

From: [Edwards, Alice L S \(DEC\)](#)
To: [Smith, Rebecca T \(DEC\)](#)
Subject: FW: Serious SIP Comments
Date: Friday, July 26, 2019 4:13:27 PM
Attachments: [2019 7 26 Serious SIP Comments EHSRM.pdf](#)

From: Frances Isgrigg [mailto:fisgrigg@alaska.edu]
Sent: Friday, July 26, 2019 4:10 PM
To: Edwards, Alice L S (DEC) <alice.edwards@alaska.gov>
Cc: Heil, Cynthia L (DEC) <cindy.heil@alaska.gov>; Huff, Deanna M (DEC) <deanna.huff@alaska.gov>
Subject: Serious SIP Comments

Ms. Edwards,

Please find attached additional comments from UAF on the draft Serious SIP prepared by ADEC. Please feel free to contact myself or Russ Steiger with any questions you may have regarding the comments.

Frances M. Isgrigg, PE

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Gallop Strengths: Achiever, Learner, Relator, Responsibility, Intellection

July 26, 2019
Alice Edwards, Director
Division of Air Quality
Alaska Department of Environmental Conservation
PO Box 111800
Juneau, AK 99811

Transmitted digitally by email to: alice.edwards@alaska.gov
cc: cindy.heil@alaska.gov; deanna.huff@alaska.gov

RE: Additional Comments from UAF on Fairbanks Serious PM_{2.5} Nonattainment Area – Draft State Implementation Plan, Section 7.7.8.6 Fairbanks Campus Power Plant Public Notice Draft

Dear Ms. Edwards,

The University of Alaska Fairbanks (UAF) is providing additional comments to the above-referenced draft State Implementation Plan (SIP) which addresses the serious non-attainment area for particulate matter with an aerodynamic diameter less than or equal to a nominal 2.5 microns (PM_{2.5}). The proposed amendments to 18 Alaska Administrative Code (AAC) 50.030 would adopt the new section Volume II, Section III.D.7: Fairbanks North Star Borough (FNSB) Fine Particulate Matter (PM_{2.5}) Serious State Implementation Plan (SIP).

UAF is specifically commenting on the following elements of the proposed SIP revisions:

- Amendments to the State Air Quality Control Plan Volume II: III.D.7.7 Section 8.6 Control Strategies, Draft, May 10, 2019. [Referred to below as “proposed SIP document.”]
- Appendix III.D.7.07 University of Alaska Fairbanks (UAF BACT Determination Documents Campus Power Plant, May 10, 2019. [Referred to below as “BACT Determination.”]

General Comments

1. In several instances, the Best Available Control Technology (BACT) limits presented in the proposed SIP document and the BACT Determination are inconsistent with respect to emissions limits and other requirements not only with each other but within themselves. Because both documents will

become part of the SIP, obtaining clarity on exactly which requirements will be applicable to each emissions unit is essential to ensure compliance.

2. Inadequate technical information is provided in the BACT Determination. This lack of information generally includes, but is not limited to, the following areas.
 - Little or no engineering data or rationale is provided to support the Alaska Department of Environmental Conservation (ADEC) determinations addressing whether an emission control technology is or is not technically feasible.
 - Little or no engineering data, cost data, or rationale is provided to support the determinations addressing whether an emission control technology is or is not BACT.
 - The methodology used to determine emissions reductions is typically not quantified.

This lack of data and rationale is not consistent with ADEC past insistence that the stationary sources provide a substantial level of detail and specific engineering data to support the BACT analyses the stationary sources submit to ADEC.

3. In many cases, the BACT Determination does not identify the methods that must be used to verify compliance with the BACT limits. The methods to be used for verifying compliance should be identified so that the Permittees can determine whether the methods that ADEC intends to require are appropriate and whether the methods will be overly cumbersome and/or expensive.
4. Throughout both documents listed above, there is inconsistency in the pollutant sections as to how:
 - Identification of the emission units (e.g. small diesel-fired engines PM_{2.5}; the SIP addresses only EU ID 27, while the BACT Determination addresses EU IDs 23, 24, 26, 28, and 29); and
 - Emission units and their BACT requirements are listed (e.g. table or bullets)

UAF suggests being consistent in both areas and would appreciate that the emission units are identified in the title of the section (e.g. Mid-Sized Diesel-Fired Boilers – EU IDs 3 and 4).

