is 8,760 hours per year based on permit application for Portable Rock Crusher dated November 2007. The application indicates that, although the engines are limited to 4,000 hours per year for PSD avoidance, the crusher may use highline power, so operations are unlimited. Emission factors from AP-42 Table 11.19.2-2 dated August 2004, with wet suppression as required by Permit No. AQ0264TVP02, Revision 4, Condition 31.4a. Use for Actual and Potential (After) emissions.																								
22	<p>Potential annual throughput (after control/limitations) for EUs 104 and 105 based on permit limit (Condition 26, Operating Permit AQ0264TVP02, Revision 4). EUs 104 and 105 are internal floating roof tanks. Turnovers calculated by TANKS</p> <p>*It is assumed that all of the fuel turned over in the bulk tanks is eventually distributed through one of the six hydrant tanks at EAFB. According to a rough estimate from bulk fuels personnel, about twenty percent is distributed to South Ramp Loop (EUs 104 and 105).</p> <p>EU 104 and 105: 18,000,000 gallons total, or 9,000,000 gallons each tank</p>																								

23	<p>No calculations performed, actual issues obtained directly from Eielson Air Force Base EMIS 2005. All issues assumed to be 100 percent volatile. Potential usage is equal to the actual issues, a conservative estimate because 100 percent volatility is assumed.</p>												
24	<p>AP-42 Table 11.19 Table 11.19.2-2 dated August 2004 in lb/ton coal, except as indicated in footnote 2 Tripper Belt EF is in lb/hr, calculations shown below From Oct 2016 source test (<i>Particulate Matter Emissions Compliance Test</i>, TRC Environmental Corporation Report 260789B, dated 12/22/2016)</p> <table border="0" style="margin-left: 40px;"> <tr> <td style="padding-right: 20px;">Rated volume is</td> <td style="padding-right: 20px;">2,500</td> <td style="padding-right: 20px;">acfm</td> <td></td> </tr> <tr> <td>EF is</td> <td>0.00008</td> <td>grains per acfm</td> <td>(highest emission factor from Bin Vent 1)</td> </tr> <tr> <td></td> <td>conversion</td> <td>7,000</td> <td>grains per pound</td> </tr> </table> <p>The coal preparation plant is completely enclosed in a building with no emissions to atmosphere; therefore, the actual emissions from all equipment is zero (except for the tripper belt with is in a separate room)</p>	Rated volume is	2,500	acfm		EF is	0.00008	grains per acfm	(highest emission factor from Bin Vent 1)		conversion	7,000	grains per pound
Rated volume is	2,500	acfm											
EF is	0.00008	grains per acfm	(highest emission factor from Bin Vent 1)										
	conversion	7,000	grains per pound										

Conversions:

1lb steam/hour =	1332	Btu/hr; Moiller Chart for Boiler rating 425 psig and 650F
	7,469	Btu/lb of coal; Gross heating value, Usibelli Subbituminous – from 27 April 2017 coal sample
Boiler efficiency (assumed) 80%	32.06	lb/lb-mol (MW Sulfur)
	64.04	lb/lb-mol (MW of Sulfur Dioxide)
Propane heat content	91,500,000	Btu/mgal (EPA, AP-42 Table 1.5-1 footnote a)
Kerosene heat content	0.135	mmBtu/short ton (40 CFR 98 Table C-1).

Attachment C: 2006 Rock Crusher Ambient Analysis

AMBIENT IMPACT ANALYSIS

An asphalt recycling plant is to be constructed at Eielson Air Force Base (AFB). The emission units associated with the plant will be PM-10 increment consuming. Previous modeling at Eielson AFB for PM-10 increment consumption was conducted in 2003 using ISCST3 (version 02035). The preprocessed meteorological data used in that modeling were provided by HMM Consulting LLC. The Eielson AFB surface data and Fairbanks upper air data for 1995 through 1999 were used to create the ISCST3 meteorological data file. The asphalt plant emission units were added to the original PM-10 increment consuming emission units in the ISCST3 input file.

Due to recent Base Realignment and Closure (BRAC) decisions, the A-10 Thunderbolt II aircraft is being phased out at Eielson AFB and by the end of 2007, only F-16 Fighting Falcons will be assigned to Eielson AFB. Because the modeling completed in 2003 used characteristics and emissions from the A-10, the modeling inputs for the Hush House used characteristics and emissions for the F-16 Fighting Falcon. The exit velocity, exit temperature, and PM-10 emissions for the Hush House were revised to time-weighted averages for velocity, temperature, and PM-10 emissions.

Additionally, controlled emission factors from Table 11.19.2-2 were used to estimate the PM-10 emissions from the Asphalt Recycling Plant/Rock Crusher. The asphalt will wetted prior to being fed into the Asphalt Recycling Plant/Rock Crusher in order reduce fugitive dust emissions form the Asphalt Recycling Plant/Rock Crusher.

The point sources and modeling parameters are provided in Table 1. The fugitive PM-10 emission units were modeled as volume sources. These emission units are listed in Table 2. Polar grid receptors with the origin at the asphalt plant and receptor rings at 400 feet (ft), 1,000 ft, 1,250 ft, and 1,500 ft were used in the modeling. This receptor grid is shown in Figure 1. The modeling results show that the 24-hour highest 6th

highest PM-10 impact due to all increment-consuming emission units at 1,000 ft is 27.22 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$).

Figure 1 shows the revised location of the asphalt recycling plant. The proposed location of the asphalt recycling plant was moved primarily because the proposed location for the asphalt crusher in the permit application was placed in the middle of the asphalt pile. The asphalt recycling plant was also moved so that ambient air would be protected along the Loop Access road. Eielson AFB will restrict access to the area north of the Loop Access rd. and within a radius of 1,000 ft. from the asphalt recycling plant when the recycling plant is in operation to Air Force personnel or contractors whose work requires them to work within the 1,000 ft. radius of the crusher while the crusher is in operation. A person who is not required to work north of the Loop Access rd. or within 1,000 feet of the crusher will not be permitted to be north of the Loop Access rd. or within 1,000 ft. of the asphalt recycling crusher while it is in operation.

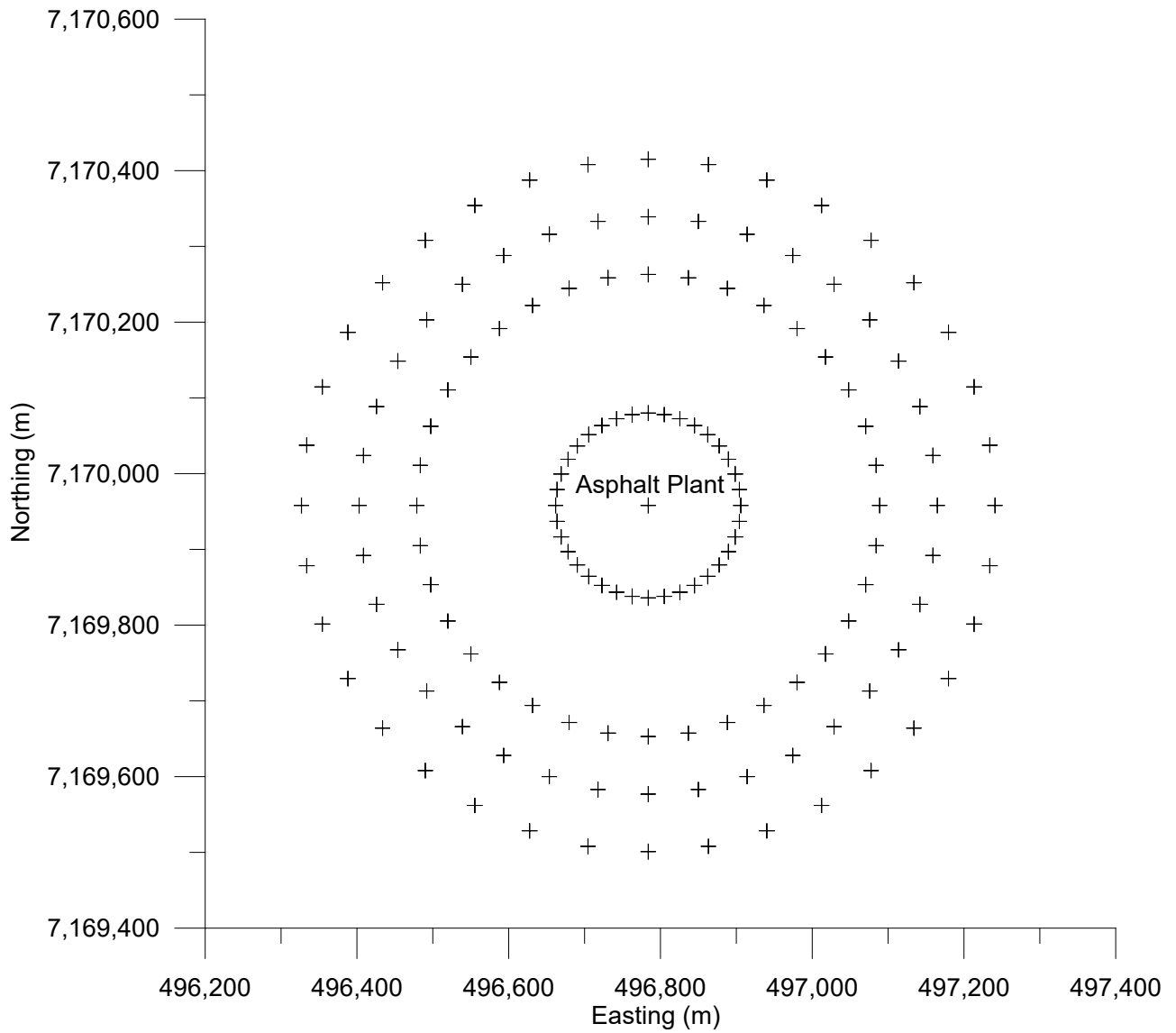
Table 1. Point Source Modeling Parameters

Model ID	Description Of Emission Unit	Elevation At Base (m)	Stack Height (m)	Exhaust Temperature (K)	Exhaust Velocity (m/s)	Stack Diameter (m)	PM-10 Emission Rate (g/s)
HUSHHSE	Hush House	0	6.10	725.8	2.74	6.9	0.371
14	Recycle Plant Engine	0	3.51	683.2	40.43	0.2	0.1247
15	683 Hydrascreen Engine	0	2.29	755.4	44.3	0.1	0.0265

Table 2. Volume Source Modeling Parameters

Model ID	Description Of Emission Unit	Elevation At Base (m)	Release Height (m)	Initial Horizontal Dimension	Initial Vertical Dimension	PM-10 Emission Rate (g/s)
1	Feed Hopper	0	3.55	0.45	0.23	0.0003
2	Cobra 1000 Recycling Plant	0	3.55	0.45	0.23	0.0102
3	Transfer Point (recycle plant to Superior Stackable conveyor)	0	2.02	0.21	0.23	0.0009
4	Transfer Point (Superior Stackable conveyor to 683 Hydrascreen)	0	4.67	0.21	0.23	0.0009
5	Findlay 683 Hydrascreen	0	4.67	0.85	0.23	0.0140
6	Transfer Point (683 Hydrascreen to oversize return conveyor belt)	0	2.33	0.23	0.23	0.0003
7	Transfer Point (oversize conveyor belt return to Cobra 1000 Recycle Plant)	0	3.55	0.15	0.23	0.0003
8	Transfer Point (683 Hydrascreen to second deck oversize return conveyor belt)	0	3.55	0.15	0.23	0.0003
9	683 Hydrascreen fines screen	0	3.55	0.71	0.23	0.0278
10	Transfer Point (fines screen to fines belt)	0	2.63	0.28	0.23	0.0006
11	Transfer Point (fines belt to Superior radial stacking conveyor)	0	2.02	0.21	0.23	0.0006
12	Feed from truck to Feed Hopper	0	4.46	0.21	0.23	0.0006
13	Transfer Point (conveyor discharge onto asphalt pile)	0	4.46	0.15	0.23	0.0006

Figure 1. Model Receptor Grid



**Attachment D: ADEC Correspondence Dated January 27, 2014 and
NO_x Source Test Dated November 27, 2013**



THE STATE
of **ALASKA**
GOVERNOR SEAN PARNELL

Department of Environmental Conservation

DIVISION OF AIR QUALITY
AIR PERMITS PROGRAM

610 University Avenue
Fairbanks, AK 99709-3643
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<http://www.dec.alaska.gov>

CERTIFIED MAIL: 7002 3150 0003 6565 4964
Return Receipt Requested

January 27, 2014

Mark Kelly, Brig. Gen., USAF, Commander
354 FW/CC
354 Broadway St. Unit 19A
Eielson AFB, AK 99702

Acceptance of Source Test Report

Subject: Receipt and Acceptance of NO_x Source Test Report for US Air Force, Eielson Air Force Base, Permit No. AQ0264TVP02, File No. 107.16.001

Dear General Kelly:

This letter presents the Alaska Department of Environmental Conservation's (the Department's) evaluation of the source test performed on the Onan Generators for the US Air Force, Eielson Air Force Base. The test demonstrated compliance with Condition 19 of Permit NO. AQ0264TVP02. In addition, according to Condition 19.2, your request is approved to operate the Onan Generators, EU IDs 20 - 23, at the maximum power of 1,425 kW and not lower than 300 kW where the source test showed compliance with NO_x emissions less than 10.8 grams per horsepower hour.

The Department found, based solely on the information contained therein, no compliance issues with the Source Test Report requirements of the permit. The Department received your report on December 4, 2013, and completed its review on January 22, 2014. A complete Department review checklist is available upon request.

If you have any questions or would like a copy of the Department's checklist, please contact Robin Wagner at 907-451-2114 or via email to robin.wagner@alaska.gov.

Sincerely,

A handwritten signature in dark ink, appearing to read "Robin Wagner".

Robin Wagner
Environmental Program Specialist

cc: William Hudson, Alaska Source Testing LLC (via email)
Katherine Stringham, Civ, 354 CFS/CEAN (via email)
P. Moses Coss, ADEC/APP, Fairbanks
Jim Baumgartner, ADEC/APP, Juneau
Jeremy Ptak, ADEC/APP, Anchorage
Jim Plosay, ADEC/APP, Juneau
Robin Wagner, ADEC/APP, Fairbanks

**NO_x Emissions Source Test Results
Eielson AFB Onan Generators Source ID EU 20-23
AQ0264TVP02
October 1-4, 2013**

Prepared for:

Air Force Civil Engineer Center (AFCEC)

Prepared by:

Alaska Source Testing, LLC
520 W 58th Unit A
Anchorage, Alaska 99518

November 27, 2013

Report Certification

As Principal Project Engineer and project manager, I certify that the testing was performed in accordance with approved methods and the data, calculations and results described in this report are true and accurate.

William M. Hudson


Signature

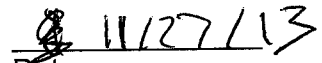

Date

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Appendix A Calculation Spreadsheets and Example Calculations

Emission and Fuel Usage Calculation Spreadsheets

Example Calculations

Appendix B Analyzer Data and Bias Corrections

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Appendix E Quality Assurance Data

NO_x Converter Test

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O₂ Analyzer Information

Appendix F Project Participants

Appendix G Project Correspondence

1. Introduction

Eielson AFB located near North Pole, Alaska operates four identical Onan generators , EUs 20-23, each permitted at 1,125 kW but capable of producing 1500 kW. Per condition 19 of permit AQ0264TV02, Eielson is required to test one of the units to verify that the NO_x emissions do not exceed their BACT limit of 10.8 grams per horsepower-hour (g/hp-hr).

Eielson, through North Wind Inc., engaged Alaska Source Testing LLC (AST) to perform a source test program.

AST performed NO_x emissions testing while the units were run on ultra low sulfur diesel at four different operational loads (Within 5% of 50, 70, 85 and 100%), or four evenly spaced loads over the operational limits of the generator. The Onan internal combustion engines were tested in accordance with *40 CFR 60 Appendix A*, Methods 3A, 7E, and 19.

Bill Hudson was the on-site AST Project Manager and was assisted by Chris Leach Dan McGauhey was the on-site North Wind Test Manager.

The overall objective of the testing was to determine the mass emission concentrations of nitrogen oxides (NO_x) at approximately 50, 70, 85, and 100 percent load.

This report summarizes the results of the test data, based on dry volumetric concentrations. Mass emission calculations for NO_x were performed in accordance with Method 19. Two units were tested.

Detailed test information and documentation is provided in the appendices of this report.

2. SUMMARY OF RESULTS

Summaries of the NO_x test results are presented in Tables 2-1 to 2-5.

Table 2-1 NO_x Emissions, Generator 2

Run	Load kW	Load %	Fuel Gal/hr	O2 % Dry	NOx dppmv*	M19 NOx lb/hr	M19 NOx g/bhp-hr
1	1125	75%	69.90	10.25	1692.56	34.05	10.25
2	1125	75%	69.90	10.24	1692.91	34.03	10.25
3	1125	75%	69.90	10.12	1712.14	34.04	10.25
Ave	1125	75%	69.90	10.20	1699.2	34.05	10.25
4	1425	95%	81.2	10.01	1824.05	41.71	9.92
5	1425	95%	81.2	9.98	1822.17	41.55	9.88
6	1425	95%	81.2	9.98	1828.56	41.68	9.91
Ave	1425	95%	81.2	9.99	1824.93	41.6	9.9
7	720	48%	47.60	11.04	1508.14	22.32	10.5
8	720	48%	47.60	11.01	1540.07	22.73	10.69
9	720	48%	47.60	11.02	1521.37	22.48	10.58
Ave	720	48%	47.60	11.02	1523.19	22.46	10.59
10	300	20%	25.60	13.25	944.85	9.70	10.95
11	300	20%	25.60	13.26	947.05	9.73	10.99
12	300	20%	25.60	13.28	941.04	9.69	10.94
Ave	300	20%	25.60	13.26	944.31	9.7	10.96

Table 2-2 NO_x Emissions, Generator 3

Run	Load kW	Load %	Fuel Gal/hr	O2 % Dry	NOx dppmv*	M19 NOx lb/hr	M19 NOx g/bhp-hr
1	1425	95%	73.70	9.77	1801.58	36.59	8.70
2	1425	95%	73.70	9.85	1822.99	37.29	8.87
3	1425	95%	73.70	9.86	1807.84	37.00	8.80
Ave	1425	95%	73.70	9.83	1810.8	36.96	8.79
4	1125	75%	66.20	13.75	822.78	23.35	7.03
5	1125	75%	66.20	13.83	785.26	22.55	6.79
6	1125	75%	66.20	13.84	780.14	22.42	6.75
Ave	1125	75%	66.20	13.81	796.06	22.8	6.86
7	675	45%	40.50	11.09	1382.33	17.49	8.78
8	675	45%	40.50	11.08	1393.46	17.62	8.84
9	675	45%	40.50	11.00	1375.13	17.25	8.66
Ave	675	45%	40.50	11.06	1383.64	17.45	8.76
10	225	15%	19.80	10.28	1372.58	7.85	11.82
11	225	15%	19.80	10.38	1368.77	7.90	11.90
12	225	15%	19.80	10.41	1357.44	7.86	11.83
Ave	225	15%	19.80	10.36	1366.3	7.87	11.85

*dry parts per million by volume

Please note that both machines exceeded the BACT limit of 10.8 g/bhp-hr on low loads and were less than the limit for all other loads including 1425 KW.

To AST's knowledge, there were no test conditions or events that may have biased the data. The analyzers met all QA and QC requirements.

A more detailed summary of results is provided in Appendix A. The field data is presented Appendix C. Test procedures met overall QC requirements. Please refer to Section 8 and Appendix E for details.

3. DESCRIPTION OF THE SOURCE

Eielson operates four identical Onan generators , EUs 20-23, each permitted at 1,125 kW but capable of producing 1500 KW.

4. DESCRIPTION OF THE SAMPLE LOCATIONS

The Onan engines were equipped with 8 inch diameter exhaust pipes that entered the catalyst bed and 14 inch exhaust exiting the catalyst bed. The catalyst was installed near each engine's exhaust manifolds where the old muffler was located. The purpose of the catalyst bed is to reduce carbon monoxide emissions. The exhaust pipe was equipped with a $\frac{3}{4}$ inch sample port located downstream of the catalyst bed. The nipple length of the port was 1 inch.

Since Method 19 was used to calculate the mass emission rate of NO_x, the ports did not have to meet Method 1 location requirements. A stratification check of all the ports indicated that no stratification was present per Method 7E criteria. The NO_x emissions were measured from the outlet ports.

5. DESCRIPTION OF SOURCE OPERATIONS AND TEST CONDITIONS

To evaluate source operations and conditions during each of the test series, process data was collected concurrently with each sample run. Bill Hudson, AST Project Manager, recorded process data.

Electrical output was read from a computer screen. Fuel data was recorded from the totalizer. An explanation of the fuel usage calculations are found in Section 7.

This data is included in Appendix D Operational Data. The average of these data values was used in the emission summaries and are provided in Appendix A. The average values are also included in the tables found in Section 2 of this report.

6. DESCRIPTION OF TEST PROCEDURES

6.1 Test Methods

The emission-testing program was performed in accordance with USEPA Reference Methods as prescribed in 40 *CFR* 60, Appendix A. The specific methods are listed below.

- ◆ Method 3A Determination of Oxygen and Carbon Dioxide Concentrations in Emissions from Stationary Sources (Instrumental Analyzer Procedure)
- ◆ Method 7E Determination of Nitrogen Oxides from Stationary Sources (Instrumental Analyzer Procedure)
- ◆ Method 19 Determination of Sulfur Dioxide Removal Efficiency and

Particulate matter, Sulfur Dioxide, and Nitrogen oxides Emission Rates

6.2 Description of Test Procedures

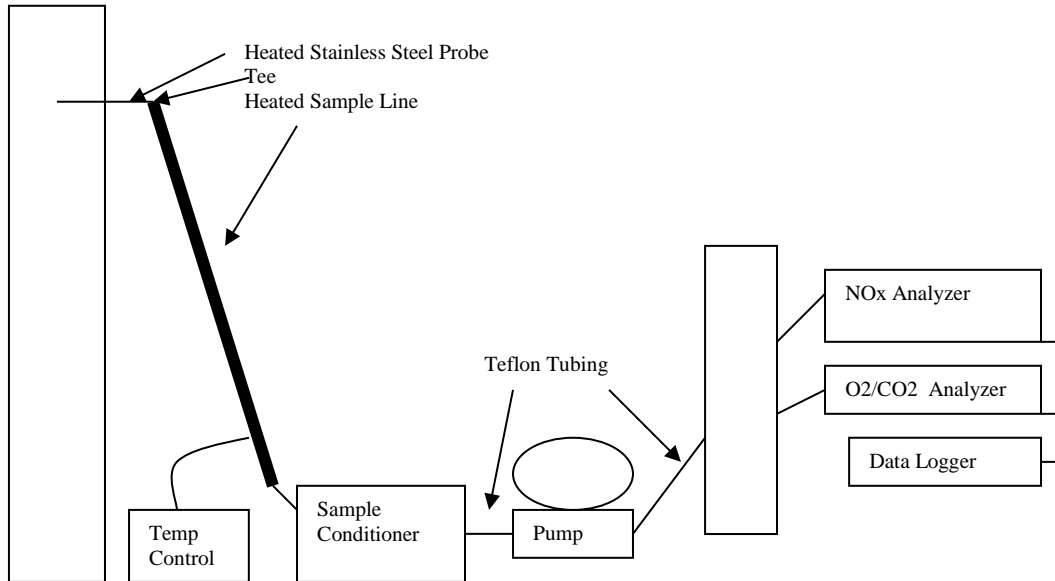
The exhaust gas concentrations for NO_x and O₂ were measured using instrumental methods. Sample gas was extracted through a stainless steel probe equipped with a filter and inserted through the sample port. The sample gas was drawn from the probe through a 100-foot heated Teflon sample line and into a sample conditioner. The sample conditioner is designed to condense and remove moisture from the sample gas while minimizing any water/gas contact. This minimizes any sample gas loss due to solubility. Dry gas from the conditioner then entered a Teflon-lined head sample pump and then the sample flow was distributed to the individual gas analyzers. Each of the instruments sent an output signal to a data recorder. The data recorder polled each analog instrument signal once every 30 seconds, converted the signal to engineering units, and recorded each data point into memory.

