Federal Land Manager Review

The State of Alaska provided an opportunity for FLM consultation at least 60 days prior to holding any public hearing on the SIP. This SIP was submitted to the FLMs on June 24, 2010 for review and comment. Comments were received from the FLMs on August 23, 2010. As required by 40 CFR Section 51.308(i)(3), the FLM comments and State responses are presented here.

FLM Review Sections:

Alaska Regional Haze Plan Response to Federal Land Manager Comments (*including* Response to March 11, 2010 comment letter from the United States Department of the Interior, National Park Service (NPS)

August 23, 2010 comment letter from the United States Department of the Interior, U.S. Fish and Wildlife Service (FWS) and National Park Service (NPS)

March 11, 2010 comment letter from the United States Department of the Interior, National Park Service (NPS)

Alaska Regional Haze Plan Response to Federal Land Manager Comments

FLM comments are paraphrased rather than quoted in their entirety. The complete comment letter precedes this response.

Comment K.3-1: The SIP should include a commitment to future air quality monitoring to support the regional haze demonstration.

Response: Explicit commitment to future air quality monitoring has been added to section III.K.10, Commitment to Future 308 Plan Revisions.

Added text: *Revisions and progress reports depend on future visibility monitoring. Assessment of monitoring strategy and analysis of monitoring data is required for progress reports. Alaska will depend on the IMPROVE monitoring program to collect and report data for reasonable progress tracking of the three Alaska Class 1 Areas currently monitored. Because Regional Haze is a long-term tracking program with a 60-year implementation period, Alaska expects the configuration of the monitors, sampling site locations, laboratory analysis methods and data quality assurance, and network operation protocols will not change, or if changed, will remain directly comparable to those operated by the IMPROVE program during the 2000-2004 Regional Haze baseline period. Technical analyses and reasonable progress goals in this plan are based on data from these sites.*

Alaska plans to use data reported by the IMPROVE program with the analysis tools found at the Visibility Information Exchange Web System (VIEWS), and those sponsored by the WRAP. Alaska will depend on the routine, timely reporting of monitoring data by the IMPROVE program to VIEWS for the tracking reasonable progress. Alaska will continue to rely on U.S. EPA to operate the IMPROVE monitoring network.

Comment K.3-2: EPA's Guidance for Tracking Progress under the Regional Haze Rule lists Denali Headquarters as the official IMPROVE site and Trapper Creek as the protocol site.

Response: The status of the two sites in EPA‟s Guidance for Tracking Progress under the Regional Haze Rule does not represent the current status of the two monitoring sites. The IMPROVE monitor near the park‟s headquarters was the original IMPROVE site, but due to topographical barriers, such as the Alaska Range, it was determined that this was not adequately representative of the entire Class I area. Therefore, Trapper Creek, just south of the park boundary, was chosen as a second site for an IMPROVE monitor and is now the official Denali IMPROVE site and the headquarters site is now the protocol site. The Trapper Creek site was chosen to characterize any transport from the Anchorage area, the most densely populated region in the state. The status of the two sites has been clarified in section III.K.3.C.2.a and III.K.4.C.1.a.

Comment K.3-3: Section E. Bering Sea Wilderness Area (p. K.4-118). While monitoring data are not available for Bering Sea, Alaska needs to consider source contributions and potential impacts to this wilderness area.

Response: Additional information about source contributions and potential impacts has been added to section III.K.4.E, Bering Sea Wilderness Area.

Comment K.5.1: Baseline and Future Year Inventories. ADEC should clarify the emissions assumed for 2018 for the GVEA – Healy Units 1 and 2, located less than four miles from Denali National Park. The Denali Borough 2018 emissions listed in Appendix II.K.5 are much lower than the allowable emissions for Healy Unit 2, and supporting documentation in the current Title V renewal permit indicates Unit 2 will be restarted before the year 2018. If the Healy Unit 1 and 2 emissions were not included in the 2018 emission inventory, then the implications of not including the emissions should be discussed in the interpretation of the Weighted Emission Potential (WEP) for Denali.

Responses: Additional information and clarification has been added throughout the draft SIP document. These are presented below in the format: **Section, Preceding text, Added text** (in italics).

Section: III.K.5.C.
Preceding text:
C. 2018 Future-Year Inventory

The 2018 inventory was developed to reflect emission levels projected to calendar year 2018, accounting for forecasted changes in source activity and emission factors. Population projections compiled by the Alaska Department of Labor and Workforce Development (DOLWD) at five-year intervals through 2030 by individual borough and census area were used to grow 2002 baseline activity to 2018 for most of the source categories, with a couple of exceptions.

First, fire sector emissions for wildfires were held constant, reflecting the fact that one cannot reasonable forecast any change in wildfire activity through the state between 2002 and 2018. (As explained later, modest reductions in prescribed burn emissions were assumed, consistent with WRAP 2018b Phase III Fire Inventory forecast.) Second, activity from small port commercial marine vessel activity in 2002 was assumed to be identical to that obtained for calendar year 2005.