5. Small Diesel Engines: UAF is requesting that ADEC remove the BACT analysis/discussion in the draft SIP and the BACT Determination for the following emission units: EU IDs 23, 24, 26, 28, and 29. In a letter dated August 14, 2015 from Alice Edwards regarding UAF PM_{2.5} Serious Nonattainment BACT Protocol Response, Item 3.b, EPA's informal comments indicated that a Serious Area BACT analysis is only required for permitted emission units (letter attached). The EU IDs mentioned in sentence 1 of this paragraph are not permitted units. UAF has left comments in this document regarding these units in case we are unaware of changes to the protocol.

BACT DETERMINATION FOR NITROGEN OXIDES (NO_x), FAIRBANKS CAMPUS POWER PLANT

In Section 7.7.8.6.1 of the proposed SIP document, ADEC states that “the NO_x controls proposed in this section are not planned to be implemented.” In the event that the U.S. Environmental Protection Agency (EPA) does not approve the precursor demonstration as justification not to require NO_x emission controls, UAF provides the following comments addressing the proposed NO_x BACT determination and associated SIP requirements.

Dual Fuel-Fired Boiler, Emissions Unit (EU) ID 113

6. If NO_x BACT is required, the proposed BACT for the Combined Heat and Power Plant (CHPP) dual fuel-fired boiler, EU ID 113, is Selective Catalytic Reduction (SCR). The proposed NO_x emission limit is 0.02 pounds per million British thermal units (lb/MMBtu) averaged over three hours. The proposed SIP document and BACT determination do not provide engineering design data supporting the emission limit for this boiler. The calculation of the emission limit is based on a 90 percent reduction in NO_x emissions compared to the baseline. A 90 percent reduction is the typical maximum emission reduction that can be expected from the use of SCR. No specific engineering information is presented that demonstrates a 90 percent reduction is achievable for EU 113. Please provide this supporting information in the final BACT Determination.
7. UAF does not agree with ADEC's estimate of cost for adding the SCR to EU ID 113. UAF's Cost Effectiveness for SCR is calculated at \$28,425 per ton of NO_x removed. Please provide additional information in the appendices of this document of how ADEC calculated the \$6,197 per ton of NO_x reviewed to support this number which is 21.7 percent of the UAF calculation. Also note that the BACT determination lists the cost effectiveness at \$22,232 in Table 3-2.
8. Although Section 3.1 of the BACT Determination indicates that NO_x BACT control proposed for EU ID 113 is SCR, good combustion practices, circulating fluidized bed (CFB), and staged combustion. Table 6-1 of the same document indicates that NO_x BACT for the unit is fabric filters. Please clarify the correct BACT control methodology for this unit.

Dual Fuel-Fired Boiler and Mid-Sized Diesel-Fired Boiler (EU IDs 3 and 113)

9. The economic analysis spreadsheet¹ is a cost estimation spreadsheet used to support the SCR BACT determination. This cost model was developed by Sargent & Lundy (S&L) but may not be an appropriate model for costs pertaining to EU IDs 3 and 113. Additionally, the inputs to the cost model may not be appropriate or adequate to properly determine costs.

Based on review of the cost effectiveness model and the supporting documentation, determining the validity of the results of the analysis is not possible. The concerns are rooted in two assumptions made by ADEC in preparing the cost model.

- *ADEC assumed that the model is valid for a plant the size of UAF CHPP.*
The S&L SCR Cost Development Methodology² white paper dated January 2017 addresses several caveats which do not appear to be addressed in the BACT Determination. The white paper states that "the costs for retrofitting a plant smaller than 100 megawatts (MW) increase rapidly due to the economy of size. S&L is not aware of any SCR installations in recent years for smaller than 100-MW units." EU ID 113 has a maximum heat input rate of

¹ 2019-05-10-adec-calculated-scr-eu113-economic-analysis-uaf.xlsx

² https://www.epa.gov/sites/production/files/2018-05/documents/attachment_5-3_scr_cost_development_methodology.pdf

295.6 MMBtu/hr which is an equivalent maximum input of approximately 88.7 MW. EU ID 3 has a maximum heat input rating of 180.9 MMBtu/hr which is an equivalent maximum input of approximately 54 MW. The output ratings, which is what was likely used in the S&L calculations, will be even lower.

- *ADEC assumed that the model is valid for a heat and power plant.*

No information is available addressing the type of plant on which the S&L spreadsheet is based. The assumption is that the plant is a single power generation unit. A combined heat and power (CHP) plant differs significantly from a “traditional” power plant in that the steam produced in a CHP plant is not exclusively used to generate electricity. UAF is unable to confirm that the direct annual costs can be accurately modeled for an installation such as EU IDs 3 and 113 by using the S&L spreadsheet.

