GVEA North Pole Power Plant BACT Cover Page

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The following spreadsheets are included as part of the appendix. However, due to their electronic nature, they may be found posted separately on the web page:

1. Updated Department North Pole Plant SO_2 Controls Economic Analysis.xlsx
2. GVEA Fuel Prices.xlsx
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ALASKA DEPARTMENT OF ENVIRONMENTAL CONSERVATION
Air Permits Program

BEST AVAILABLE CONTROL TECHNOLOGY DETERMINATION ADDENDUM
for
Golden Valley Electric Association
North Pole Power Plant

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Reviewed by: Moses Coss
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Abbreviations/Acronyms

AAC ....Alaska Administrative Code
AAAQS ....Alaska Ambient Air Quality Standards
Department ....Alaska Department of Environmental Conservation
BACT ....Best Available Control Technology
CFB……………………Circulating Fluidized Bed
CFR. ....Code of Federal Regulations
Cyclones………………Mechanical Separators
DFP……………………Diesel Particulate Filter
DLN..............................Dry Low NOx
DOC…………………...Diesel Oxidation Catalyst
EPA ....Environmental Protection Agency
ESP……………………Electrostatic Precipitator
EU.................................Emission Unit
FITR…………………...Fuel Injection Timing Retard
GCPs…………………..Good Combustion Practices
HAP ....Hazardous Air Pollutant
ITR……………………Ignition Timing Retard
LEA……………………Low Excess Air
LNB……………………Low NOx Burners
MR&Rs ....Monitoring, Recording, and Reporting
NESHAPS ....National Emission Standards for Hazardous Air Pollutants
NSCR…………………Non-Selective Catalytic Reduction
NSPS ....New Source Performance Standards
ORL ....Owner Requested Limit
PSD................................Prevention of Significant Deterioration
PTE................................Potential to Emit
RICE, ICE ....Reciprocating Internal Combustion Engine, Internal Combustion Engine
SCR ....Selective Catalytic Reduction
SIP ....Alaska State Implementation Plan
SNCR…………………Selective Non-Catalytic Reduction
ULSD ....Ultra Low Sulfur Diesel

Units and Measures

gal/hr.............................gallons per hour
g/kWh ....grams per kilowatt hour
g/hp-hr ....grams per horsepower hour
hr/day.............................hours per day
hr/yr ....hours per year
hp...................................horsepower
lb/hr ....pounds per hour
lb/MMBtu......................pounds per million British thermal units
lb/1000 gal.....................pounds per 1,000 gallons
kW ....kilowatts
MMBtu/hr......................million British thermal units per hour
MMscf/hr.......................million standard cubic feet per hour
ppmv..............................parts per million by volume
tpy.................................tons per year

Pollutants

CO ....Carbon Monoxide
HAP ....Hazardous Air Pollutant
NOx ....Oxides of Nitrogen
SO_2 ....Sulfur Dioxide
$PM_{2.5}$..............................Particulate Matter with an aerodynamic diameter not exceeding 2.5 microns
PM_{10} ....Particulate Matter with an aerodynamic diameter not exceeding 10 microns

1. INTRODUCTION

The North Pole Power Plant (North Pole) is an electric generating facility that combusts distillate fuel in combustion turbines to provide power to the Golden Valley Electric Association (GVEA) grid. The power plant contains two fuel oil-fired simple cycle gas combustion turbines, two fuel oil-fired combined cycle gas combustion turbines, one fuel oil-fired emergency generator, and two propane fired boilers.

In a letter dated April 24, 2015, the Alaska Department of Environmental Conservation (Department) requested the stationary sources expected to be major stationary sources in the particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 micrometers ($PM_{2.5}$) serious nonattainment area perform a voluntary Best Available Control Technology (BACT) review in support of the state agency's required SIP submittal once the nonattainment area is re-classified as a Serious $PM_{2.5}$ nonattainment area. The designation of the area as "Serious" with regard to nonattainment of the 2006 24-hour $PM_{2.5}$ ambient air quality standards was published in Federal Register Vol. 82, No. 89, May 10, 2017, pages 21703-21706, with an effective date of June 9, 2017. [1]

The initial BACT Determination for North Pole was included in Part 4 of Appendix III.D.7.07 Control Strategies Chapter, in the State Air Quality Control Plan adopted on November 19, 2019, with amendments adopted on November 18, 2020, as part of a complete SIP package.[2] The *EPA's Air Plan Partial Approval and Partial Disapproval; AK, Fairbanks North Star Borough; 2006 24-hour $PM_{2.5}$ Serious Area and 189(d) Plan*[3] published in the Federal Register on December 5, 2023 (*88 Fed. Reg. 84659*) disapproved of Alaska's initial BACT determinations for $PM_{2.5}$ and SO_2 controls.

This BACT addendum addresses the EPA's disapproval of the significant emission units (EUs) listed in the North Pole Power Plant's operating permit AQ0110TVP04 Rev. 1. The BACT addendum also accounts for EPA's comments listed in Memorandum dated August 24, 2022 from Zach Hedgpeth, LSASD to Matthew Jentgen, ARD.[4] This BACT addendum provides the Department's review of the BACT analysis for $PM_{2.5}$, and the BACT analysis for sulfur dioxide (SO_2) emissions, which is a precursor pollutant that can form $PM_{2.5}$ in the atmosphere post combustion.

Since preparing the SIP amendments adopted on November 18, 2020, the Department conducted extensive modeling and found that SO_2 emissions from stationary sources do not significantly contribute to ground level $PM_{2.5}$ concentrations, and that SO_2 BACT emission limits are therefore not required for major stationary sources in the Fairbanks North Star Borough. SO_2

[1] Federal Register, Vol. 82, No. 89, Wednesday May 10, 2017 (https://dec.alaska.gov/air/anpms/comm/docs/2017-09391-CFR.pdf)

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

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

[4] Document 000007_EPA Technical Support Document – GVEA BACT TSD v20220824: https://www.regulations.gov/document/EPA-R10-OAR-2022-0115-0214.

BACT determinations have, however, been included in this BACT Determination Addendum because the SO_2 major source precursor demonstration has not yet been approved by EPA.

Note that the section for oxides of nitrogen (NOx), which is also a precursor pollutant that can form $PM_{2.5}$ in the atmosphere post combustion, has been removed from this addendum because the EPA has approved[3] of the Department's comprehensive NOx precursor demonstration under 40 C.F.R. 51.1006(a)(1) and 51.1010(a)(2)(ii).

The following sections review GVEA's BACT analysis provided for the North Pole Power Plant for technical accuracy and adherence to accepted engineering cost estimation practices.

2. BACT EVALUATION

A BACT analysis is an evaluation of all available control options for equipment emitting the triggered pollutants and a process for selecting the best option based on feasibility, economics, energy, and other impacts. 40 CFR 52.21(b)(12) defines BACT as a site-specific determination on a case-by-case basis. The Department's goal is to: identify BACT for the permanent emission units (EUs) at the GVEA North Pole Power Plant that emit $PM_{2.5}$ and SO_2, establish emission limits which represent BACT, and assess the level of monitoring, recordkeeping, and reporting (MR&R) necessary to ensure GVEA applies BACT for the EUs. The Department based the BACT review on the five-step top-down approach set forth in Federal Register Volume 61, Number 142, July 23, 1996 (Environmental Protection Agency). Table A presents the EUs subject to BACT review.

Table A: Emission Units Subject to BACT Review

EU	EU Name	Description of EU	Rating/Size	Installation Date
1	GT#1	GE Frame 7, Series 7001, Fuel Oil-Fired Model BR Regenerative Simple Cycle Gas Turbine	672 MMBtu/hr (60.5 MW)	1976
2	GT#2	GE Frame 7, Series 7001, Fuel Oil-Fired Model BR Regenerative Simple Cycle Gas Turbine	672 MMBtu/hr (60.5 MW)	1977
5	GT#3	GE LM6000PC Combined Cycle Gas Turbine, Fuel 0-GT (naphtha/LSR fuel) Fired (with water injection for NOx control and CO oxidation catalyst)	455 MMBtu/hr (Higher Heating Value) 43 MW (nominal)	2005
6	GT#4	GE LM6000PC Combined Cycle Gas Turbine, Fuel 0-GT (naphtha/LSR fuel) Fired (with water injection for NOx control and CO oxidation catalyst)	455 MMBtu/hr (Higher Heating Value) 43 MW (nominal)	TBD
7	Emergency Generator	IC Engine, Fuel-Oil Fired	400 kW	2005
11	Propane-Fired Boiler	Bryan Steam RV500 Heater, Gas Fuel-Fired	5.0 MMBtu/hr	2005
12	Propane-Fired Boiler	Bryan Steam RV500 Heater, Gas Fuel-Fired	5.0 MMBtu/hr	2005

GVEA did not include BACT analyses for EUs 3 and 4. These emission units are fuel storage tanks and do not have NOx, $PM_{2.5}$, or SO_2 emissions.

Five-Step BACT Determinations

The following sections explain the steps used to determine BACT for $PM_{2.5}$ and SO_2 for the applicable equipment.

Step 1 Identify All Potentially Available Control Technologies

The Department identifies all available control technologies for the EUs and the pollutant under consideration. This includes technologies used throughout the world or emission reductions through the application of available control techniques, changes in process design, and/or operational limitations. To assist in identifying available controls, the Department reviews available controls listed on the Reasonably Available Control Technology (RACT), BACT, and Lowest Achievable Emission Rate (LAER) Clearinghouse (RBLC). The RBLC is an EPA database where permitting agencies nationwide post imposed BACT for PSD sources. It is usually the first stop for BACT research. In addition to the RBLC search, the Department used several search engines to look for emerging and tried technologies used to control $PM_{2.5}$ and SO_2 emissions from equipment similar to those listed in Table A.

Step 2 Eliminate Technically Infeasible Control Technologies

The Department evaluates the technical feasibility of each control option based on source specific factors in relation to each EU subject to BACT. Based on sound documentation and demonstration, the Department eliminates control technologies deemed technically infeasible due to physical, chemical, and engineering difficulties.

Step 3 Rank the Remaining Control Technologies by Control Effectiveness

The Department ranks the remaining control technologies in order of control effectiveness with the most effective at the top.

Step 4 Evaluate the Most Effective Controls and Document the Results as Necessary

The Department reviews the detailed information in the BACT analysis about the control efficiency, emission rate, emission reduction, cost, environmental, and energy impacts for each option to decide the final level of control. The analysis must present an objective evaluation of both the beneficial and adverse energy, environmental, and economic impacts. A proposal to use the most effective option does not need to provide the detailed information for the less effective options. If cost is not an issue, a cost analysis is not required. Cost effectiveness for a control option is defined as the total net annualized cost of control divided by the tons of pollutant removed per year. Annualized cost includes annualized equipment purchase, erection, electrical, piping, insulation, painting, site preparation, buildings, supervision, transportation, operation, maintenance, replacement parts, overhead, raw materials, utilities, engineering, start-up costs, financing costs, and other contingencies related to the control option. Sections 4 and 5 present the Department's BACT Determinations for $PM_{2.5}$ and SO_2.

Step 5 Select BACT

The Department selects the most effective control option not eliminated in Step 4 as BACT for the pollutant and EU under review. The Department lists the final BACT requirements determined for each EU in this step. A project may achieve emission reductions through the application of available technologies, changes in process design, and/or operational limitations. The Department reviewed GVEA's BACT analysis and made BACT determinations for $PM_{2.5}$ and SO_2 for the North Pole Power Plant. These BACT determinations are based on the information submitted by GVEA in their analysis, information from vendors, suppliers, sub-contractors, RBLC, and an exhaustive internet search.