Prior to beginning the testing program an initial full-scale calibration was performed on each gas analyzer to determine linearity. The zero and calibration gases used were certified in accordance with EPA protocol procedures and traceable to standards of the National Institute of Standards and Technology (NIST). Calibration gas for the initial calibration and any subsequent adjusted calibrations was introduced directly to the back of each analyzer. The on-site AST Project Manager failed to turn on the data recorder during this procedure. He did however manually record the analyzer readings. His signed and certified data sheet is in Appendix E. System bias checks and calibration checks for zero and span drift were conducted by introducing the calibration gases at the probe connection which allowed the calibration gases to flow through the entire sample system. This served two purposes, (1) to check for any system bias and (2) to check sample system integrity for air leaks. Prior to the testing program a system response time check was performed. The response time average of three checks was 165 seconds for the NO_x analyzer, and 159 seconds for the O₂ analyzer. Zero and span checks were performed for each gas analyzer prior to and following each sample run. This was to assess calibration drift during the sample period and determine if calibration adjustments were necessary..

The range of the AST NO_x analyzer was set at 0 - 3017 ppm. The range of the O₂ analyzer range was 0 – 20.9%. The analyzers met all method requirements for linearity, zero and drift span value.

Each sample run was 60 minutes. Three NO_x runs were performed at 50, 70, 85, and 100 percent load for each unit tested.

Figure 6-2 Method 7E Stack Sampling System



Drawing Not to Scale

6.3 List of Field Testing Equipment

Combustion gas analysis for O₂ was performed with a Servomex Model 4900C1 Analyzer. The instrument specifications are listed below.

Oxygen Analyzer Components	Carbon Dioxide Components
Principle of Operation: Paramagnetic	Principle of Operation: NDIR
Span: 0-5%, 0-10%, 0-25%	Span: 0-10%, 0-20%
Linearity: Better than ± 0.1 % full scale	Linearity: Better than ± 1 % full scale
Zero/Span Drift: Less than ± 0.1 % full scale in week	Zero/Span Drift: Less than ± 1 % full scale in 24 hours

The NO_x analysis for Method 7E was performed using a Thermo Environmental Instruments Inc. Model 42C Chemiluminescence NO-NO₂-NO_x analyzer. The instrument specifications are listed below.

Principle of Operation: Chemiluminescence
Span: 0-10, 20, 50, 100, 200, 500, 1000, 2000, 5000, 10,000 ppm
Linearity: ± 1 % full scale
Zero Drift: .050 ppm (24 hr)
Span Drift: ± 1 % full scale (24 hr)

The sample conduit was a 100-foot temperature controlled, dual core, Teflon sample line. The sample conditioning system used was an Alfa Laval MAK 6-2. The sample system vacuum pump is an Air Dimensions Teflon-lined head diaphragm pump. Figure 6-2 presents the configuration of the sample system.

7. CALCULATIONS

- ◆ All calculations were checked by a second party. Hand calculations have been performed to verify the spreadsheet calculations. Please refer to Appendix A for a printout of the spreadsheet and for the hand calculations.

8. QUALITY ASSURANCE

To ensure the collection of high quality and accurate data AST strictly adhered to all the U.S. EPA Reference Methods and the *Quality Assurance Handbook for Air Pollution Measurement Systems: Volume III* used during this testing program. In all other aspects of the testing, AST followed its own corporate Quality Program Manual QPM-1, Rev. 1, 08/08/10.

Documentation for all quality control/quality assurance activities for the sample collection is presented in Appendix E.

Table 8-1 Initial Analyzer Calibration and Bias Error Percentage

Calibration Gas		Analyzer Response	Bias Percent*	Span
Zero NO _x	0 ppm	0 ppm	0%	1990ppm
High Range NO _x	1990 ppm	1990ppm	0%	
Mid Range NO _x	1910 ppm	1910 ppm	1.0%	
Zero O ₂	0 %	0%	0%	8.08%
Mid Range O ₂	8.05 %	8.05%	0.0%	
High Range O ₂	14.1 %	14.1 %	0.0%	

*Method 7E, Eq. 7E-1

ACE = $((C_{Dir} - C_V)/CS) * 100$ where ACE is Analyzer Calibration Error, C_{Dir} is measured concentration, C_V is concentration of calibration gas, and CS is calibration span.

ACE must be within ± 2.0 percent of calibration span of the analyzer for each level of calibration gas.

Table 8 – 2 Analyzer Response Times EU 2 in seconds

Analyzer	Run 1	Run 2	Run 3	Average
O ₂	35s	35s	35s	35s
NO _x	90s	90s	90s	90s

Attachment E: Revised Emission Unit Inventory

Attachment E – Changes to Emissions Unit Inventory

Table 1: Updated Emission Unit Inventory

Changes shown in yellow highlight.

EU ID	Emissions Unit Name	Emissions Unit Description	Rating/Size	Building Number	Install/Construction Date/Model Year
Coal-Fired Boilers					
1 ^a	CH&PP Main Boiler #1	Springfield Boiler SN: HSB50480 A	132,000 lb steam/hr, 174 MMBtu/hr	6203	1952
1A	CH&PP Main Replacement Boiler #1A	TBD/Not Yet Installed	132,000 lb steam/hr, 174 MMBtu/hr	6203	TBD
2 ^a	CH&PP Main Boiler #2	Springfield Boiler SN: HSB50480 C	132,000 lb steam/hr, 174 MMBtu/hr	6203	1952
2A	CH&PP Main Replacement Boiler #2A	TBD/Not Yet Installed	132,000 lb steam/hr, 174 MMBtu/hr	6203	TBD
3 ^a	CH&PP Main Boiler #3	Springfield Boiler SN: HSB50480 B	132,000 lb steam/hr, 174 MMBtu/hr	6203	1952
4 ^a	CH&PP Main Boiler #4	Springfield Boiler SN: HSB50480 D	132,000 lb steam/hr, 174 MMBtu/hr	6203	1952
4A	CH&PP Main Replacement Boiler #4A	TBD/Not Yet Installed	132,000 lb steam/hr, 174 MMBtu/hr	6203	TBD
5A ^b	CH&PP Main Replacement Boiler #5A	Indeck Keystone Energy Boiler SN: 2011-002	132,000 lb steam/hr, 174 MMBtu/hr	6203	Installed 2016 Constr. 2015
6A ^b	CH&PP Main Replacement Boiler #6A	Indeck Keystone Energy Boiler SN: 2001-001	132,000 lb steam/hr, 174 MMBtu/hr	6203	2014 Constr. 2013
Oil-Fired Boilers					
7	Auxiliary Heating Plant Boiler #1	Cleaver Brooks D-68 Boiler	60.6 MMBtu/hr	3351	2002
8	Auxiliary Heating Plant Boiler #2	Cleaver Brooks D-68 Boiler	60.6 MMBtu/hr	3351	2002
9	Missile Storage Boiler #1	Cleaver Brooks CB-100-80 Boiler	3.3 MMBtu/hr	1316	1991
10	Missile Storage Boiler #2	Cleaver Brooks CB-100-70 Boiler	2.9 MMBtu/hr	1316	1993
11	Alert Hangar Boiler #1	Cleaver Brooks CB-100-150 Boiler	6.0 MMBtu/hr	1300	2008

EU ID	Emissions Unit Name	Emissions Unit Description	Rating/Size	Building Number	Install/ Construction Date/Model Year
12	Alert Hangar Boiler #2	Cleaver Brooks CB-100-150 Boiler	6.0 MMBtu/hr	1300	2008
13	Wastewater Treatment Boiler #1	Cleaver Brooks CBLE-100-2001-30HW Boiler	6.7 MMBtu/hr	2081	2012
14	Wastewater Treatment Boiler #2	Cleaver Brooks CBLE-100-2001-30HW Boiler	6.7 MMBtu/hr	2081	2012
15	Auxiliary Heating Plant II Boiler #1	TBD/Not Yet Installed	98 MMBtu/hr	1342	TBD
16	Auxiliary Heating Plant II Boiler #2	TBD/Not Yet Installed	98 MMBtu/hr	1342	TBD
Propane-Fired Boilers					
17	Corrosion Control Heater #1	Weather Rite MD-240	14.7 MMBtu/hr	1348	1987
18	Corrosion Control Heater #2	Weather Rite MD-240	14.7 MMBtu/hr	1348	1987
Diesel-Fired Internal Combustion Engines, (ICE)					
19A ^{c,e}	CH&PP Main Auxiliary Generator	Cummins QSK95-G9 SN 37285272	5,051 bHp	6203	Install TBD Constr. 2021 MY: 2021
20 ^{e,f}	CHPP Auxiliary Generator #1	Cummins Onan KTTA50-G2 SN 33140317	2,220 bHp	6203	1998
21 ^{e,f}	CHPP Auxiliary Generator #2	Cummins Onan KTTA50-G2 SN 33140312	2,220 bHp	6203	1998
22 ^{e,f}	CHPP Auxiliary Generator #3	Cummins Onan KTTA50-G2 SN 33140322	2,220 bHp	6203	1998
23A ^e	CHPP Auxiliary Generator #4	Cummins Onan KTTA50-G2 SN 33131285	1,855 bHp	6203	Inst. 11/18/2024 MY: 1995
24A ^g	Wastewater Treatment Emergency Generator [R-13]	Cummins QSX15-G9 SN 80290304	755 bHp	2081	7/23/2021 MFD. 2020/12/08
25	Central Avenue (Clinic) Generator [R-23]	Cummins QSM11-G2 SN 35150886	470 bHp	3349	2006
26	Refueling Station Generator-Oscar Row [R-16]	Cummins Onan KTA38-G1 SN 97613-121	1,135 Hp	1245	1994
28A	Alert Hangar Generator [R-25]	Cummins QSB5G13 SN 74731853	173 Hp	1300	Installed 2022, MFG YR: 2020
29	Power Plant Fire Pump [P-21]	Caterpillar D3208 SN 03Z06180	196 Hp	6203	1987
30A	Missile Maintenance Generator	Cummins Onan 6BTA5.9-G3 SN 46339016	207 bHp	1302	TBD
31	Control Tower Generator [R-03]	Cummins Onan 6BTAA5.9 G-1 SN 46339712	207 bHp	1216	2005
32A	Telephone Exchange Generator [R-14]	Caterpillar C7.1 S/N 45506018	229 bHp	3110	Inst. 08/15/2024

EU ID	Emissions Unit Name	Emissions Unit Description	Rating/Size	Building Number	Install/ Construction Date/Model Year
33	Command Post Generator [R-02]	Cummins QSB5-G3 SN 46964129	145 bHp	3112	2009
34	Airfield Lighting Generator [R-01]	Cummins Onan QSM11-G2 SN 35087769	470 Hp	1146	2003
35A	Fire Pump P-08 (Thunder Dome #1)	Cummins QSL9 Firewater Pump Engine SN 73418762	365 bHp	1142	Installed 12/2016 Constr. 6/19/2012
36A	Fire Pump P-09 (Thunder Dome #2)	Cummins QSL9 Firewater Pump Engine SN 73418764	365 bHp	1142	Installed 3/2015 Constr. 6/19/2012
37A	Fire Pump P-10 (Thunder Dome #3)	Cummins QSL9 Firewater Pump Engine SN 73418760	365 hp	1142	Installed 1/2016 Constr. 6/19/2012
38	Fire Pump P-11 (F-16 Hangar Pump #1)	Cummins NT855-F3 Firewater Pump Engine SN 18109820	340 bHp	1310	1986
39	Fire Pump P-12 (F-16 Hangar Pump #2)	Cummins NT855-F3 Firewater Pump Engine SN 18109821	340 bHp	1310	1986
40	Fire Pump P-13 (F-16 Hangar Pump #3)	Cummins NT855-F3 Firewater Pump Engine SN 18109825	340 bHp	1310	1986
41	Fire Pump P-19 (Hog Pen A-10s)	Detroit Diesel DDFP-04AT 7088 Firewater Pump Engine SN 4A-288070	235 Hp	1225	Installed 1994 MFD. 1994
43	Fire Pump P-06 – Fire Support	Caterpillar 3208 Firewater Pump Engine SN 90N70458	121 bHp	1250	1989
44	Fire Pump P-05 – Fire Support	Caterpillar 3208 Firewater Pump Engine SN 90N70449	121 bHp	1235	1990
45	Fire Pump P-01 – Fire Support	Caterpillar 3208 Firewater Pump Engine SN 90N70452	121 bHp	1118	1989
46	Taxi Way #3 Fire Pump [P-04]	Caterpillar 3208 Firewater Pump Engine SN 90N70460	121 bHp	1210	1989
47	Flightline Fire Pump #3 [P-03]	Caterpillar 3208 Firewater Pump Engine SN 90N70463	121 bHp	1170	1989

EU ID	Emissions Unit Name	Emissions Unit Description	Rating/Size	Building Number	Install/ Construction Date/Model Year
48	Fire Pump P-02	Caterpillar 3208 Firewater Pump Engine SN 90N70454	121 bHp	1139	1989
49	Communications Squadron Emergency Generator [R-10]	Cummins-Onan 6BT5.9-G6 SN 46302171	170 bHp	2268	2003
50	Water Treatment Plant Generator [R-35]	Cummins QSM11-G4 NR3 SN 35253797	470 bHp	3228	2012
51	Utilidor (Auxiliary Heat Plant) Emergency Generator [R-11]	Cummins-Onan KTA19-C4 SN 37201881	755 bHp	3351	2002
52	E-2 Complex Fuel Tank Emergency Generator [R-17]	Detroit Diesel R0837K36 SN 968830	765 bHp	6231	2002
53	Fuel Hydrant System Emergency Generator [R-15]	Caterpillar 3412 SN 3FZ02226	749 Hp	1211	2002
54	Joint Mobility Complex (JMC) Emergency Generator [R-24]	Cummins QST30-G2NRI SN 37204892	1200 Hp	4370	2002
55A	North ILS Generator [R-07]	Cummins 4BT3.3-G5 SN 72055506	69 bHp	1103	7/1/2021 MFD. 2020/10/01
56	DET 460 Generator [R-04]	Cummins QSB5-G3-NR3 SN 46964574	145 bHp	1183	2010
59	New Security Forces Facility Generator [R-18]	Cummins NTA-855-G3 SN 30371641	535 Hp	3134	2005
60	Fire Station No. 1 Generator [R-21]	Cummins 6BT5.9-G6 SN 46302244	170 Hp	1206	2003
62	354 Wing MOC Generator [R-28]	Cummins 6BT5.9-G6 SN 46302331	170 Hp	1347	2004
63	F-Well Pump [P-17]	Cummins QSB5.9-230HD SN 73073203	230 Hp	3427	2010
64A	A Water Well Pump Generator [R- 31]	Cummins QSB5-G3 NR3 SN 73353381	145 Hp	3408	2012
64B	B Water Well Pump Generator	Cummins QSB5-G3 NR3 SN 73353386	145 bHp	3430	2012
65A	Aircraft Arrestor Engine NW	Duetz D2011L04i SN 11346409	61 bHp	1113	Installed 5/2015 Constr. 2012
66A	Aircraft Arrestor Engine NE	Duetz D2011L04i SN 13388460	61 bHp	1113	Installed 7/2015 Constr. 02/01/2013
67A	Aircraft Arrestor Engine 3/4 W	Duetz D2011L04i SN 13388457	61 bHp	1119	Installed 7/2015 Constr. 02/01/2013
68A	Aircraft Arrestor Engine 3/4 E	Duetz D2011L04i SN 11340562	61 bHp	1119	Installed 5/2015 Constr. 2012

EU ID	Emissions Unit Name	Emissions Unit Description	Rating/Size	Building Number	Install/ Construction Date/Model Year
69A	Aircraft Arrestor Engine SE	Duetz D2011L04i SN 12599304	64 Hp	1265	Installed 2022 MY: 2020
70B	Aircraft Arrestor Engine SW	Duetz D2011L04i SN 12599301	64 bHp	1265	Installed 2022 MY: 2020
71	Loop Refueling (Type III Hydrant) Generator [R-36]	Cummins KTA19-G3 SN 37218566	685 Hp	1308	2006
72	AH&P Plant II Generator	TBD/Not Yet Installed	1,810 bHp	TBD	TBD
73	4 Bay Loop Hangar Emergency Generator [R-26]	Cummins QSB7-G3-NR3 SN 73056416	250 bHp	1335	2010
74	8 Bay Loop Hangar Emergency Generator [R-39]	Cummins QSL9-GN-NR3 SN 46355721	364 Hp	1338	2010
75	Missile Maintenance Well Pump Emergency Generator [R-37]	Cummins 4BT3.9-G4 SN 46600983	99 Hp	1301	Mfg. 2006/04/01 Installed 2006
76	E-2 Farm Fire Pump Emergency Generator [P-25]	John Deere JU4HUF50 SN PE4045T282577	130 Hp	6247	Mfg. 2003
77	Dining Facility Emergency Generator [R-27]	Cummins QSL9-G2 NR3 SN 73059990	364 bHp	2207	2010
78	Red Flag Emergency Generator [R-29]	Cummins QSB5-G3 NR3 SN 46925031	145 bHp	1141	2009
79	Tank E-6 Generator	TBD	539 bhp	6250	TBD
80	Cooling Pond Generator [R-41]	Cummins QSX15-G9 SN 79397696	755 bHp	6207	2011
112	North Glideslope Generator [R-08]	Kubota V3300-BG-ET01 SN CA0228	36.5 Hp	1110	2001
113	ASOS/GPS Generator [R-09]	Cummins Onan 4B3.9-G2 SN 46453162	68 bHp	1117	2005
114	Base Radio MARS Generator [R-30]	Cummins Onan B3.3-G1 SN 68013834	56 bHp	4308	2003
115	TACAN South Glideslope Generator [R-05]	Cummins Onan 4BT3.9-G4 SN 46388901	49 Hp	1259	2005
116	Lift Station Generator [R-12]	Cummins Onan QSB5-G3 NR3 SN 73224517	145 bHp	2212	2011
117	South ILS Generator [R-06]	Cummins Onan 4BT3.9-G4 SN 46388888	99 bHp	1333	2005
118A	Quarry Hill Emergency Generator [R-34]	Kubota V3300-BG-ET01 SN CA0591	48.9 bHp	6402	Installed 2018/07/03 MFD. 2012/02/16
119	POL Control Generator [R-33]	Kubota V2203-M-BG-ET02 S N 9U0752	26.9 Hp	3240	2010

EU ID	Emissions Unit Name	Emissions Unit Description	Rating/Size	Building Number	Install/ Construction Date/Model Year
120	Maintenance Squadron/ Unit Control Center (MXS/UCC) Generator [R-32]	Lister Petter LPW4 SN G998951220	27.5 bHp 19 kW	3462	1999
121	CE Control Generator [R-20]	Cummins Onan 6.0DJE SN K85078396	15 bHp	2258	1985
122	Fire Station #2 Generator [R-22]	John Deere 4039TF004 SN CD4039T305177	102 bHp	4870	1997
124	Emergency Wastewater Pump Engine	John Deere 4045DF270B	80 bHp	2316	2008
125	Emergency Wastewater Pump Engine	John Deere 4045DF270B	80 bHp	2316	2008
129	North Slope Relay Generator [R-38]	Cummins QSB5-G3 NR3 SN 73039590	145 bHp	6401	2011
130	OSS/Weapons/Intel Facility Emergency Generator [R-19]	Cummins QSB5-G6 NR3 SN 74451329	208 bHp 155 kW _e	1220	Installed 2019/06/13 MFD, 2019/02/02
131	Consolidated Munitions Facility Emergency Generator [R-40]	Cummins QSB5-G13 SN 74551896	173 bHp 129 kW _e	6210	Inst. 2020/02/26 MFD, 2019/08/08
132	Tank E-11 Generator	Caterpillar C13 SN PW301775	539 bhp	6261	Inst. 2023/09/07, Model Year 2023
Hush House (Jet Engine Test Facility)					
81	Hush House	N/A	N/A	1350	1989
Portable Asphalt/Rock Crusher Fugitives					
86	Tertiary Crusher(s)	TBD	500 TPH	N/A	TBD
89	Screen(s)	TBD	1,500 TPH	N/A	TBD
93	Fines Screen(s)	TBD	400 TPH	N/A	TBD
101	Primary/Secondary Crusher(s)	TBD	1,000 TPH	N/A	TBD
87-88, 90-92, 94-97, 102- 103	Up to 14 Transfer or Drop Points	Misc.	1,500 TPH (combined)	NA	TBD
Coal Processing Equipment subject to NSPS Subpart Y					
110A ^h	Sandwich Belt Conveyor	Regulated Coal Processing System	N/A	N/A	1994

EU ID	Emissions Unit Name	Emissions Unit Description	Rating/Size	Building Number	Install/ Construction Date/Model Year
110B ^h	Segment Crusher	Regulated Coal Processing System	N/A	N/A	2013
111	Coal Tripper System	Coal Tripper System with 6 Identical 2,500 cfm Pulse Jet Collector Bine Vent Filters	150 TPH	6203	2010
Gasoline Storage Tanks Subject to NESHAP Subpart CCCCCC					
126	Horizontal Gasoline Fuel Tank	N/A	26,000 gal	1207-3	1/1/1987
127	Horizontal Gasoline Fuel Tank	N/A	26,000 gal	1207-4	1/1/1987
128	Horizontal Gasoline Fuel Tank	N/A	26,000 gal	1207-5	1/1/1987

Notes:

- a. EU IDs 1-4: These coal-fired boilers do not have useful info on their data plates for determining the steam rating or heat input capacity of the units. The facility lead operator indicated that these boilers are physically capable of operating up to 132,000 lbs/hr of steam production. Source tests are typically performed at 120,000 lbs/hr of steam production or less. These boilers are estimated at 174 MMBtu/hr, but the heat input rate for each boiler is dependent upon several factors such as coal quality, combustion conditions, and steam production rate. Therefore, the heat input rate can vary.
- b. EU IDs 5A and 6A: The ratings given in this table for 5A and 6A are actual ratings from the boiler name plates. These boilers are estimated at 174 MMBtu/hr, but the heat input rate for each boiler is dependent upon several factors such as coal quality, combustion conditions, and steam production rate. Therefore, the heat input rate can vary.
- c. The installation of EU ID 19A to replace EU ID 19 was authorized under Minor Permit AQ0264MSS06. Per December 22, 2021 Off Permit Change notification, a 4,309 bHp Cummins C3000 D6e generator set with a Tier 4 compliant engine will be installed to permanently replace EU ID 19, instead of the proposed 4,376-bHp Caterpillar C-175 16 in the minor permit application. Construction began in October 2021, but installation and commissioning of the engine was completed only recently in November 2024.
- d. EU ID 19 (2,500 kW GM EMD) was removed from the stationary source on July 23, 2021 and replaced by a temporary portable black start generator unit (EU ID 19B) per a January 5, 2021 Off Permit Change Notification. EU ID 19B will be removed when EU ID 19A is installed and commissioned.
- e. EU IDs 19A, 20-22, and 23A are permitted as non-emergency engines. All other engines listed in the above table are emergency engines.
- f. The bHp and kW ratings shown in the table for EU IDs 20-23 represent 100% load ratings. However, the electrical production of these generator sets is limited to 1,125 kW by Condition 19.2 of Title V Permit No. AQ0264TVP02, Rev. 4. The USAF is requesting to change this limit to 1,425 kW based on NOx source test results dated November 27, 2013.
- g. Bracketed [R-#] and [P-#] in the EU Name column are equipment reference numbers for the emergency engines maintained by the Power Production shop. These are included in this list to link the permit nomenclature (EU ID #) to the on-base nomenclature for ease in identification and record retrieval.
- h. The AQ0264MSS06 emission unit inventory combines both the Sandwich Belt Conveyor and the Segment Crusher as EU ID 110. However, the NSPS Subpart Y applicability for these two system components is different due to different construction and reconstruction dates. Therefore, this application designates the older Sandwich Belt Conveyor as EU ID 110A, and the newer Segment Crusher as EU ID 110B.