Mid-Sized Diesel-Fired Boiler, EU ID 3

10. The BACT Determination and proposed SIP document indicate a BACT NO_x limit of 0.02 lb/MMBtu for the mid-sized diesel-fired boiler, EU ID 3. This BACT limit was calculated based on a 90 percent reduction in NO_x emissions compared to the baseline. A 90 percent reduction is the typical maximum reduction that can be expected from the use of SCR. No specific engineering information is presented demonstrating that a 90 percent reduction is achievable for EU ID 3.

The BACT determination, documented in Table 3-5, indicated that there was no control specified for firing diesel. Although the permit allows for the burning of natural gas (NG), EU ID 3 does not currently have the capability to burn NG. Please provide additional information as to why ADEC believes the SCR should be placed on EU ID 3.

Small Boilers, EU IDs 19 through 21

11. The BACT NO_x limits for the small boilers, EU IDs 19 through 21 list are inconsistent in the BACT Determination. That BACT Determination indicates a BACT NO_x limit of 0.15 lb/MMBtu in Step 5 page 16 and Table 3-11. While Table 6-1 in the BACT Determination indicates a BACT NO_x limit of 0.015 lb/MMBtu,. Please clarify the correct BACT NO_x limit for these emissions units. Please note that the proposed SIP document includes a BACT NO_x limit of 0.15 lb/MMBtu on page 72.

Large Diesel-Fired Engine, EU ID 8

12. UAF proposed a BACT NO_x emission limit from the large diesel-fired engine, EU ID 8, of 0.0195 grams per horsepower-hour (g/hp-hr) without the use of SCR. ADEC proposed a higher emission limit of 1.3 g/hp-hr, but requires the use of SCR at all times of operation. An economic analysis for the use of SCR was not provided. Because each BACT determination must be based on technical and economic feasibility, the economic rationale for the proposed BACT control of SCR is incomplete, making the validity of the determination questionable. Because a lower NO_x emission rate can be achieved without the use of SCR, UAF believes that the use of SCR is not economically feasible and should not be required.

Small Diesel-Fired Engines, EU ID 24, 28, and 29

13. ADEC proposes a BACT NO_x emission limit of 0.3 g/hp-hr for the small diesel-fired engine, EU ID 29, per BACT determination Table 3-17. The stated rationale for this limit is that EU ID 29 is a certified engine. EU ID 29 is certified as an EPA Tier 4i engine, which has an NO_x emission limit for an engine rated at 314 horsepower (hp) (234 kilowatts (kW)) of 2.0 grams per kilowatt-hour (g/kW-hr) (1.5 g/hp-hr). The BACT NO_x emission limit proposed by ADEC is inconsistent with the EPA Tier 4i NO_x emission limit for the rating and model year corresponding to EU ID 29. Please explain this inconsistency or revise Table 3-17 to reflect the appropriate BACT NO_x emission limit for EU ID 29.
14. Section 3.5 in the proposed BACT Determination for small diesel-fired engines, specifically Step 5(c), states that non-emergency operation of the small emergency diesel-fired engines, EU IDs 24, 28, and 29, is limited to “no more than 100 hours per year for maintenance checks and readiness testing.” Please revise this requirement to clarify that the limit is not inconsistent with applicable requirements under 40 CFR 60 Subpart IIII and 40 CFR 63 Subpart ZZZZ, which allow 100 hours per year of non-emergency operation but does not restrict those non-emergency operations to maintenance checks and readiness testing. Please ensure that Section 7.7.8.6.1 of the proposed SIP document is revised for consistency with the underlying proposed BACT determination.

BACT DETERMINATION FOR FINE FRACTION RESPIRABLE PARTICULATE MATTER (PM_{2.5})

Small Boilers, EU IDs 19 through 21

15. The BACT PM_{2.5} limits for the small boilers, EU IDs 19 through 21 are inconsistent within the BACT Determination. Step 5 – Selection of PM-2.5 BACT for the small Diesel-Fire Boiler, (b) and Table 4-8 of the BACT Determination indicates a BACT PM_{2.5} limit of 0.012 lb/MMBtu. Table 6-2, page 62 of that document indicates a BACT PM_{2.5} limit of 7.06 g/MMBtu (0.016 lb/MMBtu). Please clarify the correct BACT limit for these emissions units. Please note that the proposed SIP document, Page 75, includes a BACT PM_{2.5} limit of 0.012 lb/MMBtu.