3. BACT DETERMINATION FOR NO_X

As discussed in the Section 1 Introduction, this BACT addendum has removed the previous NOx BACT determinations included in the State Air Quality Control Plan adopted on November 19, 2019, with amendments adopted on November 18, 2020,[2] because the optional comprehensive precursor demonstration (as allowed under 40 C.F.R. 51.1006(1) and 51.1010(a)(2)(ii)) for the precursor gas NOx for point sources illustrates that NOx controls are not needed. The Department submitted with the Serious SIP a final comprehensive precursor demonstration as justification not to require post emission controls for NOx. Please see the precursor demonstration for NOx in the Serious SIP Modeling Chapter III.D.7.8. [2] The $PM_{2.5}$ NAAQS Final SIP Requirements Rule states if the state determines through a precursor demonstration that controls for a precursor gas are not needed for attaining the standard, then the controls identified as BACT/BACM or Most Stringent Measure for the precursor gas are not required to be implemented.[5] The Department's NOx precursor demonstration was approved in *EPA's Air Plan Partial Approval and Partial Disapproval; AK, Fairbanks North Star Borough; 2006 24-hour $PM_{2.5}$ Serious Area and 189(d) Plan*[3] published in the Federal Register on December 5, 2023 (*88 Fed. Reg. 84659*).

4. BACT DETERMINATION FOR $PM_{2.5}$

The Department based its $PM_{2.5}$ assessment on BACT determinations found in the RBLC, internet research, and BACT analyses submitted to the Department by GVEA for the North Pole Power Plant and Zehnder Facility, Aurora for the Chena Power Plant, US Army for Fort Wainwright, and UAF for the Combined Heat and Power Plant.

4.1 $PM_{2.5}$ BACT for the Fuel Oil-Fired Simple Cycle Gas Turbines (EUs 1 and 2)

Possible $PM_{2.5}$ emission control technologies for the fuel oil-fired simple cycle gas turbines were obtained from the RBLC. The RBLC was searched for all determinations in the last 10 years under the process code 15.110 Simple Cycle Gas Turbines (rated at 25 MW or more) The search results for simple cycle gas turbines are summarized in Table 4-1.

Table 4-1. RBLC Summary of $PM_{2.5}$ Control for Simple Cycle Gas Turbines

Control Technology	Number of Determinations	Emission Limits
Good Combustion Practices	25	0.0038 – 0.0076 lb/MMBtu
Clean Fuels	12	5 – 14 lb/hr

RBLC Review

A review of similar units in the RBLC indicates restrictions on fuel sulfur contents and good

[5] https://www.gpo.gov/fdsys/pkg/FR-2016-08-24/pdf/2016-18768.pdf

combustion practices are the principal PM control technologies installed on simple cycle gas turbines. The lowest $PM_{2.5}$ emission rate listed in the RBLC is 0.0038 lb/MMBtu.

Step 1 - Identification of $PM_{2.5}$ Control Technology for the Simple Cycle Gas Turbines
From research, the Department identified the following technologies as available for control of $PM_{2.5}$ emissions from fuel oil-fired simple cycle gas turbines:

(a) Low Sulfur Fuel
Low sulfur fuel has been known to reduce particulate matter emissions. $PM_{2.5}$ emission rates for low sulfur fuel are not available and therefore a BACT emissions rate cannot be set for low sulfur fuel. The Department does not consider low sulfur fuel a technically feasible control technology for the fuel oil-fired simple cycle gas turbines.

(b) Low Ash Fuel
Residual fuels and crude oil are known to contain ash forming components, while refined fuels are low ash. Fuels containing ash can cause excessive wear to equipment and foul combustion components. EUs 1 and 2 are fired exclusively on distillate fuel which is a form of refined fuel, and potential $PM_{2.5}$ emissions are based on emission factors for distillate fuel. The Department considers low ash fuel a technically feasible control technology for the fuel oil-fired simple cycle gas turbines.

(c) Limited Operation
Limiting the operation of emission units reduces the potential to emit for those units. Due to EUs 1 and 2 currently operating under limits, the Department considers limited operation as a technically feasible control technology for the fuel oil-fired simple cycle gas turbines.

(d) Good Combustion Practices (GCPs)
GCPs typically include the following elements:

1. Sufficient residence time to complete combustion;
2. Providing and maintaining proper air/fuel ratio;
3. High temperatures and low oxygen levels in the primary combustion zone;
4. High enough overall excess oxygen levels to complete combustion and maximize thermal efficiency.

Combustion efficiency is dependent on the gas residence time, the combustion temperature, and the amount of mixing in the combustion zone. GCPs are accomplished primarily through combustion chamber design as it relates to residence time, combustion temperature, air-to-fuel mixing, and excess oxygen levels. Proper management of the combustion process will result in a reduction of $PM_{2.5}$ emissions. The Department considers GCPs a technically feasible control technology for the fuel oil-fired simple cycle gas turbines.

Step 2 - Eliminate Technically Infeasible $PM_{2.5}$ Technologies for the Simple Cycle Gas Turbines
As explained in Step 1 of Section 4.1, the Department does not consider low sulfur fuel as a technically feasible technology to control $PM_{2.5}$ emissions from the fuel oil-fired simple cycle gas turbines.

Step 3 - Rank the Remaining $PM_{2.5}$ Control Technologies for the Simple Cycle Gas Turbines
The following control technologies have been identified and ranked by efficiency for the control of $PM_{2.5}$ emissions from the fuel oil-fired simple cycle gas turbines:

(d)	Good Combustion Practices	(Less than 40% Control)
(b)	Low Ash Fuel	(0% Control)
(c)	Limited Operation	(0% Control)

Control technologies already in practice at the stationary source or included in the design of the EU are considered 0% control for the purpose of the SIP BACT for existing stationary sources.

Step 4 - Evaluate the Most Effective Controls

GVEA BACT Proposal

GVEA proposes the following as BACT for $PM_{2.5}$ emissions from the fuel oil-fired simple cycle gas turbines:

(a) $PM_{2.5}$ emissions from EUs 1 and 2 shall not exceed 0.012 lb/MMBtu over a 4-hour averaging period; and

(b) Maintain good combustion practices.

Step 5 - Selection of $PM_{2.5}$ BACT for the Simple Cycle Gas Turbines
The Department's finding is that BACT for $PM_{2.5}$ emissions from the fuel oil-fired simple cycle gas turbine is as follows:

(a) $PM_{2.5}$ emissions from EU 1 shall be limited by complying with the combined annual NOx emissions limit for EUs 1, 5, and 6, listed in Conditions 16.1a of Construction Permit AQ0110CPT01 Rev. 1;

(b) $PM_{2.5}$ emissions from EU 2 shall be limited by complying with the 7,992 operating hour limit to reduce NOx emissions listed in Condition 16.1 of Construction Permit AQ0110CPT01 Rev. 1;

(c) $PM_{2.5}$ emissions from EUs 1 and 2 shall be controlled by combusting only low ash fuel;

(d) Maintain good combustion practices at all times of operation by following the manufacturer's operation and maintenance procedures; and

(e) $PM_{2.5}$ emissions from EUs 1 & 2 shall not exceed 0.012 lb/MMBtu[6] over a 3-hour averaging period.

Table 4-2 lists the proposed $PM_{2.5}$ BACT determination for this facility along with those for other fuel oil-fired simple cycle gas turbines located in the Serious $PM_{2.5}$ nonattainment area.

[6] Table 3.1-2a of US EPA's AP-42 Emission Factors. https://www3.epa.gov/ttnchie1/ap42/ch03/final/c03s01.pdf

Table 4-2. Comparison of $PM_{2.5}$ BACT for Simple Cycle Gas Turbines at Nearby Power Plants

Facility	Process Description	Capacity	Limitation	Control Method
GVEA – North Pole	Two Fuel Oil-Fired Simple Cycle Gas Turbines	1,344 MMBtu/hr	0.012 lb/MMBtu[6] (3-hour averaging period)	Limited Operation Low Ash Fuel Good Combustion Practices
GVEA – Zehnder	Two Fuel Oil-Fired Simple Cycle Gas Turbines	536 MMBtu/hr	0.012 lb/MMBtu[6] (3-hour averaging period)	Low Ash Fuel Good Combustion Practices

4.2 $PM_{2.5}$ BACT for the Combined Cycle Gas Turbines (EUs 5 and 6)

Possible $PM_{2.5}$ emission control technologies for the fuel oil-fired combined cycle gas turbines were obtained from the RBLC. The RBLC was searched for all determinations in the last 10 years under the process code 15.210, Liquid Fuel-Fired Combined Cycle Combustion Turbines (rated at 25 MW or more). The search results for combined cycle gas turbines are summarized in Table 4-3.

Table 4-3. RBLC Summary for $PM_{2.5}$ Control for the Combined Cycle Gas Turbines

Control Technology	Number of Determinations	Emission Limits
Good Combustion Practices	9	4 – 19.35 lb/hr
Clean Fuels	12	4.7 – 60.6 lb/hr

RBLC Review
A review of similar units in the RBLC indicates good combustion practices and clean fuels are the principal $PM_{2.5}$ control technologies installed on fuel oil-fired combined cycle gas turbines. The lowest NOx emission rate listed in the RBLC is 4 lb/hr.

Step 1 - Identification of $PM_{2.5}$ Control Technology for the Combined Cycle Gas Turbines
From research, the Department identified the following technologies as available for control of $PM_{2.5}$ emissions from fuel oil-fired combined cycle gas turbines rated at 25 MW or more:

(a) Low Sulfur Fuel
Low sulfur fuel has been known to reduce particulate matter emissions. The Department considers low sulfur fuel a technically feasible control technology for the fuel oil-fired combined cycle gas turbines.

(b) Limited Operation
Limiting the operation of emission units reduces the potential to emit for those units. EUs 5 and 6 currently operate under a combined ORL with EU 1 to restrict the combined NOx emissions from these three units to no more than 1,600 tons per 12 month rolling period. The Department considers limited operation a technically feasible control technology for the fuel oil-fired combined cycle gas turbines.

(c) Good Combustion Practices
The theory of GCPs was discussed in detail in the $PM_{2.5}$ BACT section for the fuel oil-fired simple cycle turbines and will not be repeated here. Proper management of the combustion process will result in a reduction of particulate matter. The Department considers GCPs a technically feasible control technology for the fuel oil-fired combined cycle turbines.

Step 2 - Eliminate Technically Infeasible $PM_{2.5}$ Controls for the Combined Cycle Gas Turbines
As explained in Step 1 of Section 4.1, the Department does not consider low sulfur fuel as technically feasible technology to control $PM_{2.5}$ emissions from the fuel oil-fired combined cycle gas turbines.

Step 3 - Rank the Remaining $PM_{2.5}$ Controls for the Combined Cycle Gas Turbines
The following control technologies have been identified and ranked by efficiency for the control of $PM_{2.5}$ emissions from the combined cycle gas turbines:

(c)	Good Combustion Practices	(Less than 40% Control)
(b)	Limited Operation	(0% Control)

Control technologies already in practice at the stationary source or included in the design of the EU are considered 0% control for the purpose of the SIP BACT for existing stationary sources.

Step 4 - Evaluate the Most Effective Controls

GVEA BACT Proposal

GVEA proposes the following as BACT for $PM_{2.5}$ emissions from the fuel oil-fired combined cycle gas turbines:

(a) $PM_{2.5}$ emissions shall not exceed 0.012 lb/MMBtu over a 4-hour averaging period; and

(b) Maintain good combustion practices.

Department Evaluation of BACT for $PM_{2.5}$ Emissions from the Combined Cycle Gas Turbines

The Department reviewed GVEA's proposal and found that in addition to maintaining good combustion practices, limited operation is also a technically feasible control technology.

Step 5 - Selection of $PM_{2.5}$ BACT for the Combined Cycle Gas Turbines
The Department's finding is that BACT for $PM_{2.5}$ emissions from the combined cycle gas turbines is as follows:

(a) $PM_{2.5}$ emissions from EUs 5 and 6 shall be limited by complying with the combined annual NOx emissions limit listed in Condition 16.1a of Construction Permit AQ0110CPT01 Rev. 1 of Construction Permit AQ0110CPT01 Rev. 1;

(b) $PM_{2.5}$ emissions from EUs 5 and 6 shall not exceed 0.012 lb/MMBtu[6] over a 3-hour averaging period; and

(d) Maintain good combustion practices by following the manufacturer's operating and maintenance procedures at all times of operation.

4.3 $PM_{2.5}$ BACT for the Large Diesel-Fired Engine (EU 7)

Possible $PM_{2.5}$ emission control technologies for the large diesel-fired engine were obtained from the RBLC. The RBLC was searched for all determinations in the last 10 years under the process codes 17.110-17.190, Large Internal Combustion Engines (>500 hp). The search results for large diesel-fired engines are summarized in Table 4-5.