Table 2: Emission Units to Remove

Please remove the following equipment from the Emission Unit Inventory in the current permit.

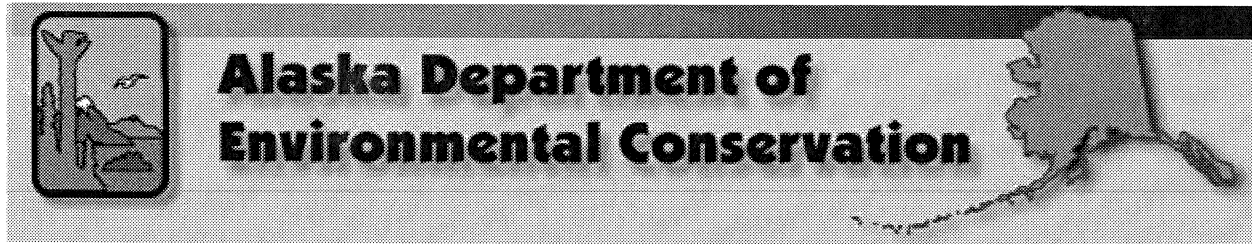
EU ID	Emissions Unit Name	Emissions Unit Description	Rating/Size	Building Number	Install/ Construction Date/Model Year
Diesel-Fired Internal Combustion Engines, (ICE)					
5	CH&PP Main Boiler #5	Garret Shafer Boiler	120,000 lb/hr	6203	1956
6	CH&PP Main Boiler #6	Garret Shafer Boiler	120,000 lb/hr	6203	1956
19	CH&PP Main Auxiliary Generator Removed: July 23, 2021	EMD Diesel Engine	2,500 kW	6203	1998
24	Wastewater Treatment Generator	Caterpillar Diesel Engine	728 bHp	2316	1994
27	Engineer Hill Generator	Onan Diesel Engine	150 kW	6158	1987
28	Alert Hangar Generator	Komatsu Diesel Engine	100 kW	1300	1985
35	Fire Pump P8 (Thunder Dome #1)	Cummins Diesel Engine	340 hp	1142	1989
36	Fire Pump P9 (Thunder Dome #2)	Cummins Diesel Engine	340 hp	1142	1989
42	Fire Pump P20 (Hog Pen A-10s)	Detroit Diesel Engine	235 hp	1225	1994
55	North ILS Generator	Cummins-Onan Diesel Engine	102 bHp	1103	1993
57	Conventional Munitions Fire Pump #1	Clark Firewater Pump	120 Hp	6385	1999
58	Conventional Munitions Fire Pump #2	Clark Firewater Pump	120 Hp	6385	1999
61	Base Supply Fire Pump [P-22]	Cummins 6BTA-5.9F1 Diesel SN 44771157	300 bHp	3426	2001
82 ¹	Recycle Plant Engine	John Deere	450 hp	N/A	03/2006
83 ¹	Jaw Crusher Engine	John Deere	450 hp	N/A	12/2006
84 ¹	Hydrascreen Engine	Duetz	96 hp	N/A	03/2006
118	Quarry Hill Generator	John Deere Diesel Engine	70 bhp	6402	2004
123	Emergency Wastewater Pump Engine	John Deere 4029D Diesel Engine	60 kW	2316	1991
Aircraft Arrestor Engines					
65	Aircraft Arrestor Engine NW	Waukesha Gas Engine	65 hp	1113	1970
66	Aircraft Arrestor Engine NE	Waukesha Gas Engine	65 hp	1113	1970
67	Aircraft Arrestor Engine ¾ W	Waukesha Gas Engine	65 hp	1119	1970
68	Aircraft Arrestor Engine ¾ E	Waukesha Gas Engine	65 hp	1119	1970
69	Aircraft Arrestor Engine SE	Wisconsin Gas Engine	61 bHp	1265	2010
70	Aircraft Arrestor Engine SW	Waukesha Gas Engine	65 hp	1265	1970
70A	Aircraft Arrestor Engine SW	Wisconsin Gas Engine	61bHp	1265	2016
Aboveground JP-8 Storage Tanks					
104	South Ramp Loop Tank #6167	AST-Internal Floating Roof Tank	420,000 gal	6167	2006
105	South Ramp Loop Tank #6268	AST-Internal Floating Roof Tank	420,000 gal	1318	2006
106	Tanker Row Tank #3241-5	AST-Internal Floating Roof	420,000 gal.	3241	2000

EU ID	Emissions Unit Name	Emissions Unit Description	Rating/Size	Building Number	Install/ Construction Date/Model Year
107	Tanker Row Tank #3244-6	AST-Internal Floating Roof	420,000 gal.	3244	2000
Miscellaneous Insignificant Emission Units					
85 ²	Fire Training	NA	NA	NA	NA
109 ³	Aircraft Corrosion Control Facility	Regulated Surface Coating	NA	1348	1987

Notes:

1. EU IDs 82, 83, and 84 are being removed from the inventory because they are nonroad engines. This application requests removing the ORL that governed these units. At the time the ORL was created, they were used as prime movers for the crusher equipment. Now the crusher equipment has been decommissioned and the engines have been in cold storage for an extended period. The base is reserving these units for use as nonroad engines on an as-needed basis.
2. EU ID 85 (Fire Training) is insignificant on an actual emissions basis [18 AAC 50.326(e)]. Propane usage is typically 1,000 gallons per year. A propane line runs to a mock aircraft used for fire training. A spark ignites the propane inside the mock aircraft. Wooden pallets are sometimes burned inside the mock aircraft; no other materials are combusted.
3. EU ID 109 – aircraft corrosion control facility. This EU is no longer subject to NESHAP Subpart GG due to reclassification of the stationary source as an area source, per the EPA’s February 8, 2018 guidance on the Reclassification of Major Sources as Area Sources under Section 112 of the Clean Air Act (CAA).

Attachment F: TAR to AQ0264CPT03



Technical Analysis Report

US Department of the Air Force Eielson Air Force Base

Auxiliary Heat & Power-Plant II Boiler Project

Construction Permit Project No. X-201

Prepared by John Kajdan
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ADEC Air Quality Construction Permits
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March 4, 2004

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List of Abbreviations Used in this Permit

AAC	Alaska Administrative Code
ACMP	Alaska Coastal Management Program
ADEC	Alaska Department of Environmental Conservation
AS	Alaska Statutes
ASTM	American Society of Testing and Materials
CEMS	Continuous Emission Monitoring System
C.F.R.	Code of Federal Regulations
COMS	Continuous Opacity Monitoring System
EPA	US Environmental Protection Agency
HB	House Bill
HHV	Higher heating value
ID	Source Identification Number
MACT	Maximum Achievable Control Technology
NAICS	North American Industry Classification System
NESHAPs	Federal National Emission Standards for Hazardous Air Pollutants [as defined in 40 CFR 61]
NSPS	Federal New Source Performance Standards [as defined in 40 CFR 60]
PS	Performance specification
PSD	Prevention of Significant Deterioration
RM	Reference Method
SIC	Standard Industrial Classification
SIL	Significant Impact Level
SCR	Selective Catalytic Reduction
VOL	Volatile Organic Liquid

Units and Measures

bhp	brake horsepower or boiler horsepower ¹
gr./dscf	grain per dry standard cubic feet (1 pound = 7000 grains)
dscf	Dry standard cubic feet
GPH	gallons per hour
kW	kilowatts
Mlb	thousand pounds
MMBtu	Million British Thermal Units
MW	MegaWatt
ppm	Parts per million
ppmv	Parts per million by volume
TPH	Tons per hour
TPY	Tons per year
Wt%	weight percent

Pollutants

CO	Carbon Monoxide
HAPS	Hazardous Air Pollutants [as defined in AS 46.14.990(14)]
H ₂ S	Hydrogen Sulfide
NO _x	Oxides of Nitrogen
PM-10	Particulate Matter [as defined in 18 AAC 50.990(70)]
SO ₂	Sulfur Dioxide
VOC	Volatile Organic Compound [as defined in 18 AAC 50.990(103)]

¹ 1 boiler horsepower = 33,472 Btu-fuel per horsepower-hour divided by the boiler's efficiency. Approximately 7000 Btu-fuel per brake horsepower-hour is required for an average diesel IC engine.

1. Introduction

The US Department of the Air Force (USAF) submitted a construction permit application for the Auxiliary Heat and Power Plant II Boiler Project at Eielson Air Force Base (Eielson). The project includes construction of two industrial sized oil fired boilers, increased operations of the base's emergency engine pool, and limits restricting annual fuel throughput of two new 420,000 gallon storage tanks. The application was prepared on behalf of USAF by Hoefler Consulting Group.

The Alaska Department of Environmental Conservation (department) has prepared this technical analysis report in order to document the department's review of the project and to document the basis for the requirements of the construction permit authorizing the Auxiliary Heat and Power Plant II Boiler Project.

The requirements of the construction permit include:

- state emission standards
- federal New Source Performance Standards (NSPS)
- operational restrictions to protect ambient air quality
- operational restrictions to avoid project classification

This technical analysis report includes:

- an overview of the project,
- the applicant's permit requests and detailed analyses of those requests,
- analyses of regulatory applicability to the project or applicant's requests,
- discussion of necessary operational limits to avoid project classification, and
- discussion of necessary operational restrictions to protect ambient air quality.

2. Facility Description

Eielson is located in interior Alaska near the communities of Fairbanks and North Pole. Eielson is home to the 354th Fighter Wing (FW). The 354th FW equips and trains the 18th Fighter Squadron to conduct offensive counter, interdiction, and close air support (CAS) roles using the F-16 Fighting Falcon. Also at Eielson, the 355th Fighter Squadron flies the A-10 and OA-10 Thunderbolt II aircraft in CAS

missions. Both units support USAF and US Army units deploying for contingencies or wartime missions.

Eielson was constructed and in full operation prior to the onset of the Prevention of Significant Deterioration (PSD) program. Therefore, Eielson did not need to obtain a PSD permit at the time the PSD program was established. Eielson has undergone PSD pre-construction review for NO_x for the installation of four² 1.25 MegaWatt (MW) diesel fired backup generators. That project was authorized by Air Quality Control Construction Permit No. 9831-AC019 issued December 1, 1998.

3. Project Description

3.1 Overview

Following is a brief summary of the project and original permit requests. The department modified the original permit requests based on the project review documented in this technical analysis report.

3.1.1 New or replacement *emissions units* included in this construction permit decision include:

- Two new 115 MMBtu/hr oil fired boilers.
- One new 1.5 MMBtu/hr oil fired boiler.
- One new 0.30 MMBtu/hr oil fired boiler.
- Thirteen emergency engines. Eight engines are new to Eielson; five replace existing engines.
- Two new 420,000 gallon capacity fuel storage tanks.

3.1.2 Project Emissions

	NO _x	SO ₂	PM	CO	VOC
Engines	5.75	0.51	0.23	3.02	0.92
Large Boilers	28.33	38.17	6.38	9.58	0.05
Small Boilers	1.15	1.23	0.20	0.29	0.03
Tanks	0	0	0	0	0.2
Total (TPY)	35.22	39.90	6.81	12.89	1.20
PSD (YES NO)	No	No	No	No	No

3.1.3 Requested³ operational limits

The USAF proposed the following limits to avoid project classification and to protect ambient air

² From Page 7 of Permit No. 9831-AC019, Source IDs 203-206.

³ From Page 1 of USAF's November Application.

quality for the Auxiliary Heat and Power Plant II Boiler Project. The department provides a detailed discussion of these limits in section 3.2, "Requested Limits," on page 5 of this report.

- Limit total fuel consumed by the new 115 MMBtu/hr boilers to no greater than 4.28 million gallons annually.
- Limit combined total operations of an assortment of 80 different emergency engines to 3,309,461 hp-hr/yr.⁴
- Limit the combined annual throughput of two new tanks to 18 million gallons.
- Limit fuel oil to 0.15% sulfur by weight.

3.1.4 Project classifications

The department finds the project is classified as follows.

- The project is classified as a modification under 18 AAC 50.300(h)(2) only.
- The project requires a *minor permit* under AS 40.14.130(c)
- PSD avoidance, the project includes owner requested limits as allowed under 18 AAC 50.305(a)(4). The project may avoid classification as a *major modification* by limiting the fuel consumed annually by the proposed boilers and annual operational limit on emergency engine pool operations.

3.2 Requested Limits

Limits requested in a permit application must be consistent with the requirements for a construction permit under 18 AAC 50.320. 18 AAC 50.320(a)(2) requires that a construction permit include permit conditions that ensure that operations after the modification are in accordance with requested limits to avoid project classification as well as limits that are in accordance with the requirements for approval of a construction permit under 18 AAC 50.315(e).

Under 18 AAC 50.315(e)(2), for the department to approve a construction permit application and issue a permit, the applicant must demonstrate compliance with the air quality *standards* and *increments*. Therefore, the permit must also contain conditions that restrict the units to the operations USAF modeled in order to meet the requirements for the department to issue a construction permit.

⁴ These engines are listed Table 1-2, "Eielson AFB – Requested Generation Limit of Selected Emission Sources." on page 3 of the application.

A description, analysis, and discussion of USAF's specific permit application requests with regard to the requirements for approval of a construction permit application are as follows.

3.2.1 3.3 MM hp-hr/yr Facility-wide Production Cap for Emergency Generators.

Request

Eielson requested an annual limit on combined operations of the base's emergency generators as follows:

"Do not exceed a combined total output of 3,309,461 horsepower-hrs (hp-hrs) in any consecutive 12-month period for the emissions sources listed in Table 1-2."

Analysis

The proposed limit allows operational flexibility while limiting total emissions from the emergency engines. In general, for a project to avoid classification as a *major modification*, potential emissions calculations that do not account for a unit's continuous operation are based on enforceable operational limits. In addition to project classification, the project also requires operational limits that are consistent with the air dispersion modeling used to demonstrate that it will not cause or contribute to a violation of the air quality standards or increments.

Discussion

Eielson's proposed cap may be deficient with respect to the operational restrictions assumed to calculate the project's *potential emissions* and assumed in the air dispersion modeling used to demonstrate that the project would not imperil air quality. USAF did not propose additional operational restrictions or propose monitoring or recordkeeping requirements consistent with assumed emergency engine operations.

While in general, *potential emissions* for units that do not conduct continuous operations should be calculated based on federally enforceable operational limits, *potential emissions* for emergency engines may be assessed on limiting factors other than federally enforceable operational limits. This is due to the inherent limitations of emergency operations. This approach is a shift from previous state requirements, and is due to revision of state statute incorporating the federal definition of *potential to emit*. EPA guidance⁵ for applying the federal

⁵ September 6, 1995 Memorandum from John S. Seitz regarding potential emissions calculations for

definition with respect to project classification indicates that *potential emissions* for emergency engines may be calculated from the maximum expected hours that power will be unavailable combined with operational hours necessary for maintenance. In accordance with this EPA guidance for emergency engines, a 200 hour limit may not be needed to ensure that the project avoids classification as a *major modification*.

The department notes that USAF's potential to emit calculations based on emergency engine electric generating capacity do not account for the energy lost converting mechanical to electrical energy. The result of this oversight is that the units' emissions would be greater than calculated. Therefore, the department recalculated potential emissions of the new engines based on the proposed emergency engines' nameplate horsepower, 200 hr-annual operations and the vendor data submitted in support of the application.

Although the EPA guidance does not require federally enforceable operational limits as the basis for emergency engines *potential emissions* calculations, the guidance does not advise against including operational restrictions on emergency engines that may be necessary to protect ambient air quality. The department finds that the proposed cap would allow existing and new engines to operate in excess of annual operations assumed for Alaska Ambient Air Quality Standards (AAQS) and increment air dispersion modeling.

USAF modeled the emergency engines operating 200 hrs per year to demonstrate compliance with the AAQS. The department provided USAF case specific guidance in an email regarding air dispersion modeling for the last application for Eielson, Project X-193. As discussed in that email, the department found that USAF would have to include emergency engines greater than 60 kilowatts (kW) and that were not restricted to 200 hrs/yr or less in the air dispersion modeling for AAQS and increments, but could exclude any emergency unit that had a 200 hr/yr permit limit from the increment analysis. *Increment* is consumed by any long term emitting activity related to the project. The department considers operation of the Eielson AFB emergency engines less than 200 hours annually to be too intermittent to be considered a long term emitting activity. Therefore, the department did not require

Emergency Generators. This memorandum is available through EPA Region VII's downloadable database of EPA guidance.

that USAF model emergency engine operations to demonstrate compliance with the *increments*.

A construction permit may not allow operations that could cause or contribute to a violation of an ambient air quality standard or increment. Eielson demonstrated that the project would not violate the standards and increments based on the assumption that emergency engine operations would be no greater than 200 hours per year. Diesel engines can have substantial air quality impacts especially with respect to annual average NO_x concentrations and daily average PM-10 and SO₂ concentrations. Due to stationary diesel engines' considerable ambient impact, the department incorporated modeled operations as enforceable limits in the construction permit.

Conclusion

The department finds that annual operations of individual emergency engines at Eielson AFB should be limited to 200 hours instead of the proposed horsepower hour production cap as follows.

- The 200-hour annual limit is necessary to protect the increment because the department determined, based on engineering judgment, that operations of emergency engines at Eielson AFB in excess of 200 hours could affect long-term degradation of air quality and consume increment.
- The 200-hour annual limit is necessary to ensure protection of ambient air quality standards because diesel engines can have substantial impacts on annual ambient NO₂ concentrations and the air dispersion modeling does not account for annual emergency engine operations greater than 200 hours.

The department also finds that based on the federal definition of *potential to emit* adopted by reference, and EPA guidance for calculating potential emissions from emergency engines, the production cap requested by USAF or the department's 200 hour operational limit is not required to ensure that the new emergency engines avoids project classification as a *major modification*.

The department has included the requirement to limit each emission unit listed in Table 1-2 of USAF's November application to no greater than 200 hrs/yr. in Section 4 of the permit, "Limits to Protect Ambient Air Quality."

3.2.2 4.28 MM gal/yr combined limit for new boilers.

Request

USAF's original application included a request to limit the two new 115 MMBtu/hr boilers to 4,284,510 gallons per consecutive 12-month rolling total.

Analysis

The proposed limit allows operational flexibility between the two units while limiting annual emissions.

Discussion

An annual fuel limit is necessary to limit NO₂ and SO₂ emissions to avoid project classification as a PSD modification and to protect ambient air quality.

The department is authorizing lower allowable annual fuel consumption than USAF had originally requested to accommodate new emissions information included in a revision to the permit application. USAF requested⁶ that the department add an additional small boiler rated at 0.30 MMBtu/hr to the project *emissions unit* inventory. Included with that request were revised emission calculations for the project. The new estimates for the two new 115 MMBtu/hr boilers assumed combined annual fuel consumption for the boilers would be 3,780,450 gallons or less.

Conclusion

The department is limiting combined fuel consumption of the two proposed 115 MMBtu/hr boilers to no greater than 3,583,851 gallons per 12-month rolling period. This limit is contained in Section 3 of the construction permit

3.2.3 Fuel oil sulfur limit.

Request

Eielson proposed to limit fuel oil sulfur to 0.15 percent sulfur by weight.

Analysis

This sulfur limit is contained in USAF Eielson's current Operating Permit 264TVP01 in Section 5 "Source-specific Standards and Requirements." Potential emissions and the modeled SO₂ emission rates were calculated based on this fuel sulfur content. Therefore, the fuel sulfur restriction is required to protect ambient air quality, and to avoid project classification as a PSD modification.

Discussion

Additional monitoring and recordkeeping permit conditions for fuel sulfur content will not be necessary. The construction permit will defer to the operating permit for monitoring and recordkeeping requirements. Construction permit fuel sulfur requirements will refer only to new emissions units because the existing and replaced engines are subject to restrictions under the operating permit.

3.2.4 18 MM gal/yr fuel tank throughput limit

Request

USAF requested that the construction permit "limit the fuel throughput of the two new 420,000 gallon capacity storage tanks to 18 million gallons per consecutive 12-month period (combined total)."

Analysis

The proposed limit ensures annual Volatile Organic Compound (VOC) emissions from the new storage tanks will not exceed the emissions calculated to determine project classification.

Discussion

USAF did not propose monitoring or recordkeeping requirements that ensure compliance with the proposed limit. Therefore, the department included the requirement for USAF to track monthly and twelve-month rolling fuel throughput for each tank in construction permit Section 5, "Owner Requested Limit."

3.3 Additional Application Request

USAF submitted a request via email to add a 0.30 MMBtu/hr boiler to the construction permit inventory. The department has included the additional boiler in the construction permit source inventory.

3.4 Regulatory Applicability

3.4.1 Ambient Air Quality Regulations

18 AAC 50.010

The project is prohibited from causing or contributing to a violation of the AAAQS set out in 18 AAC 50.010(1)-(8).

18 AAC 50.015

The maximum increases allowed since the applicable baseline dates are determined based on the Air Quality Control Region and Air Quality Classification where the project is located. Eielson AFB is located in the Northern Alaska Intrastate Air

⁶ December 11, 2003 submittal.

Quality Control Region, which is classified as a Class II area.

18 AAC 50.020

Tables 2 and 3 of 18 AAC 50.020 list the baseline dates and increments respectively.

3.4.2 Performance Standards

18 AAC 50.040

40 CFR 60.40b-49b is adopted by reference. The federal New Source Performance Standards under Subpart Db are applicable to this project.

40 CFR 60.110b-117b is adopted by reference. The federal New Source Performance Standards under Subpart Kb are not applicable to this project.

18 AAC 50.055

The state performance standards for fuel burning equipment are applicable to this project.

3.4.3 Air Pollution Prohibited

18 AAC 50.110

No person may permit any emission which is injurious to human health or welfare, animal or plant life, or property, or which would unreasonably interfere with the enjoyment of life or property.

3.4.4 Facility and Project Classification

18 AAC 50.300(b)(2)

Two of the proposed boilers and Source IDs 1-6 are rated at greater than 100 MMBtu/hr.

18 AAC 50.300(c)(1)

Existing *emissions units* at Eielson AFB have the *potential to emit* greater than 250 TPY of the following pollutants: 1,120 TPY-NO_x, 971.9 TPY-SO₂, and 594.6 TPY-CO.⁷

18 AAC 50.300(c)(2)

Eielson AFB has fossil fuel fired steam electric generating capacity capable of greater than 250 MMBtu/hr combined total heat input. Assuming approximately 1,250 Btu-fuel/lb-steam, Total capacity of the base's coal fired boilers, Emission Unit's 1-6 rated to 120,000 lbs-steam/hr apiece,⁸ at the base's Central Heat and Power Plant is 900 MMBtu/hr.

18 AAC 50.300(h)(2)

The new *emission units* will increase the stationary source's (or Eielson's) actual emissions beyond their allowable emissions.

18 AAC 50.305(a)(4)

USAF has requested limits to avoid project classification as a modification under 18 AAC 50.300(h)(3). Since the term "modification" has been redefined by House Bill (HB) 160, project classification under 18 AAC 50.300(h) depends only on the current project. It does not include any previous projects' emissions. Current regulations do not accommodate the current state statutes. Until the department adopts revised regulations that incorporate the changes made by HB 160 to AS 46.14, the department finds that a project that avoids classification as a *major modification* avoids project classification under 18 AAC 50.300(h)(3).