Small Diesel-Fired Engines, EU IDs 23, 24 and 26 through 29

16. UAF proposes EU ID 27 meet the Federal Emission standard (EPA Tier 3) to control PM_{2.5} emissions of 0.2 g/kW-hr or 0.15 g/hp-hr . Page 77 of the proposed SIP document indicates a BACT PM_{2.5} limit of 0.11 g/hp-hr . It is unclear how ADEC determined that UAF would meet the lower PM_{2.5} emission standard on this EPA approved engine. Please clarify in the SIP and BACT Determination how the 0.11 g/hp-hr was derived.
17. The proposed BACT control methodology for the small engine, EU ID 27, is inconsistent within the BACT Determination. Page 43 of the BACT Determination lists limited operation and good combustion practices, whereas Page 65 Table 6-2 also includes the use of a turbocharger and aftercooler on the engine. No economic analysis is provided to support the use of a turbocharger

and aftercooler on the engine. Please clarify that the correct BACT control methodology for this emissions unit is limited operation and good combustion practices.

18. Section 4.5 in the proposed BACT Determination for small diesel-fired engines, specifically Step 5(b), states that non-emergency operation of the small emergency diesel-fired engines, EU IDs 24, 28, and 29, is limited to “no more than 100 hours per year for maintenance checks and readiness testing.” Please revise this requirement to clarify that the limit is not inconsistent with applicable requirements under 40 CFR 60 Subpart IIII and 40 CFR 63 Subpart ZZZZ, which allow 100 hours per year of non-emergency operation but does not restrict those non-emergency operations to maintenance checks and readiness testing. Please ensure that Section 7.7.8.6.2 of the proposed SIP document is revised for consistency with the underlying proposed BACT determination.

BACT DETERMINATION FOR SULFUR DIOXIDE (SO₂)

Dual Fuel-Fired Boiler, EU ID 113

19. Page 86 of the proposed SIP document indicates that ADEC does not find installation of Dry Sorbent Injection (DSI) to be economically feasible for the dual fuel-fired boiler, EU ID 113. UAF understands and agrees with the determination that DSI is not required because UAF has demonstrated that DSI is not affordable. However, installation of DSI is indicated as BACT in both the BACT Determination and on Page 79 of the proposed SIP document. Please indicate in the BACT Determination and Page 79 of the proposed SIP document that installation of DSI is not required for clarity.
20. Page 86 of the proposed SIP document indicates that UAF would be required to limit sulfur content of coal to 0.2 percent sulfur by weight (wt. pct. S) by June 9, 2021. ADEC did not identify this proposed requirement as an available SO₂ emission control option and did not evaluate this proposed requirement using the five-step BACT process. The current coal sulfur content is not limited beyond the State SIP SO₂ standard. Imposing this limit without first preparing a proper BACT analysis is not appropriate. Even if 0.2 wt. pct. sulfur coal is available from any source, ADEC has not prepared an economic feasibility analysis to determine whether this requirement is BACT.
21. The BACT SO₂ emission limit for the dual fuel-fired boiler, EU ID 113, is listed as 0.10 lb/MMBtu/hr in the BACT Determination and the proposed SIP document. ADEC indicates in Footnote 22 of the BACT Determination that this limit was selected after evaluating existing emission limits in the RBLC database for coal-fired boilers, taking into account previous source test data from coal-fired boilers in Alaska and actual emissions data from other sources. The cited source tests and emissions data are not available for review and no supporting engineering data is provided to justify this low emissions limit. Please provide the reasons that ADEC believes this SO₂ emission limit is technically and economically feasible and is achievable in practice.

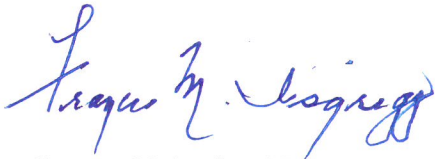
Small Diesel-Fired Engines, EU IDs 24, 28, and 29

22. Section 5.5 in the proposed BACT Determination for small diesel-fired engines, specifically Step 5(c), states that non-emergency operation of the small emergency diesel-fired engines, EU IDs 24, 28, and

29, is limited to “no more than 100 hours per year for maintenance checks and readiness testing.” Please revise this requirement to clarify that the limit is not inconsistent with applicable requirements under 40 CFR 60 Subpart IIII and 40 CFR 63 Subpart ZZZZ, which allow 100 hours per year of non-emergency operation but does not restrict those non-emergency operations to maintenance checks and readiness testing. Please ensure that Section 7.7.8.6.3 of the proposed SIP document is revised for consistency with the underlying proposed BACT determination.

If you have any questions, please contact Russ Steiger at 907-474-5812 or rhsteiger@alaska.edu or myself at 907-474-5487 or fisgrigg@alaska.edu.