Table 4-5. RBLC Summary of $PM_{2.5}$ Control for Large Diesel-Fired Engines

Control Technology	Number of Determinations	Emission Limits (g/hp-hr)
Federal Emission Standards	12	0.03 – 0.02
Good Combustion Practices	28	0.03 – 0.24
Limited Operation	11	0.04 – 0.17
Low Sulfur Fuel	14	0.15 – 0.17
No Control Specified	14	0.02 – 0.15

RBLC Review
A review of similar units in the RBLC indicates that good combustion practices, compliance with the federal emission standards, low ash/sulfur diesel, and limited operation are the principal $PM_{2.5}$ control technologies installed on large diesel-fired engines. The lowest $PM_{2.5}$ emission rate in the RBLC is 0.02 g/hp-hr.

Step 1 - Identification of $PM_{2.5}$ Control Technology for the Large Diesel-Fired Engine
From research, the Department identified the following technologies as available for controls of $PM_{2.5}$ emissions from diesel fired engines rated at 500 hp or greater:

(a) Diesel Particulate Filter (DPF)
DPFs are a control technology that is designed to physically filter particulate matter from the exhaust stream. Several designs exist which require cleaning and replacement of the filter media after soot has become caked onto the filter media. Regenerative filter designs are also available that burn the soot on a regular basis to regenerate the filter media. DPF can reduce $PM_{2.5}$ emissions by 85%. The Department considers DPF a technically feasible control technology for the large diesel-fired engine.

(b) Diesel Oxidation Catalyst (DOC)
DOC can reportedly reduce $PM_{2.5}$ emissions by 30% and PM emissions by 50%. A DOC is a form of “bolt on” technology that uses a chemical process to reduce pollutants in the diesel exhaust resulting in decreased concentrations. They replace mufflers on vehicles, and require no modifications. More specifically, this is a honeycomb type structure that has a large area coated with an active catalyst layer. As CO and other gaseous hydrocarbon particles travel along the catalyst, they are oxidized thus reducing pollution. The Department considers DOC a technically feasible control technology for the large diesel-fired engine.

(c) Positive Crankcase Ventilation
Positive crankcase ventilation is the process of re-introducing the combustion air into the cylinder chamber for a second chance at combustion after the air has seeped into and collected in the crankcase during the downward stroke of the piston cycle. This process

allows any unburned fuel to be subject to a second combustion opportunity. Any combustion products act as a heat sink during the second pass through the piston, which will lower the temperature of combustion and reduce the thermal NOx formation. Positive crankcase ventilation is included in the design of EU 7. The Department considers positive crankcase ventilation a technically feasible control technology for the large diesel-fired engine.

(d) Low Sulfur Fuel
Low sulfur fuel has been known to reduce particulate matter emissions. The Department considers low sulfur fuel as a technically feasible control technology for the large diesel-fired engine.

(e) Low Ash Diesel
Residual fuels and crude oil are known to contain ash forming components, while refined fuels are low ash. Fuels containing ash can cause excessive wear to equipment and foul engine components. EU 7 is fired exclusively on distillate fuel which is a form of refined fuel. The potential $PM_{2.5}$ emissions are based on emission factors for distillate fuel. The Department considers low ash diesel a technically feasible control technology for the large diesel-fired engine.

(f) Federal Emission Standards
NSPS Subpart IIII applies to stationary compression ignition internal combustion engines that are manufactured or reconstructed after July 11, 2005. Due to EU 7 not being subject to either 40 C.F.R. 60 Subpart IIII or 40 C.F.R. 63 Subpart ZZZZ emission standards, the Department does not consider federal emission standards a technically feasible control technology for the large diesel-fired engine.

(g) Limited Operation
Limiting the operation of emissions units reduces the potential to emit of those units. Due to EU 7 currently operating under an annual hour limit of no more than 52 hours per 12 month rolling period, the Department considers limited operation a technically feasible control technology for the large diesel-fired engine.

(h) Good Combustion Practices
The theory of GCPs was discussed in detail in the $PM_{2.5}$ BACT section for the fuel oil-fired simple cycle turbines and will not be repeated here. Proper management of the combustion process will result in a reduction of NOx emissions. The Department considers GCPs a technically feasible control technology for the large diesel-fired engine.

Step 2 - Eliminate Technically Infeasible $PM_{2.5}$ Control Technologies for the Large Engine
$PM_{2.5}$ emission rates for low sulfur fuel are not available and therefore a BACT emissions rate cannot be set for low sulfur fuel. Low sulfur fuel is not a technically feasible control technology. As explained in Step 1 of Section 4.3, federal emission standards are not technically feasible control technology for control of $PM_{2.5}$ emissions from the large diesel-fired engine.

Step 3 - Rank the Remaining $PM_{2.5}$ Control Technologies for the Large Diesel-Fired Engine
The following control technologies have been identified and ranked by efficiency for the control of $PM_{2.5}$ emissions from the large diesel-fired engines:

(a) Diesel Particulate Filters (85% Control)
(g) Good Combustion Practices (Less than 40% Control)
(b) Positive Crankcase Ventilation (0% Control)
(d) Low Ash Diesel (0% Control)
(f) Limited Operation (0% Control)

Control technologies already in practice at the stationary source or included in the design of the EU are considered 0% control for the purpose of the SIP BACT for existing stationary sources.

Step 4 - Evaluate the Most Effective Controls

GVEA Proposal

GVEA provided an economic analysis for the installation of diesel particulate filter. A summary of the analysis for is shown below:

Table 4-6. GVEA Economic Analysis for Technically Feasible $PM_{2.5}$ Controls

Control Alternative	Potential to Emit (tpy)	Emission Reduction (tpy)	Total Capital Investment ($)	Total Annual Costs ($/year)	Cost Effectiveness ($/ton)
Diesel Particulate Filter	0.035	0.03	$30,229	$4,304	$143,008
Capital Recovery Factor = 0.1424 (7% interest rate for a 10 year equipment life)					

GVEA contends that the economic analysis indicates that the level of $PM_{2.5}$ reduction does not justify the use of a diesel particulate filter based on the excessive cost per ton of $PM_{2.5}$ removed per year.

GVEA proposes the following as BACT for $PM_{2.5}$ emissions from the large diesel-fired engine:

(a) $PM_{2.5}$ emissions from EU 7 shall be controlled by operating with positive crankcase ventilation;

(b) Maintaining good combustion practices;

(c) $PM_{2.5}$ emissions from EU 7 shall be controlled by limiting operation to no more than 52 hours per 12 month rolling period; and

(d) $PM_{2.5}$ emissions from EU 7 shall not exceed 0.0022 lb/hp-hr[7] over a 4-hour averaging period.

Department Evaluation of BACT for $PM_{2.5}$ Emissions from the Large Diesel-Fired Engine
The Department reviewed GVEA's proposal for the large diesel-fired engine and finds that installing a diesel particulate filter is an economically infeasible control technology. The Department does not agree with some of the assumptions provided in GVEA's cost analysis that

[7] Emissions Inventory Data: http://dec.alaska.gov/Applications/Air/airtoolsweb/PointSourceEmissionInventory/XmlInventory?reportingYear=2017&organizationKey=10&facilityKey=110&addEmissionUnits=0&addReleasePoints=0

cause an overestimation of the cost effectiveness. However, since EU 7 is limited to 52 hours per year, the Department finds it unnecessary to revise the cost analysis as a decrease in 0.03 tpy of $PM_{2.5}$ from EU 7 will not be cost effective for installing a diesel particulate filter.

Step 5 - Selection of $PM_{2.5}$ BACT for the Large Diesel-fired Engine
The Department's finding is that the BACT for $PM_{2.5}$ emissions from the large diesel-fired engine is as follows:

(a) $PM_{2.5}$ emissions from EU 7 shall be controlled by operating with positive crankcase ventilation;
(b) $PM_{2.5}$ emissions from EU 7 shall be controlled by limiting operation to no more than 52 hours per 12 month rolling period;
(c) Maintain good combustion practices by following the manufacturer's operating and maintenance procedures at all times of operation; and
(d) $PM_{2.5}$ emissions from EU 7 shall not exceed 0.32 g/hp-hr[8] over a 3-hour averaging period.

Table 4-7 lists the proposed $PM_{2.5}$ BACT determination for the facility along with those for other diesel-fired engines rated at more than 500 hp located in the Serious $PM_{2.5}$ nonattainment area.

Table 4-7. Comparison of $PM_{2.5}$ BACT for the Large Engines at Nearby Power Plants

Facility	Process Description	Capacity	Limitation	Control Method
UAF	Large Diesel-Fired Engine	**> 500 hp**	0.05 – 0.32 g/hp-hr (3-hour averaging period)	Positive Crankcase Ventilation Limited Operation Ultra-Low Sulfur Diesel
Fort Wainwright	8 Large Diesel-Fired Engines	> 500 hp	0.15 – 10.9 g/hp-hr (3-hour averaging period)	Limited Operation Ultra-Low Sulfur Diesel Federal Emission Standards Good Combustion Practices
GVEA North Pole	Large Diesel-Fired Engine	600 hp	0.32 g/hp-hr (3-hour averaging period)	Positive Crankcase Ventilation Limited Operation Good Combustion Practices
GVEA Zehnder	2 Large Diesel-Fired Engines	11,000 hp (each)	0.32 g/hp-hr (3-hour averaging period)	Limited Operation Good Combustion Practices

4.5 $PM_{2.5}$ BACT for the Propane-Fired Boilers (EUs 11 and 12)

Possible $PM_{2.5}$ emission control technologies for the propane-fired boilers were obtained from the RBLC. The RBLC was searched for all determinations in the last 10 years under the process code 13.310, Gas-Fired Boilers (<100 MMBtu/hr). The search results for gas-fired boilers are summarized in Table 4-8.

Table 4-8. RBLC Summary of $PM_{2.5}$ Control for Gas-Fired Boilers

[8] Table 3.4-1 of US EPA's AP-42 Emission Factors (PM). https://www3.epa.gov/ttn/chief/ap42/ch03/final/c03s04.pdf.

Control Technology	Number of Determinations	Emission Limits (lb/MMBtu)
Good Combustion Practices	49	0.0019 – 0.0095
Electrostatic Precipitator	3	0.015 – 0.032

RBLC Review
A review of similar units in the RBLC indicates that good combustion practices and electrostatic precipitators are the principal $PM_{2.5}$ control technology determined for propane-fired boilers. The lowest $PM_{2.5}$ emission rate listed in the RBLC is 0.0019 lb/MMBtu.

Step 1 - Identification of $PM_{2.5}$ Control Technology for the Propane-Fired Boilers
From research, the Department identified the following technologies as available for control of $PM_{2.5}$ emissions from propane-fired boilers:

(a) Low Sulfur Fuel
The boilers (EUs 11 and 12) are fired using propane, which is an inherently low sulfur fuel. Condition 11 of AQ0110TVP03 limits the sulfur content of the propane combusted in the boilers to 120 ppmv. Recent tests indicate that the propane fired in the boilers contains less than 3 ppm H_2S as determined by the length-of-stain methodology. The Department considers low sulfur fuel a technically feasible control technology for the propane-fired boilers.

(b) Flue Gas Recirculation
Flue gas recirculation (FGR) involves recycling a portion of the combustion gases from the stack to the boiler combustion air intake. The combustion products are low in oxygen, and when mixed with the combustion air, lower the overall excess oxygen concentration. This process acts as a heat sink to lower the peak flame temperature as well as the residence time at peak flame temperature. These effects work together to limit thermal NOx formation. FGR also increases the amount of combustion, which lowers PM emissions. The Department considers FGR to be a technically feasible control technology for the propane-fired boilers.