3.4.5 Application Requirements

18 AAC 50.310

The application requirements in 18 AAC 50.310(a)-(c) and (n) are applicable to this project. USAF is required to submit a complete construction permit application according to these requirements including air dispersion modeling. 18 AAC 50.310(c)(5) gives the department discretion to require USAF to demonstrate that CO emissions increases due to the project will not cause or contribute to a violation of the applicable air quality standards for CO. USAF is required to submit air dispersion modeling with their permit application by 18 AAC 50.310(n)(2).

The project is not a *major modification* so the requirements of 18 AAC 50.310(d) for PSD preconstruction review are not applicable to this project.

AS 46.14.130(c)

The project is not a *major modification* and is not subject to HAPs or NESHAPs requirements so Eielson is eligible to obtain a *minor permit* for the project.

The department does not have minor permit program requirements established in regulation at this time. However, the department finds that existing construction permitting requirements will not be less stringent than the requirements of a minor permit program. In addition, a construction permit issued under current 18 AAC 50 will meet all requirements of any future minor permit program.

⁷ From tables B-1 and B-2 of the application.

⁸ From the operating permit source inventory in Operating Permit No. 264TVP01.

3.4.6 Alaska Coastal Management Program

6 AAC 50 and 6 AAC 80

The single agency review requirements of the Alaska Coastal Management Program (ACMP) are not applicable to this project. A project must be located on land that is not owned by the federal government that is within the coastal zone of a coastal district. Eielson AFB is on federal land, is not in a coastal district and is not located within a coastal zone.

3.5 Emission Unit Inventory

Table 1 – Additional Emissions Units, lists *emission units* included in the project that will be added to Eielson AFB’s emission unit inventory. Table 2 – Replacement Units, lists *emission units* that are replacing *emission units* in Eielson AFB’s current emission unit inventory.

Table 1 – Additional Emissions Units

Construction Permit Emission Unit Number and Name	Rating ⁹
1 AH&P-Plant II Boiler No. 1 (B1342)	115.1 MMBtu/hr
2 AH&P-Plant II Boiler No. 2 (B1342)	115.1 MMBtu/hr
3 Military Dog Kennel Boiler (B3464)	1.5 MMBtu/hr
4 Main Gate Boiler	0.30 MMBtu/hr
5 Type III Hydrant Fueling (B1309)	750 bhp
6 AH&P-Plant II Generator	750 bhp
8 New Security Forces Facility Generator (B3134)	750 bhp
9 Tank E2 Generator	317 bhp
10 Tank E6 Generator	317 bhp
11 4-Bay Hangar Generator (B1335)	207 bhp
12 Tank E11 Generator	317 bhp
13 8-Bay Hangar (B1338) Generator	317 bhp
18 Fuel Storage Tank	420,000 gal
19 Fuel Storage Tank	420,000 gal

⁹ Nameplate ratings provided in November 26, 2003 submittal.

Table 2 – Replacement Units

Construction Permit Source Number and Name	Rating ⁹	Title V ID
7 Air Field Lighting Generator (B1146)	750 bhp	27
14 Telephone Exchange Generator (B3110)	207 bhp	25
15 Wing MOC Generator (B1347)	170 bhp	None
16 Fire Station No. 1 Generator (B1206)	170 bhp	None
17 Base Radio MARS generator (B4308)	56 bhp	None

4. Ambient Impacts

USAF performed air dispersion modeling to demonstrate that the increase in emissions from Eielson AFB due to the project will not cause or contribute to a violation of AAAQS and increments for SO₂, NO₂, PM-10, CO and lead.

The department reviewed USAF’s modeling and has concluded that USAF demonstrated the project will not cause or contribute ambient pollutant concentrations in excess of the AAAQS or increments.

Project impacts were below the Significant Impact Level (SIL) for annual ambient concentrations of SO₂ and PM-10. Therefore, USAF did not submit cumulative ambient impact assessments for annual SO₂, and PM-10 impacts.

USAF submitted air dispersion modeling files for the following pollutants and averaging times.

- 1-hr and 8-hr ambient CO concentrations
- Annual NO₂ concentrations
- 24-hr and 3-hr SO₂ concentrations
- 24-hr PM-10 concentrations.

The memorandum summarizing the department’s review of USAF’s modeling is presented in Appendix A of this report. Table 1 of the memorandum presents the maximum pollutant concentrations due to the project compared to the SIL.¹⁰ Table 2 presents the total modeled pollutant concentrations due to onsite and nearby emissions units and background pollutant concentrations. Table 3 of the memorandum presents the modeled increases in pollutant concentrations since the applicable baseline

¹⁰ SIL set out in 18 AAC 50.310(d) Table 6

dates (increments).¹¹

5. Emission Standards

For each stationary source or modification subject to construction permitting, the applicant must show that the proposed emission units comply with state and federal emission standards. The department has adopted federal New Source Performance Standards (NSPS) and National Emission Standards for Hazardous Air Pollutants (NESHAP), by reference in 18 AAC 50.040. In addition, the department has source-specific emission standards listed in 18 AAC 50.050-090.

5.1 New Source Performance Standards

The two 115.1 MM Btu/hr boilers included in Eielson's Auxiliary Heat and Power Plant II Auxiliary Boiler Project are NSPS affected facilities under 40 CFR 60 Subpart Db, "Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units."¹² Applicable emissions limits under Subpart Db are 0.20 lb-NO₂/MMBtu and 20 percent exhaust opacity. Applicable monitoring requirements under Subpart Db include the requirement to install continuous emissions monitors for NO_x as well as opacity. The department has included these applicable requirements of 40 CFR 60 Subpart Db in Section 6 of the construction permit, "Federal Emission Standards."

The two 420,000 gallon storage tanks included in the project have a large enough volume to warrant regulation under Subpart Kb (40 CFR 60 Sections 110b-117b). However, the tanks are exempt from the subpart because the Reid Vapor Pressure of the fuel Eielson AFB intends to store is less than 3.5-kPa. If Eielson AFB were to store *volatile organic liquids* (VOL) with a Reid Vapor Pressure greater than 3.5-kPa, the subpart would then become applicable. Therefore, the department has included a limit in construction permit Section 4 "Limits to Avoid

¹¹ Increments set out in 18 AAC 50.020 Table 2.

¹² The EPA promulgates and implements NSPS. The intent of NSPS is to provide technology-based emission control standards. EPA may delegate to each state the authority to implement and enforce standards of performance for new stationary sources located in that state. The department has incorporated by reference the NSPS effective July 1, 1997, for specific industrial activities, as listed in 18 AAC 50.040. However, EPA has not delegated to the department the authority to administer the NSPS program at this time.

Project Classification and Protect Ambient Air Quality," that prohibits Eielson from storing VOL with a Reid Vapor Pressure greater than 3.5-kPa.

5.1.1 Subpart Db Applicability.

NSPS in Subpart Db are applicable to *steam generating units* (boilers) built after 1984 and that burn fuel at the rate of 100 MMBtu/hr or greater.¹³ The oil fired boilers proposed by USAF are rated at 115 MMBtu/hr each. USAF expects to commence construction in spring of 2004. Subpart Db sets out emission performance standards for sulfur dioxide (SO₂), particulate matter, and nitrogen oxides (NO_x). The performance standards for affected boilers vary depending on the type and quality of fuel, where the coal was mined, whether the boiler uses an emerging technology to control emissions, the boiler's *heat release rate*, and the boiler's *annual capacity factor*.

5.1.2 Subpart Db Standard for Particulate Matter - 40 CFR 60.43b

Emissions performance standards for particulate matter from affected boilers are set out in paragraphs (a) through (d), and (f) of 60.43b "Standard for particulate matter." The applicable test methods and procedures for testing the affected boilers particulate matter emissions performance are set out in 40 CFR 60.46b, "Compliance and performance test methods and procedures for particulate matter and nitrogen oxides." The NSPS NO_x requirements are included in Section 6 of the construction permit.

The NSPS particulate matter emissions performance requirements are specific to the type of fuel burned in the boiler and its *annual capacity*. The NSPS for affected boilers that burn only oil specifies maximum allowable exhaust opacity as a surrogate standard for particulate emissions. Paragraph (f) prohibits affected boilers from emitting exhaust that is more than 27 percent opaque at any time, and more than 20 percent opaque for more than six minutes each hour.

Paragraphs (a) through (d) of 40 CFR 60.43b are not applicable to the boilers proposed by USAF because the boilers do not burn coal, wood, or municipal-type solid waste. Paragraph (e) defines how *annual capacity factor* is determined. Paragraph (g) exempts affected boilers from the opacity standard during periods of startup, shutdown, or malfunction.

¹³ For oil fired boilers this equates to approximately 719 gallons of No. 2 fuel oil per hour.

5.1.3 Subpart Db Standard for Nitrogen Oxides - 40 CFR 60.44b

Emissions performance standards for NO_x from boilers subject to Subpart Db are set out in 40 CFR 60.44b "Standard for nitrogen oxides." The applicable test methods and procedures for testing the affected boilers NO_x emissions performance are set out in 40 CFR 60.46b, "Compliance and performance test methods and procedures for particulate matter and nitrogen oxides." The NSPS NO_x requirements are included in Section 6 of the construction permit.

The NSPS NO_x emission limit for a specific boiler is based on a variety of factors. These factors include the type of fuel burned, *heat release rate*, the date the boiler was manufactured, and the *annual capacity factor*. The paragraphs of 40 CFR 60.44b that govern NO_x limits for affected boilers are as follows.

60.44b paragraph (a) specifies the NO_x emission standard for boilers constructed before July 9, 1997 based on *heat release rate*, fuel type and for coal plants, whether the boiler uses a mass-feed stoker, spreader stoker and fluidized combustion, pulverized coal, coal type and whether the coal was mined in North Dakota, South Dakota, or Montana and combusted in a slag tap furnace, or if whole *steam generating unit* uses a duct burner in a combined cycle system.

60.44b paragraph (l) specifies the NO_x emissions standard for affected boilers constructed after July 9, 1997. The NO_x standard for these facilities is determined based only on whether the boiler has a *heat release rate* greater than or less than 70,000 Btu-fuel/hr per cubic foot of furnace volume. If the boiler has a *heat release rate* greater than 70,000 Btu/hr-ft³ the NO_x emission standard is the same regardless of fuel type or combination, stoker type, or where the coal was mined. If the unit has a heat release rate below 70,000 Btu/hr-ft³ then paragraph (l) sets a limit for facilities before 1997 based a variety of factors.

Eielson's affected boilers would have an *annual capacity factor* of 58 percent if only one of the two affected boilers is operated under their proposed annual fuel limit. An affected boiler must have an *annual capacity factor* of only 10 percent and maximum fuel burning capacity less than 250 MMBtu/hr to qualify for the exemption from NSPS NO_x emission limit provided by 40 CFR 60.44b paragraphs (j) and (k). Therefore, the boilers are subject to the nitrogen oxide standard under paragraph (l) as they will be constructed after 1997, and are not exempted by 48b(i) from NO_x CEMS requirements.

NO_x and particulate matter monitoring

requirements. These requirements are contained in paragraphs (a) through (i) of 40 CFR 60.48b. Paragraphs (a), (b), (e), (f), and (g) are applicable to the project. Following is a brief description of the requirements of these paragraphs, then an analysis of the paragraphs' applicability to the project.

Paragraph:

- (a) requires an opacity CEMS;
- (b) requires a NO_x CEMS;
- (e) requires USAF to install NO_x and Opacity CEMS in accordance with 60.13;
- (f) requires alternate monitoring when NO_x CEMS is not operating;
- (g) allows USAF the option of getting an approved alternate NO_x emission monitoring plan to monitor parameters other than exhaust NO_x concentration to determine NO_x emissions. To get an approved plan as allowed by this paragraph USAF must submit the plan according to 40CFR 60.49b paragraph (c).

5.1.4 Subpart Db Standard for Sulfur Dioxide

40 CFR 60.42b paragraphs (a), (b), and (c) require boilers that are subject to NSPS subpart Db to comply with a tiered SO₂ standard, the requirements of which become more stringent as the operator elects to burn higher sulfur fuel. The first tier limits the fuel sulfur content based on the type and/or combinations of fuel burned in the boiler. The second tier requires SO₂ emissions controls and performance testing of those controls when the operator elects to use fuel with higher sulfur content than specified under the first tier of the standard. The second tier of the standard requires the operator to install emissions controls so that the resulting emission rate is no greater than if the boiler was burning fuel with the lower sulfur content specified under the first tier of the standard, or a percent reduction that is specified based on the boiler's classification under 40 CFR 60.42b (a), (b), or (c), whichever is less stringent. However, boilers are exempted from the requirement to apply SO₂ emissions controls if burning *very low sulfur fuel* by 40 CFR 60.42b (j), or if they meet any of the qualifying criteria under 40 CFR 60.42b (d) (1), (2), or (3).

The performance testing and monitoring requirements for boilers subject to subpart Db vary depending on the applicable emissions performance standard. Operators firing boilers with fuel that triggers the requirement to use emissions controls are required by 40 CFR 60.45b paragraph (c) to conduct

SO₂ emissions performance testing and by 40 CFR 60.47b paragraph (a) install continuous emission monitors for exhaust SO₂ and oxygen (O₂) or carbon dioxide (CO₂) concentrations.

40 CFR 60.47b paragraph (b) allows the operator to conduct fuel sulfur analysis as a surrogate for a CEMS. 40 CFR 60.47b paragraph (f) exempts operators using *very low sulfur fuel* from all SO₂ monitoring requirements.

NSPS sulfur emissions limit. USAF's proposed boilers subject to Subpart Db are required by 40 CFR 60.42b(a) to limit sulfur emissions to 0.80 lbs SO₂ per million Btu of fuel burned. The boilers will use only *very low sulfur fuel* and therefore are exempted from the second tier requirements to install sulfur dioxide emissions controls and conduct performance testing by 40 CFR 60.42b(j). USAF will limit fuel sulfur to 0.15% sulfur by weight. This is considerably less than the maximum sulfur content allowed in *very low sulfur fuel* of 0.5 percent sulfur by weight.

NSPS sulfur emissions monitoring and record keeping. USAF is required to maintain a record of fuel receipts certifying that the fuel meets American Society of Testing and Materials (ASTM) standard specifications for fuel oils and to submit reports to the *Administrator* certifying that only *very low sulfur fuel* was combusted during the reporting period. Eielson's boilers subject to Subpart Db are exempted from sulfur emissions performance testing requirements because SO₂ emissions controls are not required.

The requirements of 40 CFR 60.42b paragraph (b) are not applicable because the boilers do not burn coal refuse alone in fluidized bed combustion. The requirements of 40 CFR 60.42b paragraph (c) are not applicable because the boilers do not use an emerging technology to control SO₂ emissions.

40 CFR 60.42b paragraph (d) specifies an alternate standard that does not require sulfur emissions controls in any one of the following three cases: the facility is located in a noncontinental area; the boiler is in a combined cycle system and has a duct burner using less than 30 percent of the total fuel burned; or the boiler would be subject to a federally enforceable limit restricting operation to no greater than 30 percent of its annual capacity.

The alternated standard under 40 CFR 60.42b paragraph (d) is not applicable to Eielson's boilers. Eielson is in a continental area and the boilers will not have duct burners or be part of a combined cycle

system. Although USAF's request to limit annual fuel consumption by both boilers is less than 30 percent of the boilers combined annual capacity, the alternate standard is not applicable because one of the two boilers would still be able to operate in excess of 30 percent of its annual capacity in a year.

5.2 National Emission Standards For Hazardous Air Pollutants

The emissions units subject to review in this permit decision are not a NESHAP affected facilities under 40 CFR 61 or 63.¹⁴

5.3 Alaska Emission Standards

Industrial processes and fuel-burning equipment are subject to Alaska's emissions standards for visible emission, particulate matter, and sulfur compound emission standards. These standards are listed in 18 AAC 50.055. The state's requirements for open burning activities are listed in 18 AAC 50.065. The state's fugitive dust requirements for bulk material handling activities are listed in 18 AAC 50.045(d).

5.3.1 Visible Emissions

The industrial processes and fuel burning equipment at the facility are subject to visible emission standards. The standard imposed by the federally adopted state implementation plan prohibits exhaust effluent from exceeding 20 percent opacity, for more than three minutes during any one-hour period. The standard imposed by 18 AAC 50.055(a)(1) prohibits exhaust effluent from exceeding 20 percent averaged over any consecutive six-minute period.

Condition 14 of the construction permit requires that the facility limit, monitor, record, and report visible emissions in accordance with Condition 3 and Section 13 of Operating Permit No. 264TVP01. Based on diesel engine visible emission surveillance records, the department finds that properly operated and maintained diesel engines should meet the visible emission standard.

¹⁴ EPA promulgates National Emission Standards for Hazardous Air Pollutants (NESHAPs). 18 AAC 50.040 adopts the federal hazardous air pollutant regulations, 40 C.F.R. 61 and 40 C.F.R. 63, by reference. EPA may delegate to each state the authority to implement and enforce certain standards for sources located in that state. At this time, EPA has not delegated authority to the department to administer the NESHAPs program.

5.3.2 Particulate Matter

All fuel burning equipment at the facility is subject to a particulate matter standard. The standard is 0.05 grains per dry standard cubic foot of exhaust gas (gr./dscf), as listed in 18 AAC 50.055(b)(1).

The department was able to determine that most project emissions units will comply with the state particulate matter standard from vendor emission data provided by USAF.

The following units may not meet the state standard for particulate matter.

- Sources No. 11 and 14 are Cummins, Inc. Model 6BTA5.9-G3 rated at 207 bhp.
- Source No. 17 is a Cummins, Inc. Model 4-B3.3-G1 rated at 56 bhp.

This as the state standard is more stringent than the applicable Tier 3 requirements under 40 CFR 89.112.

Therefore, the department has included the requirement for USAF to demonstrate the above units' compliance with the state particulate matter standard through source testing or additional vendor data. This requirement is contained in Section 7, "State Emission Standards."

To estimate particulate matter exhaust concentrations, the department used vendor emissions data or AP-42 emission factors, and the fuel factor, $F_d = 9190 \text{ dscf-exhaust/MMBtu-fuel oil}$ from 40 CFR 60, Appendix A, Method 19, Table 19-1. The department's calculations for compliance with the state PM standard are included in Appendix B, "Sample Calculations."

5.3.3 Sulfur Compounds

All fuel-burning equipment is subject to the sulfur compound emission standard as set out in 18 AAC 50.055(c). Sulfur compound emissions from fuel-burning equipment, expressed as SO₂, may not exceed 500 ppm averaged over a period of three hours.

Fuel oil having a sulfur content of 0.76 percent sulfur by weight or less will comply with the state sulfur compound emission standard, conservatively assuming the minimum theoretical amount of air required for complete combustion. Therefore, compliance with 18 AAC 50.055(c) is assured by complying with the fuel sulfur limit of 0.15 percent sulfur by weight.

5.3.4 Ice Fog Standards

Water vapor, along with CO₂ and the regulated pollutants CO, SO₂, NO_x, and PM-10, is a product of the combustion of fuel with air. The department, in its discretion, will require a person who proposes to build or operate an industrial process, fuel-burning equipment, or incinerator in an area of potential ice fog to obtain a permit and to reduce water emissions. Ice fog due to water emissions from Eielson AFB is a concern. However, the department finds that the only practical means of reducing water emissions from the *emissions units* included in this project is to reduce the amount of fuel burned. The department finds that additional operational restriction during periods of ice fog would be inappropriate because the very cold weather conditions necessary for the formation of ice fog also contribute to the need for auxiliary power or emergency electric generation. Therefore, the Department is not placing any additional conditions in the construction permit to comply with ice fog standards.

5.3.5 General Air Pollution Prohibited

18 AAC 50.110 states that no person may permit any emission that is injurious to human health or welfare, animal or plant life, or property, or that would unreasonably interfere with the enjoyment of life and property. The facility is already subject to this requirement as set in Operating Permit No. 264TVP01, Condition 57, "Air Pollution Prohibited."

6. Standard Construction Permit Conditions

Alaska regulations 18 AAC 50 contains standard permit conditions for construction permits, as they are applicable. The requirements of these conditions are set out in 18 AAC 50.345 (c)(1) and (2) and (d) – (o), and in 18 AAC 50.346 (a)(1)-(4). These standard permit conditions contain the applicable requirements for the permittee, including the requirement to comply with the requirements of their construction permit, and report assessable emissions, excess emissions, and permit deviations. The department finds that in the case of this project, the standard conditions do not need to be included in the construction permit because the requirements are already included in Eielson's current operating permit 264TVP01, or are not applicable to the project.

7. Construction Permit Requirements for Eielson AFB

Section 1 Identification

This section is for informational purposes only. The section contains facility identification and project classification information only. The section does not include any requirements that require compliance assurance. The section does not include any limits that require compliance assurance.

Section 2 Emission Information and Classification

This section lists the project and permit classification under 18 AAC 50. The section does not include any limits that require compliance assurance.

Section 3 Source Inventory and Description

This section lists the emissions units for which construction is authorized by the permit. The section does not include any limits that require compliance assurance.

Section 4 Limits to Protect Ambient Air Quality and Avoid Project Classification

The permit limits contained in this section are required to protect ambient air quality and ensure that the project avoids classification as a *major modification*. Section 3.2.1 of this report, "3.3 MM hp-hr/yr Facility-wide Production Cap for Emergency Generators.," discusses the basis for limiting annual operation to 200 hours for each engine instead of the requested annual hp-hr cap. The section also limits fuel sulfur to no greater than 0.15 percent sulfur by weight, and annual fuel consumption by the two 115 MMBtu/hr boilers.

Section 5 Limits to Protect Ambient Air Quality

The permit limits contained in this section limit individual operations of non-project emissions units. The permit limits are required because the limits

were in air dispersion models used by Eielson AFB to demonstrate that the project would not cause or contribute to a violation of AAAQS and *increments*. The limits are required to protect ambient air quality but not to avoid project classification.

Section 6 Owner Requested Limit

The permit limit contained in this section limits the new fuel tanks' loading operations. (Construction Permit IDs No. 18 and 19)

Section 7 Federal Emission Standards

This permit section contains limits based on the Federal NSPS for Industrial-Commercial-Institutional Steam Generating Units as well as the standards for new Volatile Organic Liquid Storage Vessels.

Section 8 State Emission Standards

The permit limits in this section are applicable to the project fuel burning equipment. The section requires that USAF demonstrate compliance with the state PM standard based on vendor data or by performing emissions source testing

Section 9 Permit Documentation

This section is for informational purposes only. The section documents department requests and supplemental project information submittals. The section does not include any limits that require compliance assurance.

8. Permit Administration

This permit action will authorize USAF to install the project emissions units listed in Table 1 – Additional Emissions Units and in Table 2 – Replacement Units at Eielson.

In accordance with 18 AAC 50.315(b), the department has made a preliminary decision to issue a construction permit for the project

The department will make a final decision whether to issue the construction permit after consideration of comments received during the public comment period.

Definitions

This section contains the regulatory definitions of some of the terms used in this technical analysis report. Each term is followed by its regulatory citation. Some terms have multiple regulatory definitions.

Actual Emissions – 18 AAC 50.990(1)

“actual emission: has the meaning given in 18 AAC 50.910.

18 AAC 50.910. ESTABLISHING LEVEL OF ACTUAL EMISSIONS. (a) The amount of actual emissions of each air contaminant emitted by a facility is the average quantity, in tons per year, actually emitted by the facility during the most recent two years of normal operation. The department will, in its discretion, consider facility-specific allowable emissions to be actual emissions of an air contaminant. Subject to (b) of this section, for a source that has not begun normal operations, the department will use the source’s potential to emit as its actual emissions amount.