Sincerely



Frances M, Isgrigg, PE
Director, Environmental, Health, Safety and Risk



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August 14, 2015

Frances M. Isgrigg, Director
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Subject: UAF PM2.5 Serious Nonattainment BACT Protocol Response

Dear Ms. Isgrigg:

Thank you for submitting your PM2.5 Serious Nonattainment BACT Analysis Protocol for the UAF Stationary Source.

The clarifications you have requested are below:

1. The stationary source modeling was completed for the Fairbanks PM2.5 Moderate Area SIP Submittal using the CALPLPUFF dispersion model with emissions and meteorology data representative of a severe PM2.5 winter episode. Emissions input were based on actual (reported) 2008 emissions for a two week representative metrological episode (January-February 2008). Meteorology inputs were simulated with the WRF (Weather Research and Forecast) meteorological model (Linux system required) and processed through the MMIF (Mesoscale Model Interface) preprocessor model. The modeling files are approximately 1TB in size. DEC can provide the modeling files if you can make an external hard drive available.
2. The baseline year modeling for the Serious Area will be one of the last three years of the design value that caused the Fairbanks area to become a Serious Area: 2013, 2014 or 2015.
3. The EPA R10 has provided informal comments on the BACT protocol that was submitted and they are below.
 - a. The BACT analysis should be conducted for the proposed boilers (EU IDs 101 and 102). Before the BACT analysis is officially submitted with the Serious Area SIP, a permit change is required that states if the proposed boilers are not completed by the required completion date (four years after the official designation expected in 2016), a BACT analysis will need to be completed on the old boilers.

- b. A Serious Area BACT analysis is only required for permitted emission units.
- c. EPA Region 10 reviewed the protocol and made comments, but they will not give full approval of the BACT analysis until it has been officially submitted by DEC (see the excerpt from an email below).

USEPA Region 10 Response to the PM2.5 Serious Nonattainment BACT Analysis Protocol for the UAF Stationary Source:

“EPA is providing informal comments to you on the BACT protocol provided by the University of Alaska, Fairbanks. At this time, we are not approving the protocol—we will formally review and approve the BACT analysis if/when it is submitted to us as part of the Serious Area Attainment Plan.

As we discussed earlier, it is important to clarify to UAF that, if there is any delay in the boiler replacement project and schedule, UAF will need to conduct a BACT analysis for the existing boilers. And, we understand that you have had discussions with UAF about this already, and that you are planning to ensure that UAF will take steps to address this through updates to the facilities’ existing permit(s).

Below are some additional comments on the protocol document

BACT Protocol

1. *Section 1 – The BACT analysis will be evaluated with respect to EPA BACT guidance. The protocol needs to be consistent with that guidance - this protocol will not govern should any inconsistency be identified.*
2. *Section 1.5 – This section should clarify that all cost analyses will be conducted in accordance with the EPA Air Pollution Control Cost Manual.*
3. *Section 1.5 – The final sentence should be modified as follows “...if a particular control technology is eliminated based on economic factors, the assumption will be made that the control technology is also uneconomic for smaller emission units, provided that all other factors besides size are equivalent.” This clarification is necessary because the reasoning only applies for emission units that are the same basic type of equipment, burn the same fuel, have similar retrofit challenges, etc.*
4. *Section 1.6 – Cost information must be emission unit specific. BACT cannot be determined using generic cost ranges.*
5. *Section 1.6 – Each BACT analysis must provide the basis for each input value and assumption used in the analysis and calculations. Electronic (pdf) copies of the actual documents forming the basis for each assumption should be provided. If the documents are publicly available on the internet, functional links to the information is acceptable.*
6. *Section 2 – The BACT analyses need to be conducted based on potential to emit (PTE), and EPA will verify the basis for the PTE values used for each emission unit and each pollutant. The BACT analysis should provide the basis and actual calculations used to derive each PTE value. It is acceptable to cite another document that forms the basis for the PTE, but these underlying documents must be included as attachments to the BACT analysis, and must themselves include sufficient detail in order to clearly illustrate the basis for the PTE values.*
7. *Table 2 – No control for particulate matter is listed for the proposed new boilers, although presumably they will be equipped with such control equipment.”*

Thank you again for submitting your BACT protocol for DEC and EPA Review.
If you have any further questions in order to complete a timely BACT analysis, please contact me.

Sincerely,

A handwritten signature in blue ink, appearing to read "Denise Koch". The signature is stylized and cursive, with a small flourish at the end.

Denise Koch, Director
Division of Air Quality

cc: Cindy Heil, ADEC/Non-Point Mobile Sources
Patrick Dunn, ADEC/Air Permits Program
Deanna Huff, ADEC/Non-Point Mobile Sources