(c) Baghouse
Baghouses are comprised of an array of filter bags contained in housing. Air passes through the filter media from the "dirty" to the "clean" side of the bag. These devices undergo periodic bag cleaning based on the build-up of filtered material on the bag as measured by pressure drop across the device. The cleaning cycle is set to allow operation within a range of design pressure drop. Baghouses are characterized by the type of cleaning cycle - mechanical-shaker, pulse-jet, and reverse-air. Fabric filter systems have control efficiencies of 95% to 99.9% [9] and are generally specified to meet a discharge concentration of filterable particulate (e.g., 0.01 grains per dry standard cubic feet). The only entry for a baghouse in the RBLC was for a 30 MMBtu/hr furnace for glass melting at an insulation manufacturing facility and the unit is subject to the PM emission standards under 40 C.F.R. 63 Subpart NNN. EUs 11 and 12 are much smaller units at 5 MMBtu/hr, are used for providing space heating, and have a much lower working

[9] https://www3.epa.gov/ttn/catc/dir1/ff-shaker.pdf
https://www3.epa.gov/ttn/catc/dir1/ff-pulse.pdf
https://www3.epa.gov/ttn/catc/dir1/ff-revar.pdf

temperature. Due to the differences in size, purpose, and operating temperatures, the Department does not consider a baghouse a technically feasible control technology for the propane-fired boilers.

(d) Limited Operation
Limiting the operation of emission units reduces the potential to emit for those units. EUs 11 and 12 are the only sources of heat for the North Pole Power Plant. Therefore, it is not appropriate to limit the operation of these units. The Department does not consider the use of limited operation a technically feasible control technology for the propane-fired boilers.

(e) Good Combustion Practices
The theory of GCPs was discussed in detail in the $PM_{2.5}$ BACT section for the fuel oil-fired simple cycle gas turbines and will not be repeated here. Proper management of the combustion process will result in a reduction of $PM_{2.5}$ emissions. The Department considers GCPs a technically feasible control technology for the propane-fired boiler.

Step 2 - Eliminate Technically Infeasible $PM_{2.5}$ technologies for the Propane-Fired Boilers
As explained in Step 1 of Section 4.5, the Department does not consider a baghouse and limited operation as technically feasible $PM_{2.5}$ control technologies. Flue gas recirculation is not recommended by the vendor as a control technology for EUs 11 and 12, and therefore is not considered a technically feasible control technology.

Step 3 - Rank the Remaining $PM_{2.5}$ Control Technologies for the Propane-Fired Boilers
GVEA has accepted the only technically feasible control technology for EUs 11 and 12. Therefore, ranking is not required.

Step 4 - Evaluate the Most Effective Controls

GVEA BACT Proposal

GVEA proposes the following as BACT for the propane-fired boilers:

(a) Burn low sulfur fuel in EUs 11 and 12;

(b) $PM_{2.5}$ emissions from EUs 11 and 12 shall not exceed 0.7 lb/1000 gal over a 4-hour averaging period; and

Department Evaluation of BACT for $PM_{2.5}$ Emissions from the Propane-Fired Boilers
The Department reviewed GVEA's proposal for EUs 11 and 12 and finds that an emission rate achievable with good combustion practices is also BACT for the propane-fired boilers.

Step 5 - Selection of $PM_{2.5}$ BACT for the Propane-Fired Boilers
The Department's finding is that BACT for $PM_{2.5}$ emissions from the propane-fired boilers is as follows:

(a) Burn only propane as fuel in EUs 11 and 12;

(b) $PM_{2.5}$ emissions from the operation of the propane-fired boilers shall be controlled with good combustion practices; and

(c) $PM_{2.5}$ emissions from EUs 11 and 12 shall not exceed 0.008 lb/MMBtu[10] over a 3-hour averaging period.

5. BACT DETERMINATION FOR SO_2

The Department based its SO_2 assessment on BACT determinations found in the RBLC, internet research, and BACT analyses submitted to the Department by GVEA for the North Pole Power Plant and Zehnder Facility, Aurora for the Chena Power Plant, US Army for Fort Wainwright, and UAF for the University of Alaska Fairbanks Campus.

5.1 SO_2 BACT for the Fuel Oil-Fired Simple Cycle Gas Turbines (EUs 1 and 2)

Possible SO_2 emission control technologies for the fuel oil-fired simple cycle gas turbines were obtained from the RBLC. The RBLC was searched for all determinations in the last 10 years under the process code 15.190 for Simple Cycle Gas Turbines (rated at 25 MW or more) The search results for simple cycle gas turbines are summarized in Table 5-1.

Table 5-1. RBLC Summary of SO_2 Controls for Fuel Oil-Fired Simple Cycle Gas Turbines

Control Technology	Number of Determinations	Emission Limits	
Ultra-Low Sulfur Diesel	7	0.0015	% S by wt.
Fuel Oil (0.05 % S by wt.)	2	0.0026 – 0.055	lb/MMBtu
Good Combustion Practices	3	0.6	lb/hr

RBLC Review

A review of similar units in the RBLC indicates that limiting the sulfur content of fuel and good combustion practices are the principal SO_2 control technologies determined as BACT for fuel oil-fired simple cycle gas turbines. The lowest SO_2 emission rate listed in the RBLC is combustion of ULSD at 0.0015 % S by wt.

Step 1 - Identification of SO_2 Control Technology for the Simple Cycle Gas Turbines

From research, the Department identified the following technologies as available for control of SO_2 emissions from fuel oil-fired simple cycle gas turbines rated at 25 MW or greater:

(a) Ultra Low Sulfur Diesel (ULSD)
ULSD has a fuel sulfur content of 0.0015 percent sulfur by weight or less. Using ULSD would reduce SO_2 emissions because the fuel oil-fired simple cycle gas turbines are combusting standard diesel that has a sulfur content of up to 0.5 percent sulfur by weight. Switching to ULSD could reach a greater than 99 percent decrease in SO_2 emissions from the fuel oil-fired simple cycle gas turbines. The Department considers ULSD a technically feasible control technology for the fuel oil-fired simple cycle gas turbines.

(b) Low Sulfur Fuel (No. 1 Fuel Oil)
No. 1 fuel oil has a sulfur content of approximately 0.1 percent sulfur by weight. Using No. 1 fuel oil would reduce SO_2 emissions because the fuel oil-fired simple cycle gas turbines are allowed to combust standard No. 2 fuel oil that has a sulfur content of up to 0.5 percent sulfur by weight. Switching to No. 1 fuel oil could reach an 80 percent

[10] Emission factor derived from AP-42 Table 1.5-1 for propane-fired boilers (0.7 lb/1,000 gal) converted to lb/MMbtu.

decrease in SO_2 emissions from the fuel oil-fired simple cycle gas turbines during non-startup operation. The Department considers No. 1 fuel oil a technically feasible control technology for the fuel oil-fired simple cycle gas turbines.

(c) Limited Operation
Limiting the operation of emissions units reduces the potential to emit of those units. Due to EUs 1 and 2 currently operating under limits, the Department considers limited operation a technically feasible control technology for the fuel oil-fired simple cycle gas turbines.

(d) Good Combustion Practices
The theory of GCPs was discussed in detail in the $PM_{2.5}$ BACT section for the fuel oil-fired simple cycle gas turbines and will not be repeated here. Proper management of the combustion process will result in a reduction of SO_2. The Department considers GCPs a technically feasible control technology for the fuel oil-fired simple cycle gas turbines.

Step 2 - Eliminate Technically Infeasible SO_2 Technologies for the Simple Cycle Gas Turbines
All control technologies identified are technically feasible for the fuel oil-fired simple cycle gas turbines.

Step 3 - Rank the Remaining SO_2 Control Technologies for the Simple Cycle Gas Turbines
The following control technologies have been identified and ranked for control of SO_2 from the fuel oil-fired simple cycle gas turbines:

(a)	Ultra Low Sulfur Diesel	(99.7% Control)
(b)	Low Sulfur Fuel (No. 1 Fuel Oil)	(80% Control)
(d)	Good Combustion Practices	(Less than 40% Control)
(c)	Limited Operation	(0% Control)

Control technologies already in practice at the stationary source or included in the design of the EU are considered 0% control for the purpose of the SIP BACT for existing stationary sources.

Step 4 - Evaluate the Most Effective Controls

GVEA BACT Proposal

GVEA provided an economic analysis for switching the fuel combusted in the simple cycle gas turbines to ultra-low sulfur diesel. A summary of the analyses for each of EUs 1 and 2 is shown below:

Table 5-2. GVEA Economic Analysis for Technically Feasible SO_2 Controls for EU 1

Control Alternative	Potential to Emit (tpy)	Emission Reduction (tpy)	Total Capital Investment ($)	Total Annualized Costs ($/year)	Cost Effectiveness ($/ton)
ULSD (0.0015 % S wt.)	1,486.4	1,481.9	$21,750,638	$20,661,330	$13,942
Capital Recovery Factor = 0.0944 (7% interest rate for a 20 year equipment life)					

Table 5-3. GVEA Economic Analysis for Technically Feasible SO_2 Controls for EU 2

Control Alternative	Potential to Emit (tpy)	Emission Reduction (tpy)	Total Capital Investment ($)	Total Annualized Costs ($/year)	Cost Effectiveness ($/ton)
ULSD (0.0015 % S wt.)	1,356.1	1,352.0	$8,674,362	$18,978,063	$14,037
Capital Recovery Factor = 0.0944 (7% interest rate for a 20 year equipment life)					

GVEA contends that the economic analysis indicates the level of SO_2 reduction does not justify the fuel switch to ULSD or Low Sulfur Fuel in the simple cycle turbines based on the excessive cost per ton of SO_2 removed per year.

GVEA proposes the following as BACT for SO_2 emissions from the simple cycle gas turbines:

(a) SO_2 emissions from the fuel oil-fired simple cycle gas turbines will be controlled by complying with NOx limits for EUs 1 and 2 listed in Operating Permit AQ0110TVP03 Conditions 13 and 12, respectively;

(b) SO_2 emissions from the fuel oil-fired simple cycle gas turbines will be limited by maintain good combustion practices; and

(c) Restricting the sulfur content to 500 ppm in fuel.

Department Evaluation of BACT for SO_2 Emissions from the Simple Cycle Gas Turbines

The Department revised the cost analyses provided by GVEA for the fuel switch to ULSD in the simple cycle gas turbines using an interest rate of 8.5% (current bank prime interest rate), a 30-year equipment life, and a cost range for switching from No. 2 fuel oil to ULSD of $0.185/gallon to $0.424/gallon at the North Pole Power Plant based on updated data provided by GVEA. This includes the average price per gallon difference of $0.424/gallon covering the period from January 2017 through October 2018 that was used in the Department's previous analysis, as well as an average price per gallon difference of $0.185/gallon for September 2019 through October 2020, and $0.358 for October 2021 through April 2023. Additionally, the Department reviewed the cost information provided by GVEA to appropriately evaluate the total capital investment of installing two new 1.5-million-gallon ULSD storage tanks at GVEA's North Pole Power Plant. A summary of these analyses is shown in Table 5-4 and Table 5-5.

Table 5-4. Department Economic Analysis for Technically Feasible SO_2 Controls for EU 1

Control Alternative	Potential to Emit (tpy)	Emission Reduction (tpy)	Total Capital Investment ($)	Total Annualized Costs ($/year)	Cost Effectiveness ($/ton)
ULSD	1,486.4	1481.9	10,875,319	9,824,223 – 20,646,731	6,629 – 13,932
Capital Recovery Factor = 0.0931 (8.5% interest rate for a 30-year equipment life)					

Table 5-5. Department Economic Analysis for Technically Feasible SO_2 Controls for EU 2

Control Alternative	Potential to Emit (tpy)	Emission Reduction (tpy)	Total Capital Investment ($)	Total Annualized Costs ($/year)	Cost Effectiveness ($/ton)
ULSD	1,356.1	1,352.0	10,875,319	9,089,779 – 18,963,464	6,723 – 14,026
Capital Recovery Factor = **0.0931 (8.5%** interest rate for a 30-year equipment life)					

The Department's economic analysis indicates the level of SO_2 reduction justifies the use of ULSD as BACT for the fuel oil-fired simple cycle gas turbines located in the Serious $PM_{2.5}$ nonattainment area.

Step 5 - Selection of SO_2 BACT for the Simple Cycle Gas Turbines

The Department's finding is that BACT for SO_2 emissions from the fuel oil-fired simple cycle gas turbines is as follows:

(a) SO_2 emissions from EUs 1 and 2 shall be controlled by limiting the sulfur content of fuel combusted in the turbines to no more than 0.0015 percent by weight; and

(b) Maintain good combustion practices by following the manufacturer's operating and maintenance procedures at all times of operation.