- (b) The actual emissions of an electric utility steam generating unit that has been physically or operationally changed will be established at a level equal to the expected actual annual emissions of the unit, if the change does not result in an emissions increase. To verify that the change does not result in an emissions increase, the source owner or operator shall
- (1) maintain information demonstrating that the physical or operational change did not result in an emissions increase; and
 - (2) submit that information to the department annually for five years, unless the department, in its discretion, determines that a longer period up to 10 years is more representative of normal, post-change source operation.

Annual Capacity Factor – 40 CFR 60.41b

Annual capacity factor means the ratio between the actual heat input to a steam generating unit from the fuels listed in §60.42b(a), §60.43b(a), or §60.44b(a), as applicable, during a calendar year and the potential heat input to the steam generating unit had it been operated for 8,760 hours during a calendar year at the maximum steady state design heat input capacity. In the case of steam generating units that are rented or leased, the actual heat input shall be determined based on the combined heat input from all operations of the affected facility in a calendar year.

Emission Unit – AS 46.14.990(30)

“emission unit” has the meaning given in 40 CFR 51.166 (b)

Emission Unit – 40 CFR 60.166(b)(7)

Emission unit means any part of a stationary source that emits or would have the potential to emit any regulated NSR pollutant and includes an electric utility steam generating unit as defined in paragraph (b)(30) of this section. For purposes of this section, there are two types of emissions units as described in paragraphs (b)(7)(i) and (ii) of this section.

- (i) A new emissions unit is any emissions unit that is (or will be) newly constructed and that has existed for less than 2 years from the date such emissions unit first operated.
- (ii) An existing emissions unit is any emissions unit that does not meet the requirements in paragraph (b)(7)(i) of this section.

Heat Release Rate – 40 CFR 60.41b

Heat release rate means the steam generating unit design heat input capacity (in MW or Btu/hour) divided by the furnace volume (in cubic meters or cubic feet); the furnace volume is that volume bounded by the front furnace wall where the burner is located, the furnace side waterwall, and extending to the level just below or in front of the first row of convection pass tubes.

- *High heat release rate* means a heat release rate greater than $730,000 \text{ J/sec-m}^3$ ($70,000 \text{ Btu/hour-ft}^3$).
- *Low heat release rate* means a heat release rate of $730,000 \text{ J/sec-m}^3$ ($70,000 \text{ Btu/hour-ft}^3$) or less.

Major Modification – AS 46.14.990(31)

“major modification” means a change that meets the definition of “major modification” under either 40 CFR 51.165 or 40 CFR 51.166.

Major Modification – 40 CFR 51.165(a)(v)(A)

(Please refer to 40 CFR 51 for the full definition)

Major modification means any physical change in or change in the method of operation of a major stationary source that would result in:

- (1) A significant emissions increase of a regulated NSR pollutant (as defined in paragraph (a)(1)(xxxvii) of this section); **and**
- (2) A significant net emissions increase of that pollutant from the major stationary source.

Major Modification – 40 CFR 51.166(b)(2)(i)

(Please refer to 40 CFR 51 for the full definition)

Major modification means any physical change in or change in the method of operation of a major stationary source that would result in: a significant emissions increase (as defined in paragraph (b)(39) of this section) of a regulated NSR pollutant (as defined in paragraph (b)(49) of this section); and a significant net emissions increase of that pollutant from the major stationary source.

Potential Emissions – 18 AAC 50.990(71)

“potential emissions” has the meaning given to the term “potential to emit” in AS 46.14.990.

Potential to Emit – AS 46.14.990

(21) “potential to emit” means the maximum quantity of a release of an air contaminant, considering a facility’s physical or operational design, based on continual operation of all sources within the facility for 24 hours a day, 365 days a year, reduced by the effect of pollution control equipment and approved state or federal limitations on the capacity of the facility’s sources or the facility to emit an air contaminant, including limitations such as restrictions on hours or rates of operation and type or amount of material combusted, stored, or processed; “potential to emit” does not include

- (A) a one-time, accidental release of an air contaminant; or
- (B) the fugitive emissions specifically exempted under 42 U.S.C. 7401 - 7671q (Clean Air Act);

NOTE: HB 160 replaced the term “facility” with either stationary source or emission unit.

Potential to Emit – HB 160 Sec. 57

AS 46.14.990(21) is repealed and reenacted to read: (21) “potential to emit” has the meaning given in 40 CFR 51.166(b)

Potential to Emit – 40 CFR 51.166(b)(4)

Potential to emit means the maximum capacity of a stationary source to emit a pollutant under its physical and operational design. Any physical or operational limitation on the capacity of the source to emit a pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored, or processed, shall be treated as part of its design if the limitation or the effect it would have on emissions is federally enforceable. Secondary emissions do not count in determining the potential to emit of a stationary source.

Reid vapor pressure – 40 CFR 60.111b

Reid vapor pressure means the absolute vapor pressure of volatile crude oil and volatile nonviscous petroleum liquids except liquified petroleum gases, as determined by ASTM D323-82 or 94 (incorporated by reference -- see § 60.17).

Volatile organic liquid – 40 CFR 60.111b

Volatile organic liquid (VOL) means any organic liquid which can emit volatile organic compounds (as defined in 40 CFR 51.100) into the atmosphere.

Steam Generating Unit – 40 CFR 60.41b

Steam generating unit means a device that combusts any fuel or byproduct/waste to produce steam or to heat water or any other heat transfer medium. This term includes any municipal-type solid waste incinerator with a heat recovery steam generating unit or any steam generating unit that combusts fuel and is part of a cogeneration system or a combined cycle system. This term does not include process heaters as they are defined in this subpart.

Online Reference Material

Alaska Administrative Code, Title 18, “Protection of the Environment” Chapter 50, “Air Quality Control”

(18 AAC 50) Available online at

<http://www.state.ak.us/dec/regulations/pdfs/50mas.pdf>

Alaska Statute 46.14 “Air Quality Control” Available online at

<http://www.state.ak.us/dec/air/ap/docs/as46.14.pdf>

Revisions to AS 46.14 HB 160, Available Online at

<http://www.state.ak.us/dec/air/ap/docs/hb160.pdf>

AP-42 Emission Factors. US Environmental Protection Agency. Available online at

<http://www.epa.gov/ttn/chief/ap42/>

Code of Federal Regulations, Chapter 40, Subchapter C, parts 51 and 60. Available online at

<http://www.epa.gov/docs/epacfr40/chapt-I.info/subch-C.htm>

Guideline on Air Quality Models. Available online at

http://www.access.gpo.gov/nara/cfr/cfrhtml_00/Title_40/40cfr51_00.html

Appendix A

Department Modeling Memorandum.

MEMORANDUM State of Alaska

Department of Environmental Conservation
Division of Air and Water Quality

TO: File
Construction Permit
Project No. X-201

PHONE NO: (907) 465-5100

DATE: Proposed - January 24, 2004

THRU: Alan Schuler, P.E.
Air Quality Construction Permits

SUBJECT: Air Dispersion
Modeling Review – Eielson AFB
Auxiliary Heat and Power Plant II
Project.

FROM: John Kajdan
Air Quality Construction Permits

This memorandum summarizes the Alaska Department of Environmental Conservation's (department's) findings regarding air dispersion modeling submitted by the US Department of the Air Force (USAF) Eielson Air Force Base (Eielson AFB) in support of the construction permit application for the Auxiliary Heat and Power Plant II Project (Project X-201). As described in this memorandum, the air dispersion modeling submitted by USAF adequately shows that operating the additional and modified emissions units at Eielson AFB, operating within the requested constraints, will not cause or contribute to a violation of the Alaska Ambient Air Quality Standards (AAAQS) provided in 18 AAC 50.010, or the maximum allowable increases (*increments*) listed in 18 AAC 50.020.

BACKGROUND

USAF is presently operating Eielson AFB under Operating Permit No. 264TVP01. Eielson AFB is currently classified as a Prevention of Significant Deterioration (PSD) major facility under 18 AAC 50.300(c). The Auxiliary Heat and Power Plant II Project include installation of two new 115 MMBtu/hr boilers and 13 new emergency engines. The emergency engines are diesel fired. Eight of these are new to Eielson AFB and five replace existing emergency engines.

APPROACH

Hoefler Consulting Group (Hoefler) conducted the ambient analyses on behalf of USAF. USAF used the ISCST3, version 00101, to predict the ambient concentrations of nitrogen dioxide (NO₂), sulfur dioxide (SO₂), particulate matter (PM-10) and carbon monoxide (CO). The department accepts the use of ISCST3, version 00101, for this analysis, even though version 02035 is the current release. The changes subsequent to version 00101 regard situations not applicable to this analysis. However, the department advises USAF to always use the current release in future submittals.

The USAF used the same approach as described in their December 2002 modeling protocol submitted in support of a retroactive PSD application for Eielson AFB. The department approved USAF's protocol, with comment, on March 12, 2003. The department provided additional comments regarding the protocol in a March 23, 2003 electronic mail (e-mail) message. The department determined that it was not necessary to include engines 60 kW or less in the air dispersion modeling, and that emergency engines subject to a 200 hour per year permit limit¹ would not have to be included in the *increment* analysis. Therefore, the USAF did not include these units in the air dispersion modeling.

¹ Friday March 21, 2003 Email from Alan Shuler (ADEC) to Stephen Stringham (Eielson AFB).

The USAF first determined that combined impacts of the emissions units included in this permit action were significant for all pollutants and averaging periods except annual PM-10 and SO₂ impacts. A comparison of the project's impacts to the significant impact levels (SIL) is presented below in Table 3 – Significant Impact Analysis.

Table 3 – Significant Impact Analysis²

SIL	CO		NO _x	PM-10		SO ₂		
	1-hr 2000 µg/m ³	8-hr 500 µg/m ³	Annual 1.0 µg/m ³	Annual 1.0 µg/m ³	24-hr. 5 µg/m ³	Annual 1.0 µg/m ³	24-hr. 5 µg/m ³	3-hr. 25 µg/m ³
1995	omitted	716.19	2.6340	0.15495	24.762	0.96287	56.158	131.83
1996	omitted	731.67	2.5067	0.14174	25.629	0.83124	39.576	128.56
1997	omitted	567.25	2.5922	0.14515	20.035	0.84313	35.450	130.30
1998	omitted	687.60	2.5330	0.13394	19.602	0.86316	41.036	108.00
1999	2327.0	640.90	2.4300	0.14070	33.220	0.84971	43.000	122.54

Meteorological Data

ISCST3 requires hourly meteorological data to estimate plume dispersion. The data set used consists of five years (1995-1999) of surface meteorological data collected at Eielson AFB and concurrent upper air data from National Weather Service (NWS) station 26411 in Fairbanks.

Ambient Air Boundary

For purposes of air quality modeling, “ambient air” means outside air to which the public has access. Ambient air typically excludes that portion of the atmosphere within a stationary source's boundary. The USAF used the base fence line as the ambient air boundary. The USAF also modeled impacts within the ambient air boundary in areas that are accessible to families, such as streets, on-base residential areas, and the school. The department concurs with this approach.

Receptor Grid

Within the base fence line, the USAF's receptor grid covered base residential areas, and roadways where access is not restricted. The grid extends outward from the base boundary approximately 22 km from the base center. The USAF did not model ambient pollutant concentrations in areas where access is restricted within the base boundary.

The USAF described their receptor grid in detail in their application. The department finds that the receptor locations were appropriate for this ambient impact analysis.

Load Screening Analysis

The maximum ambient concentrations do not always occur during the full-load conditions that typically produce the largest emissions. The relatively poor dispersion that occurs with cooler exhaust temperatures and slower part-load exit velocities may produce the maximum ambient impacts. Some fuel burning equipment, especially CO emissions from combustion turbines, are more susceptible to low load effects on emission rates and dispersion. Therefore, the department typically requires a part load assessment of relatively large emission units.

Eielson AFB did not assess load affects on individual emissions units' impacts. The department agrees that a load screening analysis is not required for this project.

Emission Rates and Stack Parameters

The assumed emission rate and stack parameters (for a given load) can play significant roles in an ambient demonstration. Therefore, the department reviewed these parameters to ensure they were appropriate. The emission rates, exhaust temperatures, and exit velocities used by USAF are consistent with the vendor data.

² All concentrations are highest 1st high. Hoefler Consulting Group used ISCST3 Version 00101 to model project impacts. This is not the most recent version of ISCST3.

Downwash

Downwash refers to conditions in which nearby structures influence the plume pattern. Downwash can occur when a stack height is less than a height derived by a procedure called "Good Engineering Practice" (GEP), as defined in 18 AAC 50.910(43). The modeling of downwash-related impacts requires the inclusion of dimensions from nearby buildings. EPA has established specific algorithms for determining which buildings must be included and for determining the profile dimensions that would be "seen" by a given stack. They have also incorporated these algorithms in a separate computer program called the "Building Profile Input Program" (BPIP).

The USAF used BPIP (version 95086) to determine the needed building profiles for use with ISCST3. This is the current version of BPIP and is appropriate for this analysis.

Ambient NO₂ Modeling

The modeling of ambient NO₂ concentrations can sometimes be refined using ambient air data or assumptions. The USAF used the national default ambient NO₂-to-NO_x ratio of 0.75, as provided in EPA's *Guideline on Air Quality Models*, to refine the estimated ambient NO₂ concentrations. The 0.75 ratio is appropriate for this analysis.

Ambient SO₂ Modeling

SO₂ emissions are directly related to the amount of sulfur in the fuel. USAF will use diesel fuel to operate their combustion sources and has agreed to limit the fuel sulfur level to 0.15 percent, by weight, for oil fired sources.

EPA allows the high second-high (h2h) modeled concentration to be compared to short-term air quality standards if at least one year of temporally representative site-specific, or five years of representative off-site data, are used. When these criteria are not met, then the highest estimate is to be used. Since USAF used five years of data, the department allowed them to compare the h2h estimate to the short-term SO₂ standards.

Ambient PM-10 Modeling

EPA allows the high, sixth-high modeled 24-hour PM-10 concentration modeled over a five-year meteorological period to be compared to the ambient standard. This approach is less conservative than using the h2h concentration in any one-year, but better matches the PM-10 monitoring method upon which the standard is based. USAF used the h6h approach to model the 24-hour PM-10 impacts. The department concurs with USAF's approach for modeling short-term PM-10 impacts.

Off-site Impacts

The ambient analysis must address potential air quality impacts from off-site facilities. These impacts are typically assessed through modeling. However, an off-site facility can be eliminated from the ambient analysis if it has negligible impacts within the Eielson AFB's area of significant impact (SIA).

The USAF used the "Q/d" method to screen the potential impacts from stationary sources. The Q/d method compares an off-site stationary source's emission rate (Q in tpy) with distance (d in km). If the Q/d ratio is greater than 20, then the off-site stationary source should be included in the ambient analysis. If the Q/d ratio is less than 20, then the off-site stationary source may be considered for culling. The results of the Q/d analysis will vary by pollutant and averaging period.

The USAF's Q/d analysis is described in their application. The department reviewed the analysis and agreed with the resulting off-site inventory for the ambient standard analysis.

Background Concentrations

The background concentration represents impacts from sources not included in the modeling analysis. Typical examples include natural, area-wide, and long-range transport sources. The background concentrations must be evaluated on a case-by-case basis for each ambient impact analysis. Once the background concentration is determined, it is added to the modeled concentration to estimate the total ambient concentration.

The USAF used ambient NO₂ and SO₂ background concentrations from ambient monitoring data collected by Williams Alaska Petroleum, Inc., near the North Pole Refinery. The USAF assumed that ambient CO and PM-10

concentrations would not exceed 25 percent of the applicable standard. The USAF made this assumption based on review of ambient air quality monitoring data for other locations within Alaska. The background concentrations used in the analyses are listed in Table 4 – Ambient Air Quality Standards.

RESULTS AND DISCUSSION

The maximum NO₂, CO, SO₂ and PM-10 AAAQS impacts are shown below in Table 4 – Ambient Air Quality Standards. The off-site impacts (if any), background concentrations, total impacts and AAAQS are also shown. As shown in Table 4 – Ambient Air Quality Standards – the total impacts are less than the respective AAAQS. Therefore, the project will comply with the AAAQS.

Table 4 – Ambient Air Quality Standards³

Averaging Period		CO		NO _x		PM ₁₀		SO ₂	
		1-hr.	8-hr.	Annual	Annual	24-hr.	Annual	24-hr.	3-hr.
Maximum modeled impacts	1995	4,444	1,519	31.5	N/A		N/A	247.1	651.1
	1996	4,376	1,628	34.2	N/A		N/A	154.9	654.7
	1997	4,810	1,403	33.2	N/A	109.0 ⁴	N/A	262.1	451.6
	1998	4,418	1,435	34.8	N/A		N/A	251.9	512.3
	1999	4,028	1,483	34.1	N/A		N/A	219.7	689.7
Background (µg/m ³)		10,000	2,500	12.5	12.5	37.5	7.8	52	104
AAAQS (µg/m ³)		40,000	10,000	100	50	150	80	365	1300
Total Impact		14,810	4128	47.3	N/A	146.5	N/A	314.1	793.7

A comparison of the maximum increases since the applicable baseline dates⁵ to the Class II maximum allowable increases are provided in Table 5 – Class II Maximum Allowable Increases. As shown in below, the maximum increases are less than the applicable Class II maximum allowable increases. Therefore, the project will comply with the Class II maximum allowable increases.

Table 5 – Class II Maximum Allowable Increases

Averaging Period		NO _x		PM ₁₀		SO ₂	
		Annual	Annual	24-hr.	Annual	24-hr.	3-hr.
Increment (µg/m ³)		25	17	30	20	91	512
Maximum modeled impacts	1995	22.1	N/A		N/A	88.7	259.8
	1996	23.7	N/A		N/A	88.3	257.2
	1997	22.7	N/A	21.4 ⁴	N/A	70.5	276.1
	1998	23.3	N/A		N/A	83.5	251.5
	1999	22.8	N/A		N/A	90.95	242.0

It is important to note that since ambient concentrations vary with distance from each source, the maximum values shown represent the highest value that may occur somewhere in the local airshed. They do *not* represent the highest concentration that could occur at *all* locations in the area.

CONCLUSION

The department has reviewed USAF's modeling analysis for the Auxiliary Heat and Power Plant II Boiler Project at Eielson AFB and concluded the following:

1. The NO₂, SO₂, PM-10 and CO emissions associated with operating the Auxiliary Heat and Power Plant II Boiler Project emission sources within the requested operating limits will not cause or contribute to a violation of the ambient air quality standards provided in 18 AAC 50.010, or the maximum allowable increases (increments) provided in 18 AAC 50.020.
2. The USAF's modeling analysis fully complies with the showing requirements of 18 AAC 50.315(e)(2).

³ Modeled impacts background concentration.

⁴ 6th highest concentration calculated to occur during the five meteorological data years.

⁵ The baseline dates are listed in 18 AAC 50.020 "Table 2. Baseline Dates."

3. The USAF conducted the modeling analysis in a manner consistent with EPA's *Guideline on Air Quality Models*.

The department finds that the following modeled operating restrictions were used to demonstrate that the project complies with the ambient air quality standards and maximum allowable increases. Therefore, the air quality control construction permit must include the following restrictions.

1. Limit the operation of the Eielson AFB emission units listed in Table 1-3 of the application and rated greater than 60 kW to no greater than 200 hours per 12-month rolling period; and
 2. Limit the maximum sulfur content of the fuel used to power the permanent Eielson AFB emission units to 0.15 percent, by weight.
-

Appendix B

Sample Calculations

Sample Calculations:

This attachment documents calculations performed by the department to verify regulatory applicability, project classification, and compliance with state emission standards.

The department used vendor supplied emissions performance specifications¹ included in the application and applicable operational limits to estimate potential emissions from the emergency diesel engines as well as the Auxiliary Heat and Power Plant II boilers rated at 115 MMBtu/hr each. Emissions from the Military Dog Kennel Boiler rated at 1.5 MM Btu/hr, and the Main Gate Boiler rated at 0.30 MM Btu/hr were estimated using EPA's AP-42 emission factors. Sulfur dioxide emissions were estimated based on maximum fuel consumption and fuel sulfur content.

Calculations for NSPS Applicability

Aux. Heat and P-Plant II Boilers No. 1 and 2 Heat Release Rate

The federal NO_x standard for new industrial boilers depends on the boiler's *heat release rate*, which is the boilers design heat input capacity divided by the furnace volume. Based on vendor specifications provided by Eielson AFB, the AHP-Plant II Boilers' *heat release rate* is calculated as follows:

Vendor Specifications

- Design heat input capacity = 115.048 MM Btu/hr
- Furnace Dimensions
 - Width = 6.5 ft
 - Height = 9.67 ft
 - Total Length = 23.89 ft

$$\text{Furnace Volume} = (6.5 \text{ ft})(9.67 \text{ ft})(23.89 \text{ ft}) = 1,502 \text{ ft}^3$$

$$\text{heat release rate} = \frac{(115.048 \text{ } 10^6 \text{ Btu/hr})}{(1,502 \text{ ft}^3)} = 76,597 \text{ Btu/hr} - \text{ft}^3$$

Aux. Heat and P-Plant II Boilers No. 1 and 2 Annual Capacity Factor

Boiler with an *annual capacity factor* less than 10% (0.10) are exempt from certain NSPS requirements. The *annual capacity factor* is the boiler's actual fuel consumption divided by the boilers potential fuel consumption if operated for 8,760 hours annually. Actual boiler operations are limited according to Section 4, "Limits to Protect Ambient Air Quality and Avoid Project Classification," to no greater than 3,780,045 gallons annually.

Fuel consumption at 8760 hrs annual operations.

- Design heat input capacity = 115.048 MM Btu/hr
- HHV fuel = 137,000 Btu/gallon

$$\text{Potential Operations} = \left(8760 \frac{\text{hours}}{\text{year}} \right) \left(115.048 \text{ } 10^6 \frac{\text{Btu}}{\text{hr.}} \right) \left(\frac{1 \text{ gallon}}{137,000 \text{ Btu}} \right) = 7.356 \text{ } 10^6 \frac{\text{gallons}}{\text{year}}$$

$$\text{Annual Capacity Factor} = \frac{\left(3.583 \text{ } 10^6 \frac{\text{gallons}}{\text{year}} \right)}{\left(7.356 \text{ } 10^6 \frac{\text{gallons}}{\text{year}} \right)} = 0.487$$

¹ Eielson provided vendor engine data by facsimile.

Annual Boiler Emissions

		Pollutant	NOX	SO2	PM	CO	VOC
Source Name and Construction Permit ID		annual ops	Ton/yr	Ton/yr	Ton/yr	Ton/yr	Ton/yr
1 and 2	Aux. Heat and P-Plant II Boilers No. 1 and 2	combined	28.33	38.17	6.38	9.58	0.05
3	Military Dog Kennel Boiler	8760 hrs	0.96	1.02	0.17	0.24	0.03
4	Main Gate Boiler	8760 hrs	0.19	0.20	0.03	0.05	0.01
		Total	29.48	39.39	6.59	9.87	0.08

Vendor guaranteed emissions performance specifications were available to estimate annual emissions from the large boilers. Sulfur dioxide emissions were the limiting factor in the PSD avoidance strategy for this project. As such, the department calculated the annual fuel limit for the boilers from the fuel sulfur content, sulfur dioxide emissions from the other project emission units and the PSD avoidance threshold 39.9 tons-SO₂/yr.

Aux. Heat and P-Plant II Boilers No. 1 and 2 Annual NO_x emissions

- Calculated² NO_x Emission Factor = 0.115355 lb-NO_x/MMBtu
- Annual combined operations = 3,583,851 gallons/yr
- Fuel HHV = 19,300 Btu/lb

$$\left(0.115355 \frac{\text{lb NO}_2}{\text{MM Btu - Fuel}}\right) \left(0.01930 \frac{\text{MM Btu}}{\text{lb - fuel}}\right) \left(\frac{7.1 \text{ lb - fuel}}{\text{gallon - fuel}}\right) \left(3,583,851 \frac{\text{gallons - fuel}}{\text{year}}\right) \left(\frac{1 \text{ ton}}{2000 \text{ lbs}}\right)$$

$$= 28.33 \frac{\text{ton - NO}_x}{\text{year}}$$

Aux. Heat and P-Plant II Boilers No. 1 and 2 NO_x emission rate (lb-NO_x/MM Btu-fuel)

- Vendor NO_x emission performance specification = 90 ppm NO_x @ 3% O₂.
- Molecular Weight NO_x as NO₂ = 46 lb-NO₂/lb-mole

From Method 19, Equation 19-1, in Appendix A to 40 CFR 60, the fuel specific emission rate E (lb-pollutant/MM Btu-fuel) can be estimated from the pollutant concentration C_d (lb pollutant/dscf-exhaust), the fuel specific exhaust flow rate F_d (dscf-exhaust/MM Btu), and the dry exhaust oxygen content %O_{2d}.³

The pollutant concentration C_d was calculated from the vendor NO_x performance specification, 90 ppmvd NO_x @ 3% O₂, as follows.

$$90 \text{ ppm} \Rightarrow \frac{90 \text{ scf - NO}_2}{10^6 \text{ scf - exhaust}} \left(\frac{1 \text{ lb - mole}}{385.1 \text{ scf}}\right) \left(\frac{46 \text{ lb - NO}_2}{1 \text{ lb - mole NO}_2}\right) = 10.7505 \cdot 10^{-6} \frac{\text{lb - NO}_2}{\text{scf - exhaust}}$$

Using Method 19, Equation 19-1, the fuel specific pollutant emission rate was calculated as follows.

$$E = \left(10.7505 \cdot 10^{-6} \frac{\text{lb - NO}_2}{\text{dscf - exhaust}}\right) \left(9190 \frac{\text{dscf - exhaust}}{\text{MM Btu - fuel}}\right) \left(\frac{20.9}{20.9 - 3\% \text{O}_{2d}}\right)$$

$$E = 115.355 \cdot 10^{-3} \frac{\text{lb - NO}_2}{\text{MM Btu}}$$

² Calculated from vendor emissions performance specification 90 ppmvd NO_x at 3% exhaust O₂.

³ Equation 19-1 Given on page 34 of this attachment.

Aux. Heat and P-Plant II Boilers No. 1 and 2 Annual Fuel Limit

Annual SO₂ emissions were the limiting factor for project classification avoidance. Since SO₂ emissions are due entirely to fuel sulfur content, the department calculated the fuel limit from the difference between the PSD threshold 39.9 tons-SO₂/yr and combined annual SO₂ emissions from the other project emissions units.

Total SO₂ emissions from other project emissions units.

Source Name and Construction Permit ID	annual operations	ton-SO ₂ /yr
3 Military Dog Kennel Boiler	8760 hrs	1.021
4 Main Gate Boiler	8760 hrs	0.205
5-17 Emergency Engines	200 hrs/yr each	0.506
	Total	1.732
	PSD Threshold	39.9
	Difference	38.168

Combined annual fuel consumption for the Auxiliary Heat and Power Plant II Boilers can be determined as follows.

$$\left(38.168 \frac{\text{tons - SO}_2}{\text{year}} \right) \left(\frac{2000 \text{ lbs}}{1 \text{ ton}} \right) \left(\frac{1 \text{ lb fuel - sulfur}}{2 \text{ lb SO}_2} \right) \left(\frac{1 \text{ lb - fuel}}{0.0015 \text{ lb fuel - sulfur}} \right) \left(\frac{1 \text{ gallon - fuel}}{7.1 \text{ lb - fuel}} \right)$$

$$= 3,583,850 \frac{\text{gallons - fuel}}{\text{year}}$$

Annual Engine Emissions

Vendor supplied emissions performance specifications were used to calculate emergency engine emission rates. Annual emissions were calculated based on 200 hours annual operations.

Table 6 - Annual Emissions under 200 hr/unit Limit

Source Name and Construction Permit ID		Pollutant	NOX	SO2	PM	CO	VOC
		hr/yr	Ton/yr	Ton/yr	Ton/yr	Ton/yr	Ton/yr
5	Type III Hydrant Fueling Generator	200	0.793	0.082	0.025	0.43	0.165
6	Auxiliary Heat Plant II Generator	200	0.793	0.082	0.025	0.43	0.165
7	Air Field Lighting Generator	200	0.793	0.082	0.025	0.43	0.165
8	New Security Forces Facility Generator	200	0.778	0.036	0.042	0.084	0.04
9	Tank E2 Generator	200	0.335	0.036	0.01	0.182	0.07
10	Tank E6 Generator	200	0.335	0.036	0.01	0.182	0.07
11	4-Bay Hangar Generator	200	0.315	0.02	0.018	0.388	0.046
12	Tank E11 Generator	200	0.335	0.036	0.01	0.182	0.07
13	8 Bay Hangar Generator	200	0.335	0.036	0.01	0.182	0.07
14	Telephone Exchange Gen	200	0.315	0.02	0.018	0.388	0.046
15	Wing MOC Generator	200	0.28	0.017	0.009	0.056	0.007
16	Fire Station No. 1 Gen	200	0.28	0.017	0.009	0.056	0.007
17	Base Radio Mars Gen	200	0.062	0.006	0.012	0.04	1E-03
Total			5.749	0.506	0.215	3.025	0.921

Figure 1- Vendor Engine Data

Source Name and Construction Permit ID No.		Vendor Data (g-pollutant/hp-hr)					Nameplate Capacity		fuel rate
		NOX	SO2 ⁴	PM	CO	VOC	Capacity	gal/hr	
5	Type III Hydrant Fueling Generator	4.8	0.494	0.15	2.6	1	750 hp	38.3	
6	Auxiliary Heat Plant II Generator	4.8	0.494	0.15	2.6	1	750 hp	38.3	
7	Air Field Lighting Generator	4.8	0.494	0.15	2.6	1	750 hp	38.3	
8	New Security Forces Facility Generator	9.3	0.435	0.5	1	0.48	380 bhp	17.1	
9	Tank E2 Generator	4.8	0.512	0.15	2.6	1	317 bhp	16.8	
10	Tank E6 Generator	4.8	0.512	0.15	2.6	1	317 bhp	16.8	
11	4-Bay Hangar Generator	6.9	0.444	0.4	8.5	1	207 bhp	9.5	
12	Tank E11 Generator	4.8	0.512	0.15	2.6	1	317 bhp	16.8	
13	8 Bay Hangar Generator	4.8	0.512	0.15	2.6	1	317 bhp	16.8	
14	Telephone Exchange Gen	6.9	0.444	0.4	8.5	1	207 bhp	9.5	
15	Wing MOC Generator	7.47	0.466	0.245	1.49	0.19	170 bhp	8.2	
16	Fire Station No. 1 Gen	7.47	0.466	0.245	1.49	0.19	170 bhp	8.2	
17	Base Radio Mars Gen	5.05	0.518	1.01	3.21	0.08	56 bhp	3	
							4708 total hp		

The department calculated annual emissions as follows.

⁴ SO₂ emission rates from fuel consumption rate and fuel sulfur content 0.15% sulfur by weight. See the calculation of the hp-hr SO₂ emission rate for the New Security Forces Facility Generator: on page 32 of this attachment.

Tons Pollution Per Year =

$$\left(\text{Vendor Emission Factor} \frac{\text{g - pollutant}}{\text{hp - hr}} \right) (\text{Nameplate Capacity (bhp)})$$

$$\left(\frac{1 \text{ lb}}{454 \text{ g}} \right) (\text{annual operations (hrs / yr)}) \left(\frac{1 \text{ ton}}{2000 \text{ lb}} \right)$$

Annual NO_x emissions for New Security Forces Facility Generator under 200 hr/yr permit limit.

- Vendor Emission Factor = 9.3 g-NO_x/hp-hr
- Nameplate Capacity = 380 bhp
- Permit Limit = 200 hrs/yr

$$\left(9.3 \frac{\text{g - NO}_x}{\text{hp - hr}} \right) (380 \text{ hp}) \left(\frac{1 \text{ lb}}{454 \text{ g}} \right) \left(200 \frac{\text{hr}}{\text{yr}} \right) \left(\frac{1 \text{ ton}}{2000 \text{ lb}} \right) = 0.778 \frac{\text{ton}}{\text{year}}$$

hp-hr SO₂ emission rate for the New Security Forces Facility Generator:

- Vendor Fuel rate at full load = 17.1 gallons/hr
- Fuel mass = 7.1 lbs/gallon
- Fuel Sulfur Content = 0.15% sulfur by weight
- Nameplate Capacity = 380 bhp

$$\frac{\left(0.0015 \frac{\text{lb - sulfur}}{\text{lb - fuel}} \right) \left(17.1 \frac{\text{gal}}{\text{hr}} \right) \left(7.1 \frac{\text{lb}}{\text{gal}} \right) \left(\frac{454 \text{ g}}{1 \text{ lb}} \right)}{380 \text{ hp}} = 0.217 \frac{\text{g}}{\text{hp - hr}}$$

Annual NO_x emissions from emergency engines under proposed hp-hr cap.

Eielson AFB proposed to limit emergency engine operations under an annual hp/hr cap. However, that cap did not ensure NO_x emissions from individual emergency engines would not cause the project to trigger PSD preconstruction review. Emergency engine NO_x emissions based on 200 hrs operation were less than six tons per year. The department acknowledges that actual operations of emergency engines will be very low, however, NO_x emissions from the worst emissions performer could exceed 33 tons per year under the proposed hp-hr cap. Therefore, the department finds that the 200 hr/yr limit for each new emergency engine is necessary to ensure the project avoid PSD preconstruction review.

Table 7 - Individual Emissions Under Proposed hp-hr Cap

Source Name and Construction Permit ID		NOX	SO2	PM	CO	VOC
hrs/yr		Ton/yr				
7	Air Field Lighting Generator	4412.61	17.49	1.80	0.55	3.64
6	Auxiliary Heat Plant II Generator	4412.61	17.49	1.80	0.55	3.64
5	Type III Hydrant Fueling Generator	4412.61	17.49	1.80	0.55	3.64
8	New Security Forces Facility Generator	8709.11	33.90	1.59	1.82	1.75
12	Tank E11 Generator	8760	14.68	1.57	0.46	3.06
13	8 Bay Hangar Generator	8760	14.68	1.57	0.46	3.06
9	Tank E2 Generator	8760	14.68	1.57	0.46	3.06
10	Tank E6 Generator	8760	14.68	1.57	0.46	3.06
14	Telephone Exchange Gen	8760	13.78	0.89	0.80	2.00
11	4-Bay Hangar Generator	8760	13.78	0.89	0.80	2.00
15	Wing MOC Generator	8760	12.25	0.77	0.40	0.31
16	Fire Station No. 1 Gen	8760	12.25	0.77	0.40	0.31

Source Name and Construction Permit ID		NOX	SO2	PM	CO	VOC
	hrs/yr	Ton/yr				
17 Base Radio Mars Gen	8760	2.73	0.28	0.55	1.73	0.04
Worst unit Total		33.90	1.80	1.82	16.97	3.64

Worst-case maximum hours for the New Security Forces Facility Generator under the proposed 3,309,461 hp-hr per year cap.

- From Vendor Data nameplate capacity = 380 bhp
- Annual horsepower hours = proposed cap.

$$3,309,461 \frac{\text{hp} \cdot \text{hr}}{\text{year}} \div 380 \text{ hp} = 8709.1 \frac{\text{hr}}{\text{year}}$$

Worst-case annual NO_x emissions for New Security Forces Facility Generator under hp-hr cap.

- Vendor Emission Factor = 9.3 g-NO_x/hp-hr
- Nameplate Capacity = 380 bhp
- Worst-case hours = 8709.1 hrs/yr

$$\left(9.3 \frac{\text{g} \cdot \text{NO}_x}{\text{hp} \cdot \text{hr}} \right) (380 \text{ hp}) \left(\frac{1 \text{ lb}}{454 \text{ g}} \right) \left(8709.1 \frac{\text{hr}}{\text{yr}} \right) \left(\frac{1 \text{ ton}}{2000 \text{ lb}} \right) = 33.90 \frac{\text{ton}}{\text{year}}$$

Fuel Oil Sulfur Content Corresponding to 500 ppm SO₂

Given that all of the sulfur in fuel oil will be converted completely to SO₂ when burned, every mole of sulfur contained in the fuel oil will produce a mole of sulfur dioxide. Since an exhaust concentration of 500 ppm SO₂ implies that there are 500 scf SO₂ for every million scf exhaust, the corresponding fuel sulfur content can be found by dividing the total weight of the sulfur in the 500 scf SO₂ by the weight of fuel required to produce one million scf exhaust. The weight of fuel to produce one million scf exhaust can be found using Method 19 in 40 CFR 60 Appendix A if given the higher heating value of the fuel oil and exhaust oxygen content. The weight of sulfur in 500 scf exhaust can be found given that the molecular weight of sulfur and the Ideal Gas Law, PV = nRT.

Assuming that:

- 1) the higher heating value of fuel oil is 20,000 Btu/lb.
- 2) from the ideal gas law, 1 mole of a gas at 68°F and atmospheric pressure is equal to 385.3 ft³, MW sulfur = 32 lb per lb-mole
- 3) from Table 19-1 of Method 19, at least 9190 dscf exhaust is produced for every million Btu fuel oil burned.

Percent weight sulfur =

$$\left(\frac{500 \text{ scf}}{10^6 \text{ scf exhaust}} \right) \left(\frac{1 \text{ mole}}{385.3 \text{ scf}} \right) \left(\frac{32 \text{ lb-S}}{1 \text{ mole}} \right) \left(\frac{9190 \text{ scf exhaust}}{10^6 \text{ Btu}} \right) \left(\frac{20,000 \text{ Btu}}{1 \text{ lb fuel}} \right)$$

$$= 0.007632 \text{ lb-sulfur per lb fuel}$$

$$= 0.76\% \text{ sulfur by weight}$$

This calculation is conservative since it assumes there is no additional air to provide excess oxygen. Actual combustion requires additional air to ensure complete combustion, which would dilute the SO₂ exhaust concentration. Underestimating the heating value of the fuel used would also result in a more conservative estimate.

Eielson AFB will limit liquid fuel sulfur to 0.15% sulfur by weight, and therefore will comply with the state sulfur dioxide standard for diesel fired emissions units.

Particulate Matter Compliance Demonstration

Equation 19-1 from Method 19 of Appendix A to 40 CFR 60 can be used to calculate pollutant concentrations from fuel burning equipment.

Equation 19-1

$$E = C_d F_d \left(\frac{20.9}{20.9 - \%O_{2d}} \right)$$

where,

E = Fuel Specific Emission Rate, lb-pollutant/MMBtu-fuel

F_d = dry exhaust volume per Btu fuel burned. F_d for various fuels is listed in Table 19-1 of Method 19. For fuel oil, F_d = 9,190 dscf/MM Btu.

%O_{2d} = percent oxygen by volume in dry exhaust gas

C_d = Pollutant Concentration, lbs-pollutant/dscf-exhaust

Solving Method 19 Equation 19-1 for pollutant concentration (C_d)

$$\text{Equation 1} \quad C_d = \frac{E}{F_d \left(\frac{20.9}{20.9 - \%O_{2d}} \right)}$$

To convert to C_d to grains/dscf:

$$\text{Equation 2} \quad \frac{\text{grains}}{\text{dscf}} = (C_d)(7000 \text{ grains/lb})$$

Source: Diesel-Fired Boilers/Heaters (Construction Permit IDs No. 1-3)

The PM emission factor (E) can be determined from the AP-42 emission factor and fuel oil HHV.

- From AP-42, Table 1.3-1, PM emission factor = 2 lb/1000 gallons for all distillate oil fired boilers.
- Fuel Oil HHV = 137,000 Btu/gallon

$$\text{Fuel specific PM emission rate (E)} = \frac{2 \text{ lb - PM/1000 gallons - fuel}}{0.137 \text{ MMBtu/gallon}} = 0.15 \text{ lb/MM Btu}$$

$$\text{Using Equation 1: } C_d = \frac{0.15 \text{ lb/MM Btu}}{(9,190 \text{ dscf/MM Btu}) \left(\frac{20.9}{20.9 - 0.0\%O_{2d}} \right)} = 1.4 \cdot 10^{-6} \text{ lb/dscf}$$

Using Equation 2: $(1.4 \cdot 10^{-6} \text{ lb/scf})(7000 \text{ grains/lb}) = 0.01 \text{ gr/scf}$
 0.01 grain/dscf is roughly 20% of the 0.05 gr/scf standard.

Source: Diesel-Fired Engines > 600 hp (Construction Permit IDs No. 5-7)

In order to use Equation 1, the PM emission factor (E) can be calculated from the AP-42 emission factor and brake specific fuel consumption (BSFC).

From AP-42, Table, 3.4-1 (greater than 600 hp capacity), PM emission factor = 0.0007 lb/hp-hr

From footnote (e) of Table 3.4-1 BSFC = 7,000 Btu/hp-hr.

From emission source test data for large industrial engines on file with the department, %O_{2d} = 9.0

Converting emission factor assuming 7,000 Btu/hp-hr

$$\text{Fuel specific PM emission rate (E)} = 0.0007 \text{ (lb/hp-hr)} / 7,000 \text{ (Btu/hp-hr)} = 0.1 \text{ (lb/MMBtu)}$$

$$\text{Using Equation 1: } C_d = \frac{0.1 \text{ lb/MM Btu}}{(9,190 \text{ dscf/MM Btu}) \left(\frac{20.9}{20.9 - 9.0\%O_{2d}} \right)} = 6.196 \cdot 10^{-6} \text{ lb/dscf}$$

$$\text{Using Equation 2: } (6.196 \cdot 10^{-6} \text{ (lb/scf)}) (7000 \text{ (grains/lb)}) = 0.04 \text{ gr/scf}$$

0.04 grain/dscf is roughly 80% of the 0.05 gr/scf standard.

Source: Diesel-Fired Engines < 600 hp (Construction Permit IDs No. 8-17)

AP-42 emission information and Method 19 cannot be used to demonstrate that engines rates less than 600 bhp will not violate the state standard for particulate. From AP-42, Table, 3.3-1 (emission factors for diesel engines less than 600 hp capacity), PM emission factor = 2.20 10⁻³ lb/hp-hr.

$$\text{Fuel specific PM emission rate (E)} = 0.00220 \text{ (lb/hp-hr)} / 7,000 \text{ (Btu/hp-hr)} = 0.314 \text{ (lb/MMBtu)}$$

$$\text{Using Equation 1: } C_d = \frac{0.314 \text{ lb/MM Btu}}{(9,190 \text{ dscf/MM Btu}) \left(\frac{20.9}{20.9 - 9.0\%O_{2d}} \right)} = 19.454 \cdot 10^{-6} \text{ lb/dscf}$$

$$\text{Using Equation 2: } (19.454 \cdot 10^{-6} \text{ (lb/scf)}) (7000 \text{ (grains/lb)}) = 0.136 \text{ gr/scf}$$

The state standard for particulate matter is only 0.05 grains per dscf. 0.136 grains/scf is roughly 272% of the 0.05 gr/scf standard. Therefore, applicants need to provide vendor emission data for diesel engines less than 600 hp in order to demonstrate compliance with the standard; or install add-on controls as necessary to meet the standard.

Based on the above information, the soot trap would have to have effectiveness (ξ) ≥ 0.64 where

$$(0.136 - 0.136\xi) \frac{\text{grains}}{\text{dscf}} = 0.05 \frac{\text{grains}}{\text{dscf}}$$

Because AP-42 emissions for diesel engines less than 600 hp can not be used to demonstrate compliance with the state standard for particulate matter, the department calculated the brake specific particulate matter emission rate (g-PM/hp-hr) corresponding to the state standard. Based on the calculations below, a brake specific emission rate of 0.211 g-PM/hp-hr will comply with the standard at 0.0% exhaust O₂, and a brake specific emission rate of 0.338 g-PM/hp-hr will comply with the standard at 5.0% exhaust O₂. Applicants must provide vendor emission performance data for exhaust oxygen content in order to assume exhaust oxygen greater than 0 for Method 19 calculations for diesel engines less than 600 hp.

The department used EPA Method 19 and the assumed²⁴ brake specific fuel consumption (BSFC) 7,000 Btu-fuel/hp-hr as follows to determine the brake specific PM emission rate that corresponds to the state standard as follows.

²⁴ 7,000 Bt/hp-hr from AP-42 Table 3.3-1 Footnote (a).

The results Equation 19-1 yield the fuel specific emission rate (E). The fuel specific emission rate (E) corresponding the state particulate matter standard can found as follows.

Find C_d for used in Equation 19-1 by converting the state standard 0.05 grains per dry standard cubic foot to lbs/dscf:

$$\frac{0.05 \text{ grains}}{\text{dscf}} \left(\frac{1 \text{ lb}}{7,000 \text{ grains}} \right) = 7.1429 \cdot 10^{-6} \frac{\text{lb - PM}}{\text{dscf}} = C_d$$

Using Equation 19-1:

$$E = \left(7.1429 \frac{\text{lb - PM}}{\text{dscf}} \right) \left(9,190 \frac{\text{dscf}}{\text{MM Btu}} \right) \left\{ 20.9 / (20.9 - 0.0\% O_{2d}) \right\}$$

$$E = 0.066 \frac{\text{lb - PM}}{\text{MM Btu}}$$

Converting the fuel specific PM emission rate (E) to brake specific PM emission rate (grams-PM/hp-hr)

$$\begin{aligned} \text{The brake specific particulate matter emission rate} &= (E) \left(\text{BSFC} \right) \left(\frac{453.6 \text{ g}}{1 \text{ lb}} \right) \\ &\left(\frac{10^6 \text{ Btu}}{\text{MM Btu}} \right) \\ &= \left(0.066 \frac{\text{lb - PM}}{\text{MM Btu}} \right) \left(7000 \frac{\text{Btu}}{\text{hp - hr}} \right) \frac{453.6 \left(\frac{\text{g}}{\text{lb}} \right)}{10^6 \left(\frac{\text{Btu}}{\text{MM Btu}} \right)} = 0.210 \frac{\text{grams - PM}}{\text{hp - hr}} \end{aligned}$$

As shown in Table 8 - Small Emergency Engines (< 600 bhp) - Construction Permit Sources No. 8 and 13 through 17 have emission rates greater than 0.210 grams-PM per hp-hr, and therefore require add-on controls to meet the state emissions standard when operating at full load where vendor data is not available to demonstrate that the proposed engines comply with the state standard for particulate matter.

Table 8 - Small Emergency Engines (< 600 bhp)

Construction Permit Number and Source Name	Rating size ²⁵	Units	Vendor PM factor (g/bhp-hr)	BSFC Btu/hp-hr
8 New Security Forces Facility Generator	380	bhp	0.50	6166
9 Tank E2 Generator	317	bhp	0.15	7262
10 Tank E6 Generator	317	bhp	0.15	7262
11 4-Bay Hangar Generator	317	bhp	0.15	7262
12 Tank E11 Generator	317	bhp	0.15	7262
13 8-Bay Hangar (B1335) Generator	207	bhp	0.4	6289
14 Telephone Exchange Generator	207	bhp	0.4	6289
15 Wing MOC Generator	170	bhp	0.245	6610
16 Fire Station No. 1 Generator	170	bhp	0.245	6610
17 Base Radio MARS generator	56	bhp	1.01	7341

²⁵ Nameplate ratings provided in November 26, 2003 submittal to the original permit application.

Vendor data provided by Eielson AFB for Construction Permit Sources No. 15 and 16 was sufficient to demonstrate compliance with the standard as follows.