Table 5-6 lists the proposed SO_2 BACT determination for this facility along with those for other fuel oil-fired simple cycle gas turbines located in the Serious $PM_{2.5}$ nonattainment area.

Table 5-6. Comparison of SO_2 BACT for Simple Cycle Gas Turbines at Nearby Power Plants

Facility	Process Description	Capacity	Limitation	Control Method
GVEA – North Pole	Two Fuel Oil-Fired Simple Cycle Gas Turbines	1,344 MMBtu/hr	0.0015 % S wt.	ULSD Good Combustion Practices
GVEA – Zehnder	Two Fuel Oil-Fired Simple Cycle Gas Turbines	536 MMBtu/hr	0.0015 % S wt.	ULSD Good Combustion Practices

5.2 SO_2 BACT for the Fuel Oil-Fired Combined Cycle Gas Turbines (EUs 5 and 6)

Possible SO_2 emission control technologies for the fuel oil-fired combined cycle gas turbines were obtained from the RBLC. The RBLC was searched for all determinations in the last 10 years under the process code 15.290 for Liquid Fuel-Fired Combined Cycle Gas Turbines rated at 25 MW or more. The search results for combined cycle gas turbines are summarized in Table 5-7.

Table 5-7. RBLC Summary of SO_2 Control for Oil-Fired Combined Cycle Gas Turbines

Control Technology	Number of Determinations	Emission Limits
Ultra-Low Sulfur Diesel	1	6.7 lb/hr

RBLC Review
A review of similar units in the RBLC indicates combustion of ultra-low sulfur diesel is the principal SO_2 control technology installed on fuel oil-fired combined cycle gas turbines. The SO_2 emission rate listed in the RBLC is 6.7 lb/hr.

Step 1 - Identification of SO_2 Control Technology for the Combined Cycle Gas Turbines
From research, the Department identified the following technologies as available for the control of SO_2 emissions from the fuel oil-fired combined cycle gas turbines:

(a) Ultra-Low Sulfur Diesel
The theory of ULSD was discussed in detail in the SO_2 BACT for the fuel oil-fired simple cycle turbines and will not be repeated here. The Department considers ULSD a technically feasible control technology for the fuel oil-fired combined cycle gas turbines.

(b) Light Straight Run Turbine Fuel (LSR)
EU 5 typically combusts LSR when not in startup. EU 6 will also combust LSR when not in startup when installed. The sulfur content of the LSR is limited to no more than 0.05 percent by weight as required by Condition 15.1 of Operating Report AQ0110TVP03. The Department considers operating LSR a technically feasible control technology for the fuel oil-fired combined cycle gas turbines.

(c) Low Sulfur Fuel
The theory of low sulfur fuel was discussed in detail in the SO_2 BACT for the fuel oil-fired simple cycle turbines and will not be repeated here. The Department considers low sulfur fuel a technically feasible control technology for the fuel oil-fired combined cycle gas turbines.

(d) Limited Operation
Limiting the operation of emissions units reduces the potential to emit of those units. Due to EUs 5 and 6 currently operating under limits, the Department considers limited operation a technically feasible control technology for the fuel oil-fired simple cycle gas turbines.

(e) Good Combustion Practices
The theory of GCPs was discussed in detail in the $PM_{2.5}$ BACT section for the fuel oil-fired combined cycle gas turbines and will not be repeated here. Proper management of the combustion process will result in a reduction of SO_2 emissions. The Department considers GCPs a technically feasible control technology for the fuel oil-fired combined cycle gas turbines.

Step 2 - Eliminate Technically Infeasible SO_2 Technologies for the Combined Cycle Gas Turbines
All control technologies identified are technically feasible for the fuel oil-fired combined cycle gas turbines.

Step 3 - Rank the Remaining SO_2 Control Technologies for the Combined Cycle Gas Turbines
The following control technologies have been identified and ranked by efficiency for control of SO_2 emissions from the fuel oil-fired combined cycle gas turbines:

(a) Ultra-Low Sulfur Diesel (50% Control)
(e) Good Combustion Practices (Less than 40% Control)
(b) Light Straight Run Turbine Fuel (0% Control)
(d) Limited Operation (0% Control)
(c) Low Sulfur Fuel (0% Control)

Control technologies already in practice at the stationary source or included in the design of the EU are considered 0% control for the purpose of the SIP BACT for existing stationary sources.

Low sulfur fuel is listed as 0% control as it has the same fuel sulfur content requirements as the light straight run turbine fuel that is currently combusted in the fuel oil-fired combined cycle gas turbines.

Step 4 - Evaluate the Most Effective Controls

GVEA BACT Proposal

GVEA provided an economic analysis for switching the fuel combusted in the combined cycle gas turbines to ultra-low sulfur diesel. A summary of the analyses for EUs 5 and 6 is shown below:

Table 5-8. GVEA Economic Analysis for Technically Feasible SO_2 Control for EUs 5 and 6

Control Alternative	Potential to Emit (tpy)	Emission Reduction (tpy)	Total Capital Investment ($)	Total Annualized Costs ($/year)	Cost Effectiveness ($/ton)
ULSD	6.0	3.0	--	$34,247,220	$11,415,740
Capital Recovery Factor = 0.1424 (7% interest rate for a 10 year equipment life)					

GVEA contends that the economic analysis indicates the level of SO_2 reduction does not justify the use of ULSD or low sulfur fuel based on the excessive cost per ton of SO_2 removed per year.

GVEA proposes the following as BACT for SO_2 emissions from the combined cycle gas turbines:

(a) SO_2 emissions from EUs 5 and 6 shall combust Light Straight Run Turbine Fuel (30 ppm S in fuel)

Department Evaluation of BACT for SO_2 Emissions from the Combined Cycle Gas Turbines

The Department revised the cost analysis provided for the fuel switch to ULSD in the combined cycle gas turbines by splitting apart normal operations which consume LSR with a maximum sulfur content of 0.005 % by weight, and startup operations which already use ULSD, the top SO_2 control, and therefore do not require an economic analysis. For normal operations, the Department used data provided by GVEA for the difference in the average fuel cost between ULSD and LSR Naphtha delivered to the North Pole Power Plant between January 2017 through October 2018 ($1.117/gallon) and January 2019 through October 2020 ($0.588/gal). Since there is no capital cost involved with the fuel switch to ULSD, the only value driving the cost for the evaluation was the cost difference in the fuel prices between the fuel types which is shown as a range. A summary of the analysis for the two turbines under normal operations is shown in Table 5-9:

Table 5-9. Department Economic Analysis for Technically Feasible SO_2 Controls for Turbines Under Normal Operations

Control Alternative	Potential to Emit (tpy)	Emission Reduction (tpy)	Total Capital Investment ($)	Total Annualized Costs ($/year)	Cost Effectiveness ($/ton)
ULSD	9.5	6.7	--	17,085,516 – 32,456,669	2,559,025 – 4,861,277
Capital Recovery Factor = 0.0931 (8.5% interest rate for a 30-year equipment life)					

The Department's economic analysis indicates the level of SO_2 reduction does not justify the use of ULSD as BACT during normal operations for the fuel oil-fired combined cycle gas turbines located in the Serious $PM_{2.5}$ nonattainment area. However, the Department notes that according to assessable emissions data submitted to the Department by GVEA, EU 5 (currently the only installed EU in the group) has already been combusting ULSD exclusively during startup for at least the past 5 calendar years (2023-2019).

Step 5 - Selection of SO_2 BACT for the Combined Cycle Gas Turbines

The Department's finding is that BACT for SO_2 emissions from the fuel oil-fired combined cycle gas turbines is as follows:

(a) Except during startup, SO_2 emissions from EUs 5 and 6 shall be controlled by limiting the fuel combusted in the turbines to light straight run turbine fuel (50 ppmw S in fuel);

(b) During startup, SO_2 emission from EUs 5 and 6 shall be controlled by limiting the sulfur content of fuel combusted in the turbines to no more than 0.0015 percent by weight (ULSD); and

(c) Maintain good combustion practices by following the manufacturer's operating and maintenance procedures at all times of operation.

5.3 SO_2 BACT for the Large Diesel-Fired Engine (EU 7)

Possible SO_2 emission control technologies for large engines were obtained from the RBLC. The RBLC was searched for all determinations in the last 10 years under the process codes 17.100 to

17.190, Large Internal Combustion Engines (>500 hp). The search results for large diesel-fired engines are summarized in Table 5-10.

Table 5-10. RBLC Summary Results for SO_2 Control for Large Diesel-Fired Engines

Control Technology	Number of Determinations	Emission Limits (g/hp-hr)
Low Sulfur Diesel	27	0.005 – 0.02
Federal Emission Standards	6	0.001 – 0.005
Limited Operation	6	0.005 – 0.006
Good Combustion Practices	3	None Specified
No Control Specified	11	0.005 – 0.008

RBLC Review
A review of similar units in the RBLC indicates combustion of low sulfur fuel, limited operation, good combustion practices, and compliance with the federal emission standards are the principal SO_2 control technologies installed on large diesel-fired engines. The lowest SO_2 emission rate listed in the RBLC is 0.001 g/hp-hr.

Step 1 - Identification of SO_2 Control Technology for the Large Diesel-Fired Engine
From research, the Department identified the following technologies as available for control of SO_2 emissions from diesel-fired engines rated at 500 hp or greater:

(a) Ultra-Low Sulfur Diesel
The theory of ULSD was discussed in detail in the SO_2 BACT for the fuel oil-fired simple cycle gas turbines and will not be repeated here. The Department considers ULSD a technically feasible control technology for the large diesel-fired engine.

(b) Federal Emission Standards
The theory of federal emission standards was discussed in detail in the $PM_{2.5}$ BACT section for the large diesel-fired engine and will not be repeated here. The Department does not consider federal emission standards a feasible control technology for the large diesel-fired engine.

(c) Limited Operation
Limiting the operation of emissions units reduces the potential to emit of those units. The Department considers limited operation as a technically feasible control technology for the large diesel-fired engine.

(d) Good Combustion Practices
The theory of GCPs was discussed in detail in the $PM_{2.5}$ BACT section for the fuel oil-fired simple cycle turbines and will not be repeated here. Proper management of the combustion process will result in a reduction of NOx emissions. The Department considers GCPs a technically feasible control technology for the large diesel-fired engine.

Step 2 - Eliminate Technically Infeasible SO_2 Control Technologies for the Large Engine
As explained in Step 1 of Section 5.3, the Department does not consider federal emission standards a technically feasible control technology to control SO_2 emissions from the large diesel-fired engine.

Step 3 - Rank the Remaining SO_2 Control Technologies for the Large Diesel-Fired Engine
The following control technologies have been identified and ranked by efficiency for the control of SO_2 emissions from the large diesel-fired engine:

(a) Ultra-Low Sulfur Diesel (99% Control)
(d) Good Combustion Practices (Less than 40% Control)
(c) Limited Operation (0% Control)

Control technologies already in practice at the stationary source or included in the design of the EU are considered 0% control for the purpose of the SIP BACT for existing stationary sources.

Step 4 - Evaluate the Most Effective Controls

GVEA BACT Proposal

GVEA provided an economic analysis of the control technologies available for the large diesel-fired engine to demonstrate that the use of ULSD with limited operation is not economically feasible on these units. A summary of the analysis for EU 7 is shown below:

Table 5-11. GVEA Economic Analysis for Technically Feasible SO_2 Controls

Control Alternative	Potential to Emit (tpy)	Emission Reduction (tpy)	Total Capital Investment ($)	Total Annualized Costs ($/year)	Cost Effectiveness ($/ton)
ULSD	0.01005	0.0099	--	$444	$45,072
Capital Recovery Factor = 0.1424 (7% interest rate for a 10 year equipment life)					

GVEA contends that the economic analysis indicates the level of SO_2 reduction does not justify the use of ULSD based on the excessive cost per ton of SO_2 removed per year.

GVEA proposed the following as BACT for SO_2 emissions from the diesel-fired engine:

(a) SO_2 emissions from the large diesel-fired engine shall not exceed 0.05 weight percent sulfur; and

(b) Maintain good combustion practices.