Sources No. 15 (Wing MOC Generator) and 16 (Fire Station No. 1 Generator)

Eielson AFB provided results from an emissions performance test of the Cummins 6BT-G6 diesel engine performed by the engine manufacturer.

Vendor Data

- Fuel mass flow = 58.05 lb/hr
- Dry O₂ = 8.05%
- PM Emission Rate = 41.0 g/hr

HHV No. 2 Fuel Oil

- 19,300 Btu/lb

$$\text{Fuel specific PM emission rate (E)} = \frac{\left(\frac{41.0 \text{ g}}{\text{hr}} \right) \left(\frac{1 \text{ lb}}{454 \text{ g}} \right) \left(\frac{10^6 \text{ Btu}}{\text{MM Btu}} \right)}{\left(\frac{58.05 \text{ lb}}{\text{hr}} \right) \left(\frac{19,300 \text{ Btu}}{\text{lb}} \right)} = 0.081 \frac{\text{lb - PM}}{\text{MM Btu}}$$

$$\text{Using Equation 1: } C_d = \frac{0.081 \text{ lb/MM Btu}}{(9,190 \text{ dscf/MM Btu}) \left(\frac{20.9}{20.9 - 8.05\% \text{O}_{2d}} \right)} = 5.419 \cdot 10^{-6} \text{ lb/dscf}$$

$$\text{Converting to grains/dscf} = (5.419 \cdot 10^{-6} \text{ (lb/scf)}) (7000 \text{ (grains/lb)}) = 0.038 \text{ gr/scf}$$

Appendix C

Submittals

- November 26, 2003 FAX Transmittal from Al Trbovich (Hoefer Consulting Group) to John Kajdan (ADEC).
RE: Data sheets for new emergency engines. 12 pages including cover.
- December 11, 2003 Email message from Al Trbovich (Hoefer Consulting Group) to John Kajdan (ADEC).
RE: Eielson AFB Air Permit Application. The submittal requests addition of one small
boiler to the project. Includes attached PDF file with vendor data for PM compliance
demonstration for two new emergency engines and Excel spreadsheet file with revised
emissions calculations.
-

Attachment G: Emergency Engine Operating Hours 2021-2022

TAB 2, TABLE 2 OF SEMIANNUAL FACILITY OPERATING REPORT

12-month rolling total hours of operation for IC engines

EU ID	EU Description	2021	2021	2021	2021	2021	2021
		JAN	FEB	MAR	APR	MAY	JUN
024	WASTEWATER TREATMENT GENERATOR	18.0	13.0	12.0	11.0	11.0	9.0
025	CENTRAL AVE (CLINIC) GENERATOR	15.5	15.3	15.3	15.2	15.2	13.7
028	ALERT HANGER GENERATOR	33.3	15.3	16.4	15.3	18.1	15.9
029	POWER PLANT FIRE PUMP	3.5	3.5	3.5	3.5	3.6	3.6
031	CONTROL TOWER GENERATOR	13.4	13.7	13.9	13.8	13.8	12.4
032	TELEPHONE EXCHANGE GENERATOR	16.3	16.4	16.4	16.6	15.3	12.9
033	COMMAND POST GENERATOR	13.6	12.4	11.4	10.4	9.4	10.2
034	AIRFIELD LIGHTING GENERATOR	14.7	14.7	14.6	14.6	14.5	13.2
035	FIRE PUMP P8	4.8	4.8	4.8	4.9	4.9	4.9
036	FIRE PUMP P9	5.1	5.1	5.1	5.2	5.3	5.3
037	FIRE PUMP P10	5.1	5.1	5.1	5.2	5.2	5.3
041	FIRE PUMP P19	11.8	5.1	5.2	5.3	5.4	5.5
043	FIRE PUMP P6	5.6	5.7	6.2	6.2	5.6	5.7
045	FIRE PUMP P1	6.0	5.9	6.5	6.4	6.5	6.5
047	PUMPHOUSE #3 FIRE PUMP	5.4	5.3	5.4	5.4	6.0	6.2
048	FIRE PUMP P2	3.1	3.1	3.1	3.1	2.5	2.1
049	COMM SQD EMERGENCY GEN	23.0	24.1	24.1	24.1	14.4	12.7
050	WATER TREATMENT PLANT GEN	6.8	6.8	6.8	6.8	6.8	4.6
051	AUX HEAT PLANT EMERGENCY GEN	12.1	10.9	10.8	12.5	12.6	12.2
052	E2 CX FUEL TANK EMERGENCY GEN	6.4	6.2	7.9	6.7	8.0	8.0
053	FUEL HYDRANT SYS EMERGENCY GEN	4.0	5.0	4.0	4.0	4.0	3.0
055	N ILS GENERATOR	21.2	16.9	16.7	16.6	18.0	15.3
056	DET 460 GENERATOR	20.3	20.4	20.4	20.3	20.3	12.5
059	SECURITY FORCES GENERATOR	10.5	9.5	8.4	7.4	5.9	4.8
060	FIRE STATION #1 GENERATOR	16.4	16.4	14.1	14.0	13.9	12.2
062	354 WING MOC GENERATOR	18.7	18.9	18.9	18.8	20.8	20.8
063	F WELL PUMP	1.4	1.5	1.6	2.2	2.4	2.9
064A	A WATER WELL PUMP GENERATOR	21.2	21.3	21.7	19.4	19.4	17.5
065	AIRCRAFT ARRESTOR ENGINE NW	7.5	7.7	7.66	7.8	8.05	8.04
066	AIRCRAFT ARRESTOR ENGINE NE	4.86	4.76	4.9	4.49	4.74	4.67
067	AIRCRAFT ARRESTOR ENGINE 3/4W	8.43	8.63	8.63	8.2	8.11	8.06
068	AIRCRAFT ARRESTOR ENGINE 3/4E	5.9	6.1	6.2	6.1	6.1	6.0
069	AIRCRAFT ARRESTOR ENGIEN SE	5.3	5.3	5.3	5.2	5.3	5.2
070	AIRCRAFT ARRESTOR ENGIEN SW	4.9	5.1	103.9	104.1	104.2	104.5
071	LOOP REFUELING GENERATOR	8.1	8.0	2.9	2.9	4.1	3.1
075	MMX WATER WELL PUMP GENERATOR	11.1	11.2	11.1	11.0	16.3	16.2
076	E-2 TANK FARM FIRE PUMP GEN	5.4	5.4	5.4	5.4	4.9	4.9
077	DINING FACILITY EMERGENCY GEN	26.9	27.0	27.1	27.2	18.1	13.6
078	RED FLAG EMERGENCY GENERATOR	14.2	14.2	14.3	14.3	14.4	12.8
080	COOLING POND GENERATOR	2.2	2.2	2.2	2.2	2.2	1.1

Notes:

EU IDs 27 and 42 have been removed.

EU IDs 30, 38-40, 42, 44, 46, 57, 58, 61, 64B, 73 and 74 are non-operational; there were no reportable 12-month rolling total hours for these units.

EU ID 79 has not been installed.

TAB 2

Table 2

Conditions 1.4 and 24 – Emergency Engines: Owner Requested Limit of 200 Hours per 12-Month Rolling Total

Corrected values for Jul-Dec 2021 appear below

EU ID	Power Pro ID	EU Description	12-Month Rolling Total Hours						12-Month Rolling Total Hours					
			2021	2021	2021	2021	2021	2021	2022	2022	2022	2022	2022	2022
			Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
24*	R-13	WASTEWATER TREATMENT GENERATOR	9.0	10.2	11.4	41.4	42.4	37.5	38.7	38.7	39.8	40.8	41.9	41.2
25	R-23	CENTRAL AVE (CLINIC) GENERATOR	22.2	22.1	22.1	42.7	42.6	42.5	42.2	42.3	42.3	42.3	42.2	42.3
28	R-25	ALERT HANGER GENERATOR	23.1	24.2	21.8	47.6	47.6	47.6	47.6	47.5	47.5	48.5	47.6	47.7
29	P-21	POWER PLANT FIRE PUMP	3.6	3.6	3.1	3.1	3.1	3.1	2.6	3.1	2.6	2.1	1.5	1.0
31	R-03	CONTROL TOWER GENERATOR	22.1	23.0	23.1	43.4	43.4	43.2	43.2	43.1	43.1	43.1	43.0	48.6
32	R-14	TELEPHONE EXCHANGE GENERATOR	17.9	18.0	17.0	34.5	35.5	34.6	33.8	33.1	32.2	31.4	30.7	29.8
33	R-02	COMMAND POST GENERATOR	18.8	19.8	19.7	45.1	45.1	45.0	45.9	47.5	48.4	49.4	50.3	50.1
34	R-01	AIRFIELD LIGHTING GENERATOR	22.2	23.4	23.3	48.6	48.0	47.9	47.7	46.8	46.8	46.7	46.6	48.6
35A*	P-08	FIRE PUMP P8	5.6	6.2	6.2	6.2	6.3	6.3	6.2	5.7	5.8	5.7	5.6	5.6
36A*	P-09	FIRE PUMP P9	5.9	6.5	6.0	5.9	6.0	6.0	6.0	5.5	5.5	5.4	5.1	5.1
37A*	P-10	FIRE PUMP P10	5.3	5.9	5.5	5.5	5.6	5.6	5.6	5.1	5.1	5.0	4.8	4.7
41	P-19	FIRE PUMP P19	6.3	6.8	6.0	5.8	6.3	6.3	6.2	5.7	5.7	5.1	4.9	4.9
43*	P-06	FIRE PUMP P6	5.7	6.3	6.4	5.8	5.7	5.2	4.6	4.0	3.5	3.0	3.0	2.4
45*	P-01	FIRE PUMP P1	6.7	7.5	7.8	6.9	6.8	6.2	5.7	5.2	4.6	4.1	3.5	2.9
47*	P-03	PUMPHOUSE #3 FIRE PUMP	5.4	6.2	6.5	6.5	6.6	6.2	5.7	5.3	4.7	4.1	3.5	2.7
49	R-10	COMM SQD EMERGENCY GEN	17.7	18.9	18.9	35.9	35.8	35.7	35.6	35.5	35.4	35.3	35.2	34.8
50	R-35	WATER TREATMENT PLANT GEN	12.5	13.8	14.7	17.2	18.9	19.9	20.3	21.5	22.5	23.5	24.4	27.6
51	R-11	AUX HEAT PLANT EMERGENCY GEN	19.0	20.3	20.1	59.3	59.5	58.5	58.5	59.6	59.6	59.3	59.2	59.0
52	R-17	E2 CX FUEL TANK EMERGENCY GEN	5.4	7.7	7.8	8.0	7.9	7.9	8.0	9.2	7.4	7.6	6.5	6.6
53	R-15	FUEL HYDRANT SYS EMERGENCY GEN	15.0	15.0	15.0	14.0	14.0	14.0	14.0	13.0	13.0	13.0	14.0	16.0
55*	R-07	N ILS GENERATOR	14.0	14.0	15.2	28.0	28.05	25.8	25.9	25.7	25.8	25.9	26.0	24.2
56	R-04	DET 460 GENERATOR	21.5	22.6	43.8	69.2	69.4	69.2	68.4	67.4	66.6	65.9	65.1	67.1
59	R-18	SECURITY FORCES GENERATOR	13.7	15.4	14.2	34.8	35.6	36.6	37.6	37.9	38.1	38.2	39.4	40.3
60	R-21	FIRE STATION #1 GENEARTOR	21.3	22.6	22.7	43.8	45.0	44.9	44.8	44.9	44.8	44.8	44.9	52.1
62	R-28	354 WING MOC GENERATOR	27.2	28.4	27.8	45.6	43.8	51.1	51.0	50.7	50.7	50.6	46.2	46.1
63	P-17	F WELL PUMP	10.3	10.8	11.4	11.1	11.6	11.9	11.7	12.2	12.1	11.8	11.6	11.7
64A	R-31	A WATER WELL PUMP GENERATOR	17.8	19.4	19.1	33.8	33.5	33.3	33.2	33.1	33.1	34.3	34.2	42.6

TAB 2

Table 2

Conditions 1.4 and 24 – Emergency Engines: Owner Requested Limit of 200 Hours per 12-Month Rolling Total

****Corrected values for Jul-Dec 2021 appear below****

EU ID	Power Pro ID	EU Description	12-Month Rolling Total Hours						12-Month Rolling Total Hours					
			2021		2021		2021		2022		2022		2022	
			Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
65A*	AAS-NW	AIRCRAFT ARRESTOR ENGINE NW	7.74	8.15	7.64	7.34	6.64	6.21	5.87	5.56	5.45	5.04	4.78	4.84
66A*	AAS-NE	AIRCRAFT ARRESTOR ENGINE NE	4.3	4.33	4.36	4.06	3.66	3.44	3.22	3.07	3.04	2.89	2.44	2.25
67A*	AAS-3/4W	AIRCRAFT ARRESTOR ENGINE 3/4W	7.25	7.7	6.93	6.53	6.2	5.85	5.25	4.84	4.67	4.56	4.55	4.54
68A*	AAS-3/4E	AIRCRAFT ARRESTOR ENGINE 3/4E	5.2	5.2	5.2	5.1	4.5	4.3	4.37	3.87	3.77	3.47	3.17	3.07
69A*	AAS-SE	AIRCRAFT ARRESTOR ENGINE SE	5.5	5.7	5.3	4.4	4.2	4.1	3.9	3.6	3.4	2.7	2.7	2.4
70A*	AAS-SW	AIRCRAFT ARRESTOR ENGINE SW	104.7	105.0	104.5	103.6	104.0	103.8	103.6	103.3	4.2	3.5	3.4	3.6
71	R-36	LOOP REFUELING GENERATOR	13.5	15.7	15.4	14.4	14.4	14.4	14.4	14.4	14.4	14.3	13.0	12.9
73	R-26	4-BAY LOOP HANGAR GENERATOR	20.7	21.7	21.6	22.8	22.8	23.7	23.8	23.7	23.7	23.6	23.5	23.6
74	R-39	8-BAY LOOP HANGAR GENERATOR	19.8	20.8	21.9	23.2	23.0	22.9	23.1	22.9	22.7	22.8	22.8	22.8
75	R-37	MMX WATER WELL PUMP GENERATOR	26.0	27.1	27.5	34.2	34.7	34.7	34.7	34.5	34.6	34.5	29.1	28.1
76	P-25	E-2 TANK FARM FIRE PUMP GEN	5.0	5.5	5.6	5.1	5.6	5.0	4.9	4.4	3.9	3.6	3.6	3.5
77	R-27	DINING FACILITY EMERGENCY GEN	18.7	19.7	19.5	39.8	40.1	39.9	38.8	37.9	37.8	37.6	37.9	37.6
78	R-29	RED FLAG EMERGENCY GENERATOR	22.0	23.6	23.4	43.8	43.7	43.5	43.5	43.4	43.2	43.1	42.9	42.9
80	R-41	COOLING POND GENERATOR	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.8	1.2
122	R-22	FIRE STATION #2 GENERATOR	19.5	20.6	20.6	33.5	33.5	33.3	34.3	34.2	34.1	34.0	33.9	34.0

***Notes:**

- EU IDs 30 and 79 do not appear in the table because they have not been installed.
- EU IDs 27, 42 and 57 do not appear in the table because they have been removed.
- Pump engines P-11 through P-13 (EU IDs 38-40), Pumps P-02, P-04 and P-05 (EU IDs 48, 44 and 46), the conventional Munitions fire pump (EU ID 58), the Base Supply fire pump (EU ID 61), and the B-well pump (EU ID 64B) do not appear in the table because they are non-operational; there were no reportable 12-month rolling total hours for these units.
- The Power Production shop is no longer maintaining Pumps P-01, P-03 and P-06 (EU IDs 43, 45, and 47). The last operation of these pumps occurred in November 2021.
- EU IDs 35A-37A and EU IDs 65A-68A were installed between 2015 and 2016 as replacements for older units; off-permit change letters were submitted to the EPA with a courtesy copy to ADEC on 07 Nov 2016 (for EU IDs 35A-37A) and on 27 Oct 2017 (for EU IDs 65A-68A). The off-permit change letters explain that these emission units are subject to a limit of 200 hours per 12-month rolling period in accordance with Condition 24 of Title V Permit AQ0264TVP02, Rev. 4.
- The Waste Water Treatment and North ILS Generators (EU IDs 24 and 55) were replaced by new generators installed on 7/1/21 (EU ID 55) and on 7/23/21 (EU ID 24), and are subject to the Condition 24 limit of 200 hours per 12-month rolling period.
- EU IDs 69A and 70A (Southeast and Southwest Aircraft Arrestor Engines), previously gasoline-fired engines, were replaced with diesel-fired engines on 3/20/2022. The new South Aircraft Arrestor Engines are the same make and model as the other Aircraft Arrestor Engines (Deutz diesel engines).

TAB 3 Eielson AFB Facility Operating Report

Table 2

**Conditions 1.4 and 24 – Emergency Engines:
Owner Requested Limit of 200 Hours per 12-Month Rolling Total**

EU ID	Power Pro ID	EU Description	12-Month Rolling Total Hours					
			2022	2022	2022	2022	2022	2022
			Jul	Aug	Sep	Oct	Nov	Dec
24A*	R-13	WASTEWATER TREATMENT GENERATOR	46.1	45.9	48.2	19.9	21.7	21.7
25	R-23	CENTRAL AVE (CLINIC) GENERATOR	33.8	33.8	36.5	15.8	19.3	19.3
28A*	R-25	ALERT HANGER GENERATOR	54.3	53.6	54.1	27.5	29.1	18.8
29	P-21	POWER PLANT FIRE PUMP	1.0	1.0	1.0	1.0	1.0	1.0
31	R-03	CONTROL TOWER GENERATOR	38.7	38.9	38.6	18.2	18.2	18.2
32	R-14	TELEPHONE EXCHANGE GENERATOR	23.8	24.0	24.1	5.7	4.2	4.3
33	R-02	COMMAND POST GENERATOR	40.7	40.2	40.2	14.6	14.5	14.5
34	R-01	AIRFIELD LIGHTING GENERATOR	39.4	39.2	39.1	13.7	13.8	13.7
35A*	P-08	FIRE PUMP P8	5.3	5.3	5.3	5.7	5.6	6.2
36A*	P-09	FIRE PUMP P9	5.0	4.9	4.9	5.4	5.4	5.4
37A*	P-10	FIRE PUMP P10	5.2	5.1	5.1	5.5	5.5	6.0
41	P-19	FIRE PUMP P19	4.7	4.8	4.9	5.4	6.0	6.6
43*	P-06	FIRE PUMP P6	1.9	1.3	0.6	0.6	0.0	0.0
45*	P-01	FIRE PUMP P1	2.1	1.3	0.5	0.5	0.0	0.0
47*	P-03	PUMPHOUSE #3 FIRE PUMP	2.7	1.9	1.1	0.6	0.0	0.0
49	R-10	COMM SQD EMERGENCY GEN	29.9	29.7	32.4	15.3	15.7	15.9
50	R-35	WATER TREATMENT PLANT GEN	17.8	17.6	19.7	18.2	18.1	18.0
51	R-11	AUX HEAT PLANT EMERGENCY GEN	50.3	50.0	51.7	13.5	13.3	14.3
52	R-17	E2 CX FUEL TANK EMERGENCY GEN	7.0	6.8	6.9	6.9	6.6	6.8

TAB 3 Eielson AFB Facility Operating Report

Table 2

**Conditions 1.4 and 24 – Emergency Engines:
Owner Requested Limit of 200 Hours per 12-Month Rolling Total**

EU ID	Power Pro ID	EU Description	12-Month Rolling Total Hours					
			2022	2022	2022	2022	2022	2022
			Jul	Aug	Sep	Oct	Nov	Dec
53	R-15	FUEL HYDRANT SYS EMERGENCY GEN	6.0	7.0	9.0	6.0	7.0	8.0
55A*	R-07	N ILS GENERATOR	29.2	30.6	31.9	19.2	24.0	24.0
56	R-04	DET 460 GENERATOR	57.1	56.3	35.0	9.4	8.5	7.7
59	R-18	SECURITY FORCES GENERATOR	31.3	30.6	33.6	12.5	12.8	12.8
60	R-21	FIRE STATION #1 GENEARTOR	42.1	41.9	41.7	21.1	20.9	20.8
62	R-28	354 WING MOC GENERATOR	41.2	43.2	42.9	24.9	25.5	23.2
63	P-17	F WELL PUMP	3.8	3.3	3.2	3.6	3.7	3.6
64A	R-31	A WATER WELL PUMP GENERATOR	40.8	40.3	40.1	26.4	26.0	25.7
65A*	AAS-NW	AIRCRAFT ARRESTOR ENGINE NW	4.4	4.2	4.3	4.8	5.3	5.5
66A*	AAS-NE	AIRCRAFT ARRESTOR ENGINE NE	1.9	1.7	1.4	1.4	1.4	1.3
67A*	AAS-3/4W	AIRCRAFT ARRESTOR ENGINE 3/4W	4.4	4.1	4.0	4.1	4.1	4.1
68A*	AAS-3/4E	AIRCRAFT ARRESTOR ENGINE 3/4E	2.8	2.4	2.3	2.1	2.0	1.9
69A*	AAS-SE	AIRCRAFT ARRESTOR ENGINE SE	2.0	1.6	1.5	1.5	1.3	1.1
70B*	AAS-SW	AIRCRAFT ARRESTOR ENGINE SW	3.1	2.9	2.9	3.2	2.5	2.5
71	R-36	LOOP REFUELING GENERATOR	2.4	0.2	0.2	1.8	3.6	3.8
73	R-26	4-BAY LOOP HANGAR GENERATOR	13.7	13.7	13.8	13.7	14.3	13.5
74	R-39	8-BAY LOOP HANGAR GENERATOR	13.1	13.1	13.1	12.8	12.9	12.9
75	R-37	MMX WATER WELL PUMP GENERATOR	18.2	18.1	17.5	11.8	11.3	11.3

TAB 3 Eielson AFB Facility Operating Report

Table 2

Conditions 1.4 and 24 – Emergency Engines:

Owner Requested Limit of 200 Hours per 12-Month Rolling Total

EU ID	Power Pro ID	EU Description	12-Month Rolling Total Hours					
			2022	2022	2022	2022	2022	2022
			Jul	Aug	Sep	Oct	Nov	Dec
76	P-25	E-2 TANK FARM FIRE PUMP GEN	3.1	3.1	3.0	3.9	4.0	4.5
77	R-27	DINING FACILITY EMERGENCY GEN	32.3	32.3	53.0	32.4	32.9	32.8
78	R-29	RED FLAG EMERGENCY GENERATOR	33.3	32.7	34.4	13.9	14.3	14.4
80	R-41	COOLING POND GENERATOR	1.4	1.7	2.0	2.3	2.6	2.9

***Notes:**

1. EU IDs 30, 72 and 79 do not appear in the table because they have not been installed.
2. EU IDs 27, 42 and 57 do not appear in the table because they have been removed.
3. Pump engines P-11 through P-13 (EU IDs 38-40), Pumps P-02, P-04 and P-05 (EU IDs 48, 44 and 46), the conventional Munitions fire pump (EU ID 58), the Base Supply fire pump (EU ID 61), and the B-well pump (EU ID 64B) do not appear in the table because they are non-operational; there were no reportable 12-month rolling total hours for these units.
4. The Power Production shop is no longer maintaining Pumps P-01, P-03 and P-06 (EU IDs 43, 45, and 47). The last operation of these pumps occurred in November 2021.
5. EU IDs 35A-37A and EU IDs 65A-68A were installed between 2015 and 2016 as replacements for older units; off-permit change letters were submitted to the EPA with a courtesy copy to ADEC on 07 Nov 2016 (for EU IDs 35A-37A) and on 27 Oct 2017 (for EU IDs 65A-68A). The off-permit change letters explain that these emission units are subject to a limit of 200 hours per 12-month rolling period in accordance with Condition 24 of Title V Permit AQ0264TVP02, Rev. 4.
6. EU IDs 69A and 70B were installed in 2022; these new diesel engines are replacements for older gas engines.
7. The Waste Water Treatment and North ILS Generators (formerly EU IDs 24 and 55) were replaced by new generators installed on 7/1/21 (EU ID 55A) and on 7/23/21 (EU ID 24A), and are subject to the Condition 24 limit of 200 hours per 12-month rolling period.
8. The Alert Hangar Generator, R-25 (formerly EU ID 28) was replaced with a new unit (EU ID 28A) in August 2022.