Department Evaluation of BACT for SO_2 Emissions from the Large Diesel-Fired Engine

The Department reviewed GVEA's proposal for the large diesel-fired engine and revised the cost analysis for the fuel switch to ULSD. The Department used the difference in the average fuel cost between ULSD versus No. 1 fuel oil delivered to the North Pole Power Plant between January 2019 through October 2020, of $0.223/gallon and between October 2021 and April 2023, of $0.651/gallon. For baseline emissions, the Department used the existing fuel sulfur limit of 0.1 percent by weight contained in Condition 5 of Construction Permit AQ0110CPT01, March

3, 2006 (incorporated into Operating Permit AQ0110TVP04 Rev. 1 as Condition 15), as well as the existing 52-hour yearly limit from Conditions 6 and 15 of the construction and operating permit, respectively. Since there is no capital cost involved with the fuel switch from fuel oil with a sulfur content of 0.1 percent by weight to ULSD, the only value driving the cost for the evaluation was the yearly cost difference in the fuel prices between the two fuel types. A summary of the analysis for the large diesel-fired engine is shown below in Table 5-12.

Table 5-12. Department Economic Analysis for Technically Feasible SO_2 Controls

Control Alternative	Potential to Emit (tpy)	Emission Reduction (tpy)	Total Capital Investment ($)	Total Annualized Costs ($/year)	Cost Effectiveness ($/ton)
ULSD	0.0118	0.0116	--	444 – 1,083	38,150 – 93,086
Capital Recovery Factor = 0.0931 (8.5% interest rate for a 30-year equipment life)					

The Department's economic analysis indicates the level of SO_2 reduction does not justify the use of ULSD as BACT for the large diesel fired engine located in the Serious $PM_{2.5}$ nonattainment area.

Step 5 - Selection of SO_2 BACT for the Large Diesel-Fired Engine

The Department's finding is that the BACT for SO_2 emissions from the diesel-fired engine is as follows:

(a) SO_2 emissions from EU 7 shall be controlled by combusting fuel that does not exceed 0.05 weight percent sulfur (500 ppmw) at all times the unit is in operation;

(b) SO_2 emissions from EU 7 shall be controlled by limiting operation to no more than 52 hours per 12 month rolling period; and

(d) Maintain good combustion practices by following the manufacturer's maintenance procedures at all times of operation.

The following table lists the proposed BACT determination for this facility along with those for other diesel-fired engines rated at more than 500 hp in the Serious $PM_{2.5}$ nonattainment area.

Table 5-13. Comparison of SO_2 BACT for Large Diesel-Fired Engines at Nearby Power Plants

Facility	Process Description	Capacity	Limitation	Control Method
Fort Wainwright	8 Large Diesel-Fired Engines	> 500 hp	15 ppmw S in fuel	Limited Operation Good Combustion Practices Ultra-Low Sulfur Diesel
UAF	Large Diesel-Fired Engine	13,266 hp	15 ppmw S in fuel	Limited Operation Good Combustion Practices Ultra-Low Sulfur Diesel
GVEA North Pole	Large Diesel-Fired Engine	600 hp	500 ppmw S in fuel	Limited Operation **Low Sulfur Diesel** Good Combustion Practices

Facility	Process Description	Capacity	Limitation	Control Method
GVEA Zehnder	2 Large Diesel-Fired Engines	11,000 hp	15 ppmw S in fuel	Limited Non-Emergency Operation Good Combustion Practices Ultra-Low Sulfur Diesel

5.4 SO_2 BACT for the Propane-Fired Boilers (EUs 11 and 12)

Possible SO_2 emission control technologies for the propane-fired boilers were obtained from the RBLC. The RBLC was searched for all determinations in the last 10 years under the process code 13.310, Gas-Fired Boilers (<100 MMBtu/hr). The search results for gas-fired boilers are summarized in Table 5-14.

Table 5-14. SO_2 Control for Gas-Fired Boilers with a Rating < 100 MMBtu/hr

Control Technology	Number of Determinations	Emission Limits
Low Sulfur Fuel	6	0.03 – 0.12 lb/hr
Good Combustion Practices	4	0.0048 – 0.6 lb/MMBtu
Pipeline Quality Natural Gas	28	0.0006 – 0.0048 lb/MMBtu
No Control Specified	4	0.0021 lb/MMBtu

RBLC Review
A review of similar units in the RBLC indicates that good combustion practices and combustion of low sulfur fuel are the principal SO_2 control technologies installed on propane-fired boilers. The lowest SO_2 emission rate listed in the RBLC is 0.0006 lb/MMBtu.

Step 1 - Identification of SO_2 Control Technology for the Propane-Fired Boilers
From research, the Department identified the following technologies as available for SO_2 control for the propane-fired boilers:

(a) Low Sulfur Fuel
The theory of low sulfur fuel was discussed in detail in the $PM_{2.5}$ BACT for the propane-fired boilers and will not be repeated here. The Department considers low sulfur fuel a technically feasible control technology for the propane-fired boilers.

(b) Good Combustion Practices
The theory of GCPs was discussed in detail in the $PM_{2.5}$ BACT section for the fuel oil-fired simple cycle gas turbines and will not be repeated here. Proper management of the combustion process will result in a reduction of SO_2. The Department considers GCPs a technically feasible control technology for the propane-fired boilers.

Step 2 - Eliminate Technically Infeasible SO_2 Technologies for the Propane-Fired Boilers
All identified control devices are technically feasible technologies for the propane-fired boilers.

Step 3 - Rank the Remaining SO_2 Control Technologies for the Propane-Fired Boilers
GVEA has accepted the only technically feasible control technology for the propane-fired boilers. Therefore, ranking is not required.

Step 4 - Evaluate the Most Effective Controls

GVEA BACT Proposal

GVEA proposed the following as BACT for SO_2 emissions from the propane-fired boilers:

(a) SO_2 emissions from the operation of the propane-fired boilers shall be controlled by using low sulfur fuel at all times of operation.

(b) SO_2 emissions from the propane-fired boilers shall not exceed 0.0012 lb/kgal over a 4-hour averaging period.

Department Evaluation of BACT for SO_2 Emissions from the Propane-Fired Boilers

The Department reviewed GVEA's proposal for the propane-fired boilers and finds that the SO_2 emission rate provided by GVEA was erroneously calculated. The Department used AP-42 Table 1.5-1 emission factor for propane combustion (0.10S lb/1,000 gal, where S = gr/100 scf) and using the existing sulfur limit in Condition 11 of the stationary source's Operating Permit AQ0110TVP03 (120 ppmv) The Department corrected this emission factor to 0.75 lb/1,000 gal, assuming 16 ppmv sulfur = 1 gr/100 scf.

Step 5 - Selection of SO_2 BACT for the Propane-Fired Boilers

The Department's finding is that BACT for SO_2 emissions from the propane-fired boilers is as follows:

(a) SO_2 emissions from EUs 11 and 12 shall be controlled by only combusting gas fuel (propane) with a total sulfur content of no more than 120 ppmv, or direct emissions of 0.75 lb/1,000 gal; and

(b) Maintain good combustion practices by following the manufacturer's operating and maintenance procedures at all times of operation.

6. BACT DETERMINATION SUMMARY

Table 6-1. NOx BACT Limits

EU ID	Description	Capacity	BACT Limit	BACT Control
All	N/A	N/A	EPA approved a comprehensive precursor demonstration for NOx See details in the Section 1 Introduction	

Table 6-2. $PM_{2.5}$ BACT Limits

EU ID	Description	Capacity	BACT Limit (*)	BACT Control
1	Fuel Oil-Fired Simple Cycle Gas Turbine	672 MMBtu/hr	0.012 lb/MMBtu	Low Ash Fuel Limited Operation Good Combustion Practices
2	Fuel Oil-Fired Simple Cycle Gas Turbine	672 MMBtu/hr	0.012 lb/MMBtu	
5	Fuel Oil-Fired Combined Cycle Gas Turbine	455 MMBtu/hr	0.012 lb/MMBtu	Limited Operation Good Combustion Practices
6	Fuel Oil-Fired Combined Cycle Gas Turbine	455 MMBtu/hr	0.012 lb/MMBtu	
7	Large Diesel-Fired Engine	619 hp	0.32 g/hp-hr	Limited Operation Positive Crankcase Ventilation Good Combustion Practices
11	Propane-Fired Boiler	5.0 MMBtu/hr	0.008 lb/MMBtu	Propane as Fuel Good Combustion Practices
12	Propane-Fired Boiler	5.0 MMBtu/hr	0.008 lb/MMBtu	

(*) 3-hour average

Table 6-3. SO_2 BACT Limits

EU ID	Description	Capacity	BACT Limit	BACT Control
1	Fuel Oil-Fired Simple Cycle Gas Turbine	672 MMBtu/hr	15 ppmw S in fuel	Ultra-Low Sulfur Diesel Good Combustion Practices
2	Fuel Oil-Fired Simple Cycle Gas Turbine	672 MMBtu/hr	15 ppmw S in fuel	
5	Fuel Oil-Fired Combined Cycle Gas Turbine	455 MMBtu/hr	50 ppmw S in fuel (Normal Ops) 15 ppmw S in fuel (Start-Up)	Light Straight Run Turbine Fuel for Normal Operations ULSD for Start-Up Good Combustion Practices
6	Fuel Oil-Fired Combined Cycle Gas Turbine	455 MMBtu/hr	50 ppmw S in fuel (Normal Ops) 15 ppmw S in fuel (Start-Up)	
7	Large Diesel-Fired Engine	619 hp	500 ppmw S in fuel	Limited Operation Good Combustion Practices Low Sulfur Fuel
11	Propane-Fired Boiler	5.0 MMBtu/hr	N/A	Propane as Fuel Good Combustion Practices
12	Propane-Fired Boiler	5.0 MMBtu/hr		

Stationary Source: North Pole Power Plant

Emission Units: EU IDs 1 and 2 (672 MMBtu/hr (60.5 MW) Simple Cycle Turbines)

Pollutant of Concern: SO_2	
BACT Measure	**Monitoring, Recordkeeping and Reporting Requirements** Error! Bookmark not defined.
Combust Only Ultra Low Sulfur fuel at no more than 0.0015 percent sulfur by weight	• For each shipment of fuel, test sulfur content or keep receipts that specify fuel grade date, and quantity of fuel received. Keep records of the results of sulfur content tests and receipts for fuel shipments. • Include in each semi-annual operating report required by the Operating Permit, a summary of fuel test results or fuel grade shipping receipts received during the reporting period.
Good Combustion Practices	• Perform regular maintenance according to the manufacturer's and the operator's maintenance requirements and procedures. • Keep records of any maintenance that would have a significant effect on emissions. The records may be kept in electronic format. • Keep a copy of the manufacturer's and the operator's maintenance procedures. • Report a summary of the maintenance records. • Operate the EUs consistent with manufacturer's recommended combustion settings or those established during the source test conducted to demonstrate compliance with the BACT emissions limit.

Emission Units: EU IDs 5 and 6 (455 MMBtu/hr (43 MW) Combined Cycle Turbines)

BACT Measure	Monitoring, Recordkeeping and Reporting Requirements Error! Bookmark not defined.
Combust Only Ultra Low Sulfur fuel during startup	• For each shipment of fuel, test the sulfur content or keep receipts that specify fuel grade date, and quantity of fuel received. Keep records of the results of sulfur content tests and receipts for fuel shipments. • Include in each semi-annual operating report required by the Operating Permit, a summary of fuel test results or fuel grade shipping receipts from the reporting period.
Except during startup, limit sulfur content in fuel to 50 ppmw	• For each shipment of fuel, test the sulfur content or keep receipts that specify fuel grade and date Keep records of the results of sulfur content tests and receipts for fuel shipments. • Include in each semi-annual operating report, a summary of fuel test results or fuel grade shipping receipts from the reporting period.
Good Combustion Practices	• Perform regular maintenance according to the manufacturer's and the operator's maintenance requirements and procedures. • Keep records of any maintenance that would have a significant effect on emissions. The records may be kept in electronic format. • Keep a copy of the manufacturer's and the operator's recommended maintenance procedures. • Report a summary of the maintenance records.

Emission Unit: EU ID 7 (400 kW Emergency Diesel Engine)

Pollutant of Concern: SO_2	
BACT Measure	**Monitoring, Recordkeeping and Reporting Requirements** Error! Bookmark not defined.
Limit the sulfur content of the fuel combusted to 0.05 weight percent	• For each shipment of fuel combusted in EU ID 7, keep receipts that specify fuel grade, date, and quantity of fuel received. • Include in each semi-annual operating report required by the Operating Permit a summary of the fuel grade shipping receipts received during the reporting period.
Good Combustion Practices	• Perform records of maintenance conducted on emissions units to comply with this BACT measure. • Keep records of any maintenance that would have a significant effect on emissions. The records may be kept in electronic format. • Keep a copy of the manufacturer's and the operator's recommended maintenance procedures. • Report a summary of the maintenance that would have a significant effect on emissions in each operating report.
Limit operation to no more than 52 hours per 12 month rolling period	• Demonstrate compliance by complying with Condition 7.1b of Minor Permit AQ0110MSS01 Rev. 1.

Emission Units: EU IDs 11 and 12 (5.0 MMBtu/hr Boilers)

Pollutant of Concern: SO_2	
BACT Measure	**Monitoring, Recordkeeping and Reporting Requirements** Error! Bookmark not defined.
Combust only propane	• For each shipment of fuel, keep receipts that specify the date, type, and quantity of fuel received. Keep records of the receipts for fuel shipments. • Alternatively, conduct a stack test to directly measure SO_2 emissions and report results in lb/1,000 gal of fuel combusted. • Include in each semi-annual operating report required by the Operating Permit, a summary of the types of fuel received or shipping receipts from the reporting period.
Good Combustion Practices	• Perform regular maintenance according to the manufacturer's and the operator's maintenance requirements and procedures. • Keep records of any maintenance that would have a significant effect on emissions. The records may be kept in electronic format. • Keep a copy of the manufacturer's and the operator's maintenance procedures. • Report a summary of the maintenance records.

DEPARTMENT OF ENVIRONMENTAL CONSERVATION
AIR QUALITY CONTROL MINOR PERMIT

Minor Permit: **AQ0110MSS01 Revision 1** **Final Date – October 30, 2024**
Rescinds Permit: **AQ0110MSS01**

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

Permittee: **Golden Valley Electric Association**
PO Box 71249
Fairbanks, AK 99707

Stationary Source: **North Pole Power Plant**

Location: North Pole, Alaska
Latitude: 64.7344° North; Longitude: 147.3453° West

Project: $PM_{2.5}$ Serious Nonattainment State Implemtation Plan (SIP)

Permit Contact: Naomi Morton Knight, P.E.
907-458-4557
NMKnight@gvea.com

The Permittee submitted an application for Minor Permit AQ0110MSS01 under AS 46.14.130(c)(2) because the Department found that public health or air quality effects provided a reasonable basis to regulate the stationary source. This finding is contained in the State Air Quality Control Plan adopted on November 19, 2019.

With the issuance of AQ0110MSS01 Revision 1, The Department finds that public health or air quality effects still provide a reasonable basis to regulate the stationary source under AS 46.14.130(c)(2). This finding is contained in the State Air Quality Control Plan adopted on November 19, 2019, for the $PM_{2.5}$ Serious Nonattainment area.

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.

Conditions 6 through 6.2 and 16 through 16.4b of Construction Permit AQ0110CPT01 Rev. 1 have been adopted into this minor permit.

________________ for:______________
James R. Plosay, Manager
Air Permits Program

Table of Contents

Abbreviations and Acronyms

AAC....................Alaska Administrative Code
AAAQS ....Alaska Ambient Air Quality Standards
ADEC ....Alaska Department of Environmental Conservation
AOS ....Air Online Services
AS ....Alaska Statutes
ASTM.................American Society for Testing and Materials
BACM ....Best Available Control Measures
BACT ....Best Available Control Technology
bhp ....Brake Horsepower
CAA....................Clean Air Act
CDX....................Central Data Exchange
CEDRI ....Compliance and Emissions Data Reporting Interface
CEMS ....Continuous Emissions Monitoring System
CFR. ....Code of Federal Regulations
CMS....................Continuous Monitoring System
CO ....Carbon Monoxide
CO_2e ....CO_2-equivalent
dscf ....Dry Standard Cubic Foot
EPA ....US Environmental Protection Agency
EU.......................Emissions Unit
EU ID(s) ....Emissions Unit Identification Number(s)
GHG ....Greenhouse Gas
gph ....Gallons Per Hour
gr/dscf.................Grain per Dry Standard Cubic Foot (1 pound = 7000 grains)
GVEA ....Golden Valley Electric Association
HAPs ....Hazardous Air Pollutants [as defined in AS 46.14.990]
hp ....Horsepower
kW ....Kilowatt
LAER..................Lowest Achievable Emission Rate
MACT ....Maximum Achievable Control Technology [as defined in 40 C.F.R. 63]
MMBtu/hr...........Million British Thermal Units per Hour
MMscf ....Million Standard Cubic Feet
MR&R ....Monitoring, Recordkeeping, and Reporting
NA ....Not Applicable
NAICS ....North American Industrial Classification System
NESHAPs............National Emission Standards for Hazardous Air Pollutants [as contained in 40 C.F.R. 61 and 63]
NH_3.......................Ammonia
NOx ....Nitrogen Oxides
NSPS ....New Source Performance Standards [as contained in 40 C.F.R. 60]
O_2..........................Oxygen
ORL......................Owner Requested Limit
PAL ....Plantwide Applicability Limitation
Pb..........................Lead
$PM_{2.5}$.....................Particulate Matter [2.5 nominal microns or less in diameter]
PM_{10} ....Particulate Matter [10 nominal microns or less in diameter]
ppm ....Parts Per Million
ppmv, ppmvd........Parts Per Million by Volume on a Dry Basis
ppmw ……………Parts Per Million by Weight
psia ....Pounds per Square Inch (Absolute)
PSD ....Prevention of Significant Deterioration
PTE.......................Potential To Emit
SIC........................Standard Industrial Classification
SIP ....State Implementation Plan
SO_2 ....Sulfur Dioxide
SPC.......................Standard Permit Condition or Standard Operating Permit Condition
TPY ....Tons Per Year
ULSD ....Ultra-Low Sulfur Diesel
VOC ....Volatile Organic Compound [as defined in 40 C.F.R. 51.100(s)]
VOL......................Volatile Organic Liquid [as defined in 40 C.F.R. 60.111b, Subpart Kb]
vol% ....Volume Percent
wt% ....Weight Percent
$wt\%S_{fuel}$ ....Weight Percent of Sulfur in Fuel

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	Emissions Unit Name	Emissions Unit Description	Fuel	Rating/Size	Installation or Construction Date
1	GT#1	GE Frame 7, Series 7001 Regenerative Gas Turbine	Fuel Oil	672 MMBtu/hr (60.5 MW)	1976
2	GT#2	GE Frame 7, Series 7001 Regenerative Gas Turbine	Fuel Oil	672 MMBtu/hr (60.5 MW)	1977
5	GT#3	GE LM6000PC Gas Turbine (water injection for NO_x control) (oxidation catalyst for CO control)	Naphtha/LSR Jet A	455 MMBtu/hr (43 MW, nominal)	2005
6	GT#4	GE LM6000PC Gas Turbine (water injection for NO_x control) (oxidation catalyst for CO control)	Naphtha/LSR Jet A	455 MMBtu/hr (43 MW, nominal)	Not Installed
7	Emergency Generator	Mitsubishi Engine #0A8829 (Generac Gen Set #5231150100)	Fuel Oil	565 hp	2005
11	Building Boiler	Bryan Steam RV500 Boiler	Propane	5.0 MMBtu/hr	2005
12	Building Boiler	Bryan Steam RV500 Boiler	Propane	5.0 MMBtu/hr	2005

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**.**

Section 3 State Implementation Plan (SIP) Requirements

Fairbanks $PM_{2.5}$ Serious Nonattainment Area SIP Requirements

5. **Simple Cycle Turbine Emissions Limit.** The Permittee shall limit the emissions form the simple cycle gas tubrine EU IDs 1 and 2 as specified in Table 2.

Table 2 - EU IDs 1 and 2 SIP BACT Limits

Pollutant	BACT Control	Fuel Type	BACT Emissions Limit
$PM_{2.5}$	Good Combustion Practices and Limited Operation	Low Ash (Distillate) Fuel	0.012 lb/MMBtu (3-hour average)

5.1 For EU IDs 1 and 2, the Permittee shall:

a. Conduct an initial source test on either EU ID 1 or 2 in accordance with Section 6, within 12 months of permit issuance, to demonstrate compliance with the $PM_{2.5}$ emissions limit listed in Table 2.

(i) Conduct the source test, in accordance with the procedures specified in 40 CFR 51, Appendix M, Method 201A and, if applicable, Method 202 as provided in Method 201A, for at least three loads representative of the normal operating range of the EU. The Permittee may perform testing at the highest achievable load point, if at least 75 percent of peak load cannot be achieved in practice.

(ii) Emission results shall be reported as the arithmetic 3-hour average of all valid test runs and shall be in units of lb/MMBtu.

(iii) The Permittee shall report the results of the source test in accordance with Condition 27.

(iv) Include the following in the next operating report in accordance with Condition 12, that is due after the submittal date of the initial source test report:

(A) a summary of the source test results; and

(B) relevant combustion settings (including but not limited to average CO and O_2 concentrations in the flue gas) established during the source test that demonstrates compliance with the BACT $PM_{2.5}$ emissions limit in Table 2.

b. Report the compliance status with the $PM_{2.5}$ emissions limit in Table 2 in accordance with each annual compliance certification described in Condition 13.

c. Combust only low ash (distillate) fuel.

(i) For each shipment of fuel, keep receipts that specify the fuel grade and amount.

(ii) Include copies of the records required by Condition 5.1c(i) for the reporting period, in each operating report required by Condition 12.

d. Maintain good combustion practices at all times the EUs are in operation.

(i) Perform regular maintenance according to the manufacturer's and the operator's maintenance requirements and procedures.

(ii) Keep records of any maintenance that would have a significant effect on emissions. The records may be kept in electronic format.

(iii) Keep a copy of the manufacturer's and the operator's maintenance procedures.

(iv) Include a summary of the maintenance records collected under Condition 5.1d(ii) for the reporting period, in each operating report required by Condition 12.

(v) Operate the EUs consistent with manufacturer's recommended combustion settings (e.g., maximum CO, excess air in flue gas, and other relevant parameters) or those established during the source test conducted to demonstrate compliance with the BACT emissions limit in Table 2.

(A) For each of EU IDs 1 and 2, measure and record the CO and O_2 concentrations in the exhaust stream using a portable handheld combustion analyzer during or within 30 days after the end of a calendar quarter that the EU operates.[1]

(B) Include copies of the records required by Condition 5.1d(v)(A) for the reporting period, in each operating report required by Condition 12.

e. Report in accordance with Condition 11, whenever

(i) an emissions rate determined by the source test required by Condition 5.1a exceeds the limit in Table 2; or

(ii) any of Conditions 5.1a through 5.1d are not met.

5.2 For EU ID 1, the Permittee shall comply with Condition 6.2.

5.3 For EU ID 2, the Permittee shall operate no more than 7,992 hours in any consecutive 12-month rolling period.

a. On or before the 15th of each month

[1] It is not the Department's intention to require the Permittee to start up an EU just to perform the CO and O_2 concentration measurements.

(i) Record the hours of operation for EU ID 2 for the previous calendar month, and

(ii) Calculate and record the rolling 12-month hours of operation for EU ID 2.

b. Report in accordance with Condition 11 whenever the total operating hours of EU ID 2 exceeds 7,992 hours in a 12-consecutive month period.

c. Include copies of the records required under Condition 5.3a(ii) in the operating report required under Condition 12 for the period covered by the report.

6. **Combined Cycle Turbine Emissions Limit.** The Permittee shall limit the emissions from the gas turbine EU IDs 5 and 6 as specified in Table 3.