TAB 2
Eielson AFB Facility Operating Report

Table 1

Condition 1.2 – 12-Month Rolling Total Hours Limits for Boilers and Generators

Condition 23 – Combined Limit for EU IDs 7 and 8

Building #	Source Name	Title V EU ID	12-MRT Limit (hrs)	12-Month Rolling Total Hours (12-MRT)					
				Jan-23	Feb-23	Mar-23	Apr-23	May-23	Jun-23
3351	Auxiliary Heat Plant Boiler #1	7	400	17	15	16	16	15	15
3351	Auxiliary Heat Plant Boiler #2	8	400	16	12	13	13	12	12
3351	Auxiliary Heat Plant Boilers #1 & #2 (combined)	7 & 8	4,464	33	27	29	29	27	27
1316	Missile Storage Boiler #1	9	4,000	253	239	328	434	513	513
1316	Missile Storage Boiler #2	10	4,000	2,271	2,365	2,226	2,097	1,925	1,925
1300	Alert Hangar Boiler #1	11	4,000	1,515	1,405	1,321	1,324	1,247	1,247
1300	Alert Hangar Boiler #2	12	4,000	471	437	451	445	445	445
2316	Waste Water Treatment Boiler #1	13	4,000	377	328	268	257	245	245
2316	Waste Water Treatment Boiler #2	14	4,000	2,375	2,355	2,390	2,425	2,379	2,379
1245	Refueling Station Generator (Power Pro Unit ID R-16)	26	150 for VEE 200 for Ops	24	24	24	24	24	24
4370	Joint Mobility Complex Generator (Power Pro Unit ID R-24)	54	150 for VEE 200 for Ops	9	9	9	9	9	3

TAB 2

Eielson AFB Facility Operating Report

Table 2

Conditions 1.4 and 24 – Emergency Engines:

Owner Requested Limit of 200 Hours per 12-Month Rolling Total

EU ID	Power Pro ID	EU Description	12-Month Rolling Total Hours					
			2023	2023	2023	2023	2023	2023
			Jan	Feb	Mar	Apr	May	Jun
24A*	R-13	WASTEWATER TREATMENT GENERATOR	21.6	21.6	21.6	21.6	21.6	20.3
25	R-23	CENTRAL AVE (CLINIC) GENERATOR	19.1	19.1	19.0	18.9	18.8	17.7
28A*	R-25	ALERT HANGER GENERATOR	6.7	5.6	4.5	3.5	2.4	1.3
29	P-21	POWER PLANT FIRE PUMP	1.0	0.0	0.0	0.0	0.0	0.0
31	R-03	CONTROL TOWER GENERATOR	18.2	18.1	18.1	18.0	18.0	14.7
32	R-14	TELEPHONE EXCHANGE GENERATOR	4.1	3.8	3.8	3.7	3.6	3.4
33	R-02	COMMAND POST GENERATOR	14.5	13.9	14.0	14.6	14.6	13.2
34	R-01	AIRFIELD LIGHTING GENERATOR	13.6	14.3	14.3	14.2	14.2	12.1
35A*	P-08	FIRE PUMP P8	6.2	6.7	6.7	6.7	6.7	6.4
36A*	P-09	FIRE PUMP P9	4.9	4.9	4.4	3.9	4.1	4.0
37A*	P-10	FIRE PUMP P10	6.0	6.5	6.6	6.6	6.7	6.7
41	P-19	FIRE PUMP P19	7.1	7.7	8.0	8.5	8.5	7.4
49	R-10	COMM SQD EMERGENCY GEN	15.9	15.9	15.9	15.9	16.1	16.0
50	R-35	WATER TREATMENT PLANT GEN	18.0	17.9	17.9	18.0	18.1	16.0
51	R-11	AUX HEAT PLANT EMERGENCY GEN	14.2	14.1	14.2	14.2	14.2	14.6
52	R-17	E2 CX FUEL TANK EMERGENCY GEN	6.8	6.6	6.9	6.6	7.4	7.2
53	R-15	FUEL HYDRANT SYS EMERGENCY GEN	8.0	9.0	9.0	9.0	9.0	7.0
55A*	R-07	N ILS GENERATOR	24.1	24.1	24.0	24.0	24.2	24.4
56	R-04	DET 460 GENERATOR	7.7	7.7	8.3	8.3	8.2	5.4
59	R-18	SECURITY FORCES GENERATOR	12.7	13.3	14.0	14.9	14.8	13.8
60	R-21	FIRE STATION #1 GENEARTOR	20.5	20.4	20.3	20.2	20.0	11.5
62	R-28	354 WING MOC GENERATOR	28.4	28.6	28.7	28.8	28.7	27.7

TAB 2

Eielson AFB Facility Operating Report

Table 2

**Conditions 1.4 and 24 – Emergency Engines:
Owner Requested Limit of 200 Hours per 12-Month Rolling Total**

EU ID	Power Pro ID	EU Description	12-Month Rolling Total Hours					
			2023	2023	2023	2023	2023	2023
			Jan	Feb	Mar	Apr	May	Jun
63	P-17	F WELL PUMP	4.2	4.1	4.6	3.9	4.5	4.5
64A	R-31	A WATER WELL PUMP GENERATOR	25.2	23.8	23.4	21.2	19.8	9.7
65A*	AAS-NW	AIRCRAFT ARRESTOR ENGINE NW	5.2	4.8	4.9	4.3	4.4	4.1
66A*	AAS-NE	AIRCRAFT ARRESTOR ENGINE NE	1.5	1.6	1.8	1.5	1.4	1.1
67A*	AAS-3/4W	AIRCRAFT ARRESTOR ENGINE 3/4W	4.2	4.2	4.1	3.9	3.9	3.7
68A*	AAS-3/4E	AIRCRAFT ARRESTOR ENGINE 3/4E	1.4	1.3	1.2	1.0	0.9	0.9
69A*	AAS-SE	AIRCRAFT ARRESTOR ENGINE SE	0.4	0.2	0.0	0.0	0.0	0.0
70B*	AAS-SW	AIRCRAFT ARRESTOR ENGINE SW	2.5	2.6	2.5	2.3	2.4	2.0
71	R-36	LOOP REFUELING GENERATOR	4.2	4.2	5.4	5.4	6.4	6.4
73	R-26	4-BAY LOOP HANGAR GENERATOR	13.4	13.4	13.5	13.5	15.4	14.3
74	R-39	8-BAY LOOP HANGAR GENERATOR	12.7	12.8	12.7	12.7	14.5	13.4
75	R-37	MMX WATER WELL PUMP GENERATOR	11.2	11.2	11.1	11.1	11.1	11.1
76	P-25	E-2 TANK FARM FIRE PUMP GEN	4.4	4.9	5.4	5.2	5.7	5.2
77	R-27	DINING FACILITY EMERGENCY GEN	33.6	34.5	34.4	34.4	34.0	33.0
78	R-29	RED FLAG EMERGENCY GENERATOR	14.3	14.3	14.3	14.4	14.4	13.4
80	R-41	COOLING POND GENERATOR	3.1	4.5	6.5	6.5	6.0	5.6

***Notes:**

- EU IDs 30, 72 and 79 do not appear in the table because they have not been installed.
- EU IDs 27, 42 and 57 do not appear in the table because they have been removed.
- Pump engines P-11 through P-13 (EU IDs 38-40), Pumps P-02, P-04 and P-05 (EU IDs 48, 44 and 46), the conventional Munitions fire pump (EU ID 58), the Base Supply fire pump (EU ID 61), and the B-well pump (EU ID 64B) do not appear in the table because they are non-operational; there were no reportable 12-month rolling total hours for these units.

TAB 2

Eielson AFB Facility Operating Report

Table 2

Conditions 1.4 and 24 – Emergency Engines:

Owner Requested Limit of 200 Hours per 12-Month Rolling Total

4. The Power Production shop is no longer maintaining Pumps P-01, P-03 and P-06 (EU IDs 43, 45, and 47). The last operation of these pumps occurred in November 2021.
5. EU IDs 35A-37A and EU IDs 65A-68A were installed between 2015 and 2016 as replacements for older units; off-permit change letters were submitted to the EPA with a courtesy copy to ADEC on 07 Nov 2016 (for EU IDs 35A-37A) and on 27 Oct 2017 (for EU IDs 65A-68A). The off-permit change letters explain that these emission units are subject to a limit of 200 hours per 12-month rolling period in accordance with Condition 24 of Title V Permit AQ0264TVP02, Rev.
4. P-06, P-03, and P-01 have not been operational since 11/21.
6. EU IDs 69A and 70B were installed in 2022; these new diesel engines are replacements for older gas engines.
7. The Waste Water Treatment and North ILS Generators (formerly EU IDs 24 and 55) were replaced by new generators installed on 7/1/21 (EU ID 55A) and on 7/23/21 (EU ID 24A), and are subject to the Condition 24 limit of 200 hours per 12-month rolling period.
8. The Alert Hangar Generator, R-25 (formerly EU ID 28) was replaced with a new unit (EU ID 28A) in August 2022.

TAB 3
Eielson AFB Facility Operating Report

Table 1

Condition 1.2 – 12-Month Rolling Total Hours Limits for Boilers and Generators

Condition 23 – Combined Limit for EU IDs 7 and 8

Building #	Source Name	Title V EU ID	12-MRT Limits (hrs)	12-Month Rolling Total Hours (12-MRT)					
				Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23
3351	Auxiliary Heat Plant Boiler #1	7	400	14	14	14	5	6	18
3351	Auxiliary Heat Plant Boiler #2	8	400	11	11	11	4	7	17
3351	Auxiliary Heat Plant Boiler #1 & #2 (combined)	7 & 8	4,464	25	25	25	9	13	35
1316	Missile Storage Boiler #1	9	4,000	513	513	593	632	704	865
1316	Missile Storage Boiler #2	10	4,000	1925	1925	1875	1742	1499	2166
1300	Alert Hangar Boiler #1	11	4,000	1247	1247	1183	1040	850	1247
1300	Alert Hangar Boiler #2	12	4,000	445	445	444	416	392	244
2316	Waste Water Treatment Boiler #1	13	4,000	245	245	308	497	718	960
2316	Waste Water Treatment Boiler #2	14	4,000	2380	2380	2483	2283	2075	2952
1245	Refueling Station Generator (Power Pro Unit ID R-16)	26	150 for VEE 200 for Ops	26	24	22	22	21	15
4370	Joint Mobility Complex Generator (Power Pro Unit ID R-24)	54	150 for VEE 200 for Ops	7	7	7	7	7	7

TAB 3
Eielson AFB Facility Operating Report

Table 2

Conditions 1.4 and 24 – Emergency Engines:

Owner Requested Limit of 200 Hours per 12-Month Rolling Total

EU ID	Power Pro ID	EU Description	12-Month Rolling Total Hours (12-MRT)					
			Jul-23	Aug-23	Sep-23	Oct-23	Nov-23	Dec-23
24A*	R-13	WASTEWATER TREATMENT GENERATOR	17.5	18.0	15.5	15.2	13.4	13.2
25	R-23	CENTRAL AVE (CLINIC) GENERATOR	18.7	18.8	16.0	16.1	12.5	12.6
28A*	R-25	ALERT HANGER GENERATOR	17.5	18.0	17.7	17.4	18.7	18.4
29	P-21	POWER PLANT FIRE PUMP	0.0	0.0	0.0	0.0	0.0	0.0
31	R-03	CONTROL TOWER GENERATOR	15.7	15.7	15.7	15.8	15.8	16.1
32	R-14	TELEPHONE EXCHANGE GENERATOR	3.8	3.8	3.7	3.7	3.2	3.1
33	R-02	COMMAND POST GENERATOR	13.3	13.9	14.0	14.1	14.1	14.1
34	R-01	AIRFIELD LIGHTING GENERATOR	13.4	13.5	13.5	13.5	13.4	13.6
35A*	P-08	FIRE PUMP P8	6.5	6.4	6.3	5.8	5.9	5.8
36A*	P-09	FIRE PUMP P9	4.1	4.1	4.1	3.6	3.5	4.0
37A*	P-10	FIRE PUMP P10	6.7	6.7	6.7	6.1	6.1	6.1
41	P-19	FIRE PUMP P19	7.7	7.6	7.6	7.1	6.5	6.3
49	R-10	COMM SQD EMERGENCY GEN	6.7	6.7	6.7	6.1	5.5	5.0
50	R-35	WATER TREATMENT PLANT GEN	16.2	16.3	14.2	14.3	13.5	13.6
51	R-11	AUX HEAT PLANT EMERGENCY GEN	14.0	13.9	12.3	12.2	12.7	12.7
52	R-17	E2 CX FUEL TANK EMERGENCY GEN	6.7	6.0	5.7	5.7	5.8	5.5
53	R-15	FUEL HYDRANT SYS EMERGENCY GEN	10.0	10.0	9.0	9.0	10.0	9.0
55A*	R-07	N ILS GENERATOR	20.6	20.5	19.0	18.9	14.0	14.2
56	R-04	DET 460 GENERATOR	7.3	7.3	7.3	6.6	6.5	6.6
59	R-18	SECURITY FORCES GENERATOR	14.8	14.7	12.6	12.6	12.2	12.3
60	R-21	FIRE STATION #1 GENERATOR	16.7	16.6	16.6	16.6	16.6	16.6
62	R-28	354 WING MOC GENERATOR	30.9	28.7	28.0	28.0	27.3	22.4
63	P-17	F WELL PUMP	0.0	0.0	0.0	0.0	0.0	0.0
64A	R-31	A WATER WELL PUMP GENERATOR	10.2	9.4	8.7	8.0	7.2	6.2
65A*	AAS-NW	AIRCRAFT ARRESTOR ENGINE NW	3.9	3.8	3.6	3.1	2.9	2.9
66A*	AAS-NE	AIRCRAFT ARRESTOR ENGINE NE	1.0	1.0	1.0	1.2	1.4	1.8
67A*	AAS-3/4W	AIRCRAFT ARRESTOR ENGINE 3/4W	3.6	3.4	3.3	3.2	3.2	3.1
68A*	AAS-3/4E	AIRCRAFT ARRESTOR ENGINE 3/4E	1.1	1.0	1.0	1.0	1.1	1.2
69A*	AAS-SE	AIRCRAFT ARRESTOR ENGINE SE	0.7	0.6	0.6	0.6	0.7	0.7
70B*	AAS-SW	AIRCRAFT ARRESTOR ENGINE SW	2.0	1.9	1.7	1.5	1.6	1.6
71	R-36	LOOP REFUELING GENERATOR	8.1	9.2	9.5	7.9	7.3	7.1
73	R-26	4-BAY LOOP HANGAR GENERATOR	15.6	15.8	15.6	15.7	15.0	15.0
74	R-39	8-BAY LOOP HANGAR GENERATOR	14.7	14.7	14.7	14.8	14.7	14.8
75	R-37	MMX WATER WELL PUMP GENERATOR	12.1	12.2	12.4	11.4	10.6	9.9
76	P-25	E-2 TANK FARM FIRE PUMP GEN	5.0	5.0	4.5	4.1	3.5	3.0
77	R-27	DINING FACILITY EMERGENCY GEN	34.1	34.2	13.5	13.9	13.2	13.2
78	R-29	RED FLAG EMERGENCY GENERATOR	14.4	13.4	11.7	11.8	11.4	11.3
80	R-41	COOLING POND GENERATOR	6.2	6.3	6.5	6.5	6.4	6.4
135	R-42	E-11 Generator	0.0	0.0	0.0	0.0	1.5	2.0

NOTES:

1. EU IDs 30, 72 and 79 do not appear in the table because they have not been installed.

2. EU IDs 27, 42 and 57 do not appear in the table because they have been removed.

3. Pump engines P-11 through P-13 (EU IDs 38-40), Pumps P-02, P-04 and P-05 (EU IDs 48, 44 and 46), the conventional Munitions fire pump (EU ID 58), the Base Supply fire pump (EU ID 61), and the B-well pump (EU ID 64B) do not appear in the table because they are non-operational; there were no reportable 12-month rolling total hours for these units.

4. The Power Production shop is no longer maintaining Pumps P-01, P-03 and P-06 (EU IDs 43, 45, and 47). The last operation of these pumps occurred in November 2021.

5. EU IDs 35A-37A and EU IDs 65A-68A were installed between 2015 and 2016 as replacements for older units; off-permit change letters were submitted to the EPA with a courtesy copy to ADEC on 07 Nov 2016 (for EU IDs 35A-37A) and on 27 Oct 2017 (for EU IDs 65A-68A). The off-permit change letters explain that these emission units are subject to a limit of 200 hours per 12-month rolling period in accordance with Condition 24 of Title V Permit AQ0264TVPO2, Rev. 4. P-06, P-03, and P-01 have not been operational since 11/21.

6. EU IDs 69A and 70B were installed in 2022; these new diesel engines are replacements for older gas engines.

7. The Waste Water Treatment and North ILS Generators (formerly EU IDs 24 and 55) were replaced by new generators installed on 7/1/21 (EU ID 55A) and on 7/23/21 (EU ID 24A), and are subject to the Condition 24 limit of 200 hours per 12-month rolling period.

8. The Alert Hangar Generator, R-25 (formerly EU ID 28) was replaced with a new unit (EU ID 28A) in August 2022.

9. EU ID 135 is a new diesel generator set installed Septemeber 13, 2023. On off permit change notification was sent to the ADEC dated November 22, 2023.

Attachment H: JP-8 Tank Throughputs 2021-2022

Eielson Air Force Base
 JP8 Tank Throughputs, All Tanks, 2021

Product	Tank	January	February	March	April	May	June	July	August	September	October	November	December	Totals	Mo. Throughput
JP8	100-EU 104	251,426	136,565	381,475	261,960	427,430	730,272	581,749	490,913	542,279	432,905	293,043	106,020	4,636,037	386,336
JP8	200-EU-105	302,814	97,349	266,531	694,094	721,406	-	621,779	381,150	451,224	258,770	458,641	95,497	4,349,255	362,438
JP8	300	167,670	13,663	148,917	140	384,251	190,859	97,810	149	102,129	125,438	122,503	196,744	1,550,273	129,189
JP8	400		132,902		159,277	153,437	195,945	280	222,282	140,040	145,874		105,008	1,255,045	104,587
JP8	500	388,842	222,551	261,970	587,331	779,389	1,106,549	518,803	920,180	425,313	394,828	304,663	262,041	6,172,460	514,372
JP8	600	444,233	121,290	415,657	618,743	843,918	950,156	595,990	848,255	430,715	414,196	589,136	430,347	6,702,636	558,553
JP8	515													-	-
JP8	522	11	10	1,440,203	360,009		11,449	1,440,021	360,140				307	3,612,150	301,013
JP8	535	540,062			720,066				544,942		65,308			1,870,378	155,865
JP8	536		38,575			360,007	360,053	720,011	720,011					2,198,657	183,221
JP8	537	720,012					653,986						360,006	1,734,004	144,500
JP8	538	720,013			360,062	360,004					360,006			1,800,085	150,007
JP8	539	360,074	360,005				720,102		5,455				360,006	1,805,642	150,470
JP8	540	179,994	360,006				360,005	360,006					360,006	1,620,017	135,001
JP8	557											720,079	1,080,077	1,800,156	150,013
JP8	558		720,072		360,008				1,080,051		655,456	815,159		3,630,746	302,562
JP8	559						720,010			308,837	1,080,017			2,108,864	175,739
JP8	560						368,111		320,986	1,267,473			278,862	2,235,432	186,286
JP8	561				216,515				1,440,025	165,756		1,298,528		3,120,824	260,069
JP8	562				324			8,179						8,503	709
JP8	566			360,048				360,007						720,055	60,005
2021 Total Throughput, Base-wide														52,931,219	
2021 Throughput, EU 104 and 105														8,985,292	

Eielson Air Force Base
 JP8 Tank Throughputs, All Tanks, 2022

Product	Tank	January	February	March	April	May	June	July	August	September	October	November	December	Totals	Mo. Throughput
JP8	100-EU 104	189,100	122,938	487,850	935,329	719,620	535,150	441,351	476,678	778,778	663,405	476,508	427,001	6,253,708	521,142
JP8	200-EU 105	61,397	132,574	458,493	739,743	637,383	502,526	491,680	539,874	560,896	674,709	518,557	178,663	5,496,495	458,041
JP8	300	194,170	156,013	139,776	446,651	407,384	354,908	328,319	433,890	213,695	393,362	93,119	115,335	3,276,622	273,052
JP8	400	145,060	255,781	153,325	569,077	536,601	272,298	338,550	321,956	223,547	161,048	163,535	52,486	3,193,264	266,105
JP8	500	544,242	330,221	392,029	557,269	1,063,450	897,703	479,391	993,387	459,228	677,566	356,506	138,884	6,889,876	574,156
JP8	600	221,242	411,451	377,254	446,031	1,134,515	844,175	494,121	1,082,957	371,782	739,940	327,803	200,264	6,651,535	554,295
JP8	515	-	-	-	-	-	-	-	-	-	-	-	-	-	-
JP8	522	549,413	1,455	2,136	1,994,901	1,126,172	386,206	131,556	1,952,206	1,178,522	1,212,829	820,903	440,851	9,797,150	816,429
JP8	535	112,141	-	-	851,781	-	-	243,436	-	-	499,802	-	-	1,707,160	142,263
JP8	536	230,374	-	-	-	252,336	-	-	199,729	499,455	683,139	-	-	1,865,033	155,419
JP8	537	3	260,479	404,621	-	218,847	-	82,447	-	710,735	-	-	-	1,677,132	139,761
JP8	538	-	-	-	-	887,922	-	-	661,484	376,021	-	-	460,326	2,385,753	198,813
JP8	539	-	338,322	359,549	-	-	-	146,179	888,761	-	-	774,299	239,282	2,746,392	228,866
JP8	540	-	-	-	818,014	-	-	247,379	-	-	-	-	520,912	1,586,305	132,192
JP8	557	-	-	-	-	381,911	1,201,059	2,533	-	-	-	121,673	-	1,707,176	142,265
JP8	558	-	530,464	-	-	-	1,542,358	-	-	-	-	-	-	2,072,822	172,735
JP8	559	221,362	-	-	-	1,403,577	-	-	495,825	166,389	700,030	-	-	2,987,183	248,932
JP8	560	-	248,308	-	-	-	1,232	706,153	809,034	-	-	-	-	1,764,727	147,061
JP8	561	-	-	-	-	-	322,502	1,166,403	-	-	-	-	-	1,488,905	124,075
JP8	562	-	-	10,582	10,187	-	8,155	3,750	-	-	-	4,029	-	36,703	3,059
JP8	566	-	2,439	1,192,571	231,368	-	-	-	-	-	-	-	-	1,426,378	118,865
														2022 Total Throughput, Base-wide	65,010,319
														2022 Throughput, EU 104 and 105	11,750,203

MS Excel Sheets

Included on Enclosed Compact Disc

- Attachment I: Emissions Summary

Trinity TankESP Output Files:

- Att J.1__EAFB_Actual VOC HAP_TankESP,
- Att J.2__EAFB_ORL VOC HAP_TankESP, and
- Att J.3__EAFB_PTE VOC HAP_TankESP.