Table 3 - EU IDs 5 and 6 SIP BACT Limits

Pollutant	BACT Contol	BACT Emissions Limit
$PM_{2.5}$	Good Combustion Pratices and Limited Operation	0.012 lb/MMBTU (3-hour average)

6.1 For EU IDs 5 and 6, the Permittee shall:

a. Conduct an initial source test on either EU ID 5 or 6 in accordance with Section 6, within 12 months of permit issuance, to demonstrate compliance with the $PM_{2.5}$ emissions limit listed in Table 3.

(i) Conduct the source test, in accordance with the procedures specified in 40 CFR 51, Appendix M, Method 201A and, if applicable, Method 202 as provided in Method 201A, for at least three loads representative of the normal operating range of the EU. The Permittee may perform testing at the highest achievable load point, if at least 75 percent of peak load cannot be achieved in practice.

(ii) Emission results shall be reported as the arithmetic 3-hour average of all valid test runs and shall be in units of lb/MMBtu.

(iii) The Permittee shall report the results of the source test in accordance with Condition 27.

(iv) Include the following in the next operating report in accordance with Condition 12, that is due after the submittal date of the initial source test report:

(A) a summary of the source test results; and

(B) relevant combustion settings (including but not limited to average CO and O_2 concentrations in the flue gas) established during the source test that demonstrates compliance with the BACT $PM_{2.5}$ emissions limit in Table 3.

b. Report the compliance status with the $PM_{2.5}$ emissions limit in Table 3 in accordance with each annual compliance certification described in Condition 13.

c. Maintain good combustion practices at all times the EUs are in operation.

(i) Perform regular maintenance according to the manufacturer's and the operator's maintenance requirements and procedures.

(ii) Keep records of any maintenance that would have a significant effect on emissions. The records may be kept in electronic format.

(iii) Keep a copy of the manufacturer's and the operator's maintenance procedures.

(iv) Include a summary of the maintenance records collected under Condition 6.1c(ii) for the reporting period, in each operating report required by Condition 12.

(v) Operate the EUs consistent with manufacturer's recommended combustion settings (e.g., maximum CO, excess air in flue gas, and other relevant parameters) or those established during the source test conducted to demonstrate compliance with the BACT emissions limit in Table 3.

(A) For each of EU IDs 5 and 6, measure and record the CO and O_2 concentrations in the exhaust stream using a portable handheld combustion analyzer during or within 30 days after the end of a calendar quarter that the EU operates.[2]

(B) Include copies of the records required by Condition 6.1c(v)(A) for the reporting period, in each operating report required by Condition 12.

d. Report in accordance with Condition 11, whenever

(i) an emissions rate determined by the source test required by Condition 6.1a exceeds the limit in Table 3; or

(ii) any of Conditions 6.1a through 6.1c are not met.

6.2 For EU IDs 1, 5, and 6, the Permittee shall comply with Conditions 16.1 through 16.4 of Construction Permit AQ0110CPT01 Rev. 1, issued March 3, 2006.

7. **Emergency Diesel Engine Emissions Limit.** The Permittee shall limit the emissions form the emergency diesel engine EU ID 7 as specified in Table 4.

[2] It is not the Department's intention to require the Permittee to start up an EU just to perform the CO and O_2 concentration measurements.

Table 4 - EU ID 7 SIP BACT Limit

Pollutant	BACT Control	BACT Emissions Limit
$PM_{2.5}$	Good Combustion Practices Limited Operation Positive Crankcase Ventilation	0.32 g/hp-hr (3-hour average)

7.1 For EU ID 7, the Permittee shall demonstrate compliance with the $PM_{2.5}$ BACT emissions limit contained in Table 4 as follows:

a. Maintain good combustion practices at all times the EU is in operation.

(i) Perform regular maintenance according to the manufacturer's and the operator's maintenance requirements and procedures.

(ii) Keep records of any maintenance that would have a significant effect on emissions. The records may be kept in electronic format.

(iii) Keep a copy of the manufacturer's and the operator's maintenance procedures.

b. Limit the operation of the EU to 52 hours per 12-month rolling period.

(i) Demonstrate compliance by complying with Conditions 6 through 6.2 of Construction Permit AQ0110CPT01 Rev. 1.

c. Maintain a positive crankcase ventilation (PCV) system at all times the EU operates in accordance with the manufacturer's and operator's recommended operating and maintenance procedures.

(i) Submit an initial certification that the PCV system listed in Table 4 has been installed or is an inherent design to the EU, in the first operating report due after permit issuance, as required by Condition 12.

d. Report in accordance with Condition 12

(i) a summary of the maintenance records collected under Condition 7.1a(ii); and

(ii) the operating hour records collected under Condition 7.1b(i)(B)(2).

e. Report the compliance status with the $PM_{2.5}$ emissions limit in Table 4 in accordance with each annual compliance certification described in Condition 13.

f. Report in accordance with Condition 11, whenever

(i) an emissions rate exceeds the limit in Table 4; or

(ii) any of Conditions 7.1a through 7.1e are not met.

8. Boiler Emissions Limit. The Permittee shall limit the emissions form the boiler EU IDs 11 and 12 as specified in Table 5.

Table 5 - EU IDs 11 and 12 SIP BACT Limits

Pollutant	BACT Control	Fuel Type	BACT Emissons Limit
$PM_{2.5}$	Good Combustion Practices Combust only Propane	Propane	0.008 lb/MMBTU (3-hour average)

8.1 For EU IDs 11 and 12, the Permittee shall demonstrate compliance with the $PM_{2.5}$ BACT emissions limit contained in Table 5 as follows:

a. Maintain good combustion practices at all times the EUs are in operation.

(i) Perform regular maintenance according to the manufacturer's and the operator's maintenance requirements and procedures.

(ii) Keep records of any maintenance that would have a significant effect on emissions. The records may be kept in electronic format.

(iii) Keep a copy of the manufacturer's and the operator's maintenance procedures.

b. Combust only gas fuel (propane).

(i) For each shipment of fuel, keep receipts that specify the date, type,and quantity of fuel received .

c. Report in accordance with Condition 12

(i) a summary of the maintenance records collected under Condition 8.1a(ii); and

(ii) a summary of the types of fuel received or shipping receipts collected under Condition 8.1b(i).

d. Report the compliance status with the $PM_{2.5}$ emissions limit in Table 5 in accordance with each annual compliance certification described in Condition 13.

e. Report in accordance with Condition 11, whenever

(i) an emissions rate exceeds the limit in Table 5; or

(ii) any of Conditions 8.1a through 8.1d are not met.

Section 4 Recordkeeping, Reporting, and Certification Requirements

9. 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.

9.1 The Department may accept an electronic signature on an electronic application or other electronic record required by the Department if the person providing the electronic signature

a. uses a security procedure, as defined in AS 09.80.190, that the Department has approved; and

b. accepts or agrees to be bound by an electronic record executed or adopted with that signature.

10. Submittals. Unless otherwise directed by the Department or this permit, the Permittee shall submit to the Department one certified copy of reports, compliance certifications, and/or other submittals required by this permit. The Permittee may submit the documents electronically or by hard copy

10.1 Submit the certified copy of reports, compliance certifications, and/or other submittals in accordance with the submission instructions on the Department's Standard Permit Conditions web page at http://dec.alaska.gov/air/air-permit/standard-conditions/standard-condition-xvii-submission-instructions/.

11. Excess Emissions and Permit Deviation Reports. The Permittee shall report excess emissions and permit deviations as follows:

11.1 **Excess Emissions Reporting.** The Permittee shall report all emissions or operations that exceed emissions standards or limits of this permit as follows:

a. In accordance with 18 AAC 50.240(c), as soon as possible after the event commenced or is discovered, report

(i) excess emissions that present a potential threat to human health or safety; and

(ii) excess emissions that the Permittee believes to be unavoidable.

b. In accordance with 18 AAC 50.235(a), within two working days after the event commenced or was discovered, report an unavoidable emergency, malfunction, or nonroutine repair that causes emissions in excess of a technology-based emissions standard.

c. If a continuous or recurring excess emissions is not corrected within 48 hours of discovery, report within 72 hours of discovery unless the Department provides written permission to report under Condition 11.1d.

d. Report all other excess emissions not described in Conditions 11.1a, 11.1b, and 11.1c within 30 days after the end of the month during which the excess emissions occurred or as part of the next routine operating report in Condition 12 for excess emissions that occurred during the period covered by the report, whichever is sooner.

e. If requested by the Department, the Permittee shall provide a more detailed written report to follow up on an excess emissions report.

11.2 **Permit Deviations Reporting.** For permit deviations that are not "excess emissions," as defined under 18 AAC 50.990:

a. Report all other permit deviations within 30 days after the end of the month during which the deviation occurred or as part of the next routine operating report in Condition 12 for permit deviations that occurred during the period covered by the report, whichever is sooner.

11.3 **Reporting Instructions.** When reporting either excess emissions or permit deviations, the Permittee shall report using the Department's online form for all such submittals, beginning no later than September 7, 2023. The form can be found at the Division of Air Quality's Air Online Services (AOS) system webpage http://dec.alaska.gov/applications/air/airtoolsweb using the Permittee Portal option. Alternatively, upon written Department approval, the Permittee may submit the form contained in Section 8 of this permit. The Permittee must provide all information called for by the form that is used. Submit the report in accordance with the submission instructions on the Department's Standard Permit Conditions webpage found at http://dec.alaska.gov/air/air-permit/standard-conditions/standard-conditions-iii-and-iv-submission-instructions/.

12. Operating Reports. During the life of this permit3, the Permittee shall submit to the Department an operating report in accordance with Conditions 9 and 10 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.

12.1 The operating report must include all information required to be in operating reports by other conditions of this permit, for the period covered by the report.

12.2 When excess emissions or permit deviations that occurred during the reporting period are not included with the operating report under Condition 12.1, the Permittee shall identify

a. the date of the excess emissions or permit deviation;

[3] *Life of this permit* is defined as the permit effective dates, including any periods of reporting obligations that extend beyond the permit effective dates. For example, if a permit expires prior to the end of a calendar year, there is still a reporting obligation to provide operating reports for the periods when the permit was in effect.

b. the equipment involved;

c. the permit condition affected;

d. a description of the excess emissions or permit deviation; and

e. any corrective action or preventive measures taken and the date(s) of such actions; or

12.3 when excess emissions or permit deviation reports have already been reported under Condition 11 during the period covered by the operating report, the Permittee shall either

a. include a copy of those excess emissions or permit deviation reports with the operating report; or

b. cite the date(s) of those reports.

13. Annual Compliance Certification. Each year by March 31, the Permittee shall compile and submit to the Department an annual compliance certification report according to Condition 10.

13.1 Certify the compliance status of the stationary source over the preceding calendar year consistent with the monitoring required by this permit, as follows:

a. identify each term or condition set forth in Section 2 through Section 6, that is the basis of the certification;

b. briefly describe each method used to determine the compliance status;

c. state whether compliance is intermittent or continuous; and

d. identify each deviation and take it into account in the compliance certification.

13.2 In addition, submit a copy of the report directly to the Clean Air Act Compliance Manager, US EPA Region 10, ATTN: Air Toxics and Enforcement Section, Mail Stop: 20-C04, 1200 Sixth Avenue, Suite 155, Seattle, WA 98101-3188.

Section 6 General Source Test Requirements

20. **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.

21. **Operating Conditions.** Unless otherwise specified by an applicable requirement or test method, the Permittee shall conduct source testing

21.1 at a point or points that characterize the actual discharge into the ambient air; and

21.2 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.

22. **Reference Test Methods.** The Permittee shall use the following references for test methods when conducting source testing for compliance with this permit:

22.1 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.

22.2 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.

22.3 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.

22.4 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.

23. **Excess Air Requirements.** To determine compliance with this permit, standard exhaust gas volumes must include only the volume of gases formed from the theoretical combustion of the fuel, plus the excess air volume normal for the specific emissions unit type, corrected to standard conditions (dry gas at 68° F and an absolute pressure of 760 millimeters of mercury).

24. **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.

25. **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 20 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.

26. **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.

27. **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 9. If requested in writing by the Department, the Permittee must provide preliminary results in a shorter period of time specified by the Department.