Emission factors specific to calendar year 2018 were also developed for source sectors affected by regulatory control programs and technology improvements. These source sectors included on-road and non-road mobile sources (except commercial marine vessels and aviation) and stationary point sources.

Added text:
While the methodology adopted to forecast the 2018 inventory ensures that there is continuity in the emission sources and activity levels represented, it fails to account for structural changes that will occur. For example, within the stationary source sector, some of the point sources operating in 2002 have already shut down; nevertheless their emissions are forecast to grow in proportion to the population growth rate. Similarly, new and or permitted sources that are not currently operating may be in operation in 2018 and their emissions are not included in the 2018 forecast. An example of a source that has shut down is the Agrium facility located in the Kenai. An example of a permitted source that did not operate in 2002, is not currently operating, but could operate in future years is the Healy Clean Coal Project (HCCP). To the extent that the status of these and other facilities are known their impact on forecasted emissions and visibility will be discussed to provide a more accurate view of potential impacts.

Section III.K.7.B.
Preceding text:
It is useful to contrast the change in total WEP values with the summaries reached for the top three boroughs for each site to see if any revisions are needed:

- Denali – The large increase in point source SOx from the Kenai seen in Table III.K.7-1 is largely offset by reductions from other sources to a value of less than 1.0. All of the other anthropogenic sources show either a decline or a negligible increase.

Added text:
These forecasts do not account for the emissions from the HCCP at the GVEA facility in Healy (i.e., unit # 2). That facility did not operate in 2002 and is not currently operating, but is permitted to operate. If brought on line, the point source NOx emitted within the Denali Borough would increase by a factor of 4.0 and the SOx would increase by a factor of 2.8 (based on permitted not actual emissions). This increase would make the Denali Borough the largest sources of anthropogenic emissions and the second largest source of all emissions impacting the Denali monitors.

Section III.K.9.D.
Preceding text:
Denali – The WEP analysis shows the anthropogenic contribution of each of the pollutants impacting Denali varies considerably: $PM_{2.5}$ and NH_3 are at the low end, with values well below 10%; while VOC, NOx and SOx values range from roughly one third to one half of the total. It also shows that modest changes are projected for all of the pollutants impacting this site. For the key pollutants, NOx emissions are forecast to decline slightly while SOx emissions are forecast to increase slightly. The WEP analysis presented in Section III.K.7 showed the dominant boroughs impacting Denali included Yukon Koyukuk and Southeast Fairbanks (primarily natural fires impacting all of the pollutants) and Fairbanks North Star (point sources impacting SOx) and Denali (area

sources impacting VOC). The BART analysis presented in Section III.K.6 showed GVEA's Healy Power Plant has a SO_2 limit in place so no increase in nearby SOx emissions can occur. It also showed that significant visibility improvements in Denali can be expected from additional NOx controls that will be implemented at that facility.

Added text:
These forecasts do not account for the emissions from the HCCP at the GVEA facility in Healy (i.e., unit # 2). That facility did not operate in 2002 and is not currently operating, but is permitted to operate. If brought on line, the point source NOx emitted within the Denali Borough would increase by a factor of 4.0 and the SOx would increase by a factor of 2.8 (based on permitted not actual emissions). This would substantially increase the WEP forecast of NOx and SOx emissions impacting the Denali monitors.

Section III.K.9.E.
Preceding text:
Denali – Figure III.K.9-1 shows the URP glide path is quite modest relative to the baseline values (i.e., a 0.6 deciview reduction over a 14-year period). It also shows there is considerable variance in the 2000-2006 deciview measurements, which produce a standard deviation of 0.5 deciview. It is clear the WEP trend falls well within the resulting 95% confidence bounds surrounding the URP glide path. This indicates that there is no difference between the flat (i.e., no change) WEP forecast of pollutants impacting the site and the URP reduction target computed for 2018.

Added text:
The WEP forecast does not account for emissions from GVEA's HCCP (i.e., Healy unit # 2). As previously noted, that facility did not operate in 2002, is not currently operating, but is permitted to operate. If it is brought on line, the permitted NOx and SOx emission levels would cause the WEP trend line to fall well above the 95% confidence bounds surrounding the URP glide path.

ADEC is well aware that changes in the operating status of major point sources have the potential to significantly impact visibility levels in one or more of the Class I areas. At this point the information available for assessing the potential effects of the HCCP facility on Denali visibility is mixed. While the WEP analysis shows the potential for negative impacts, the PSD modeling analysis for that facility demonstrated little potential for visibility impacts from plumes and haze derived that facility's operations. Another consideration is that HCCP is a clean coal demonstration project that integrates a slagging, multi-staged coal combustor system with an innovative sorbent injection / spray dryer absorber / baghouse exhaust gas scrubbing system. Since many of the coal fired boiler control options considered in the four-factor analysis have already been implemented at this facility, the modeling results provide conflicting views of the potential impacts and the facility has an active permit, as a result ADEC is not mandating additional controls prior to startup through this SIP.

Section III.K.10.
Preceding text:
In accordance with the requirements listed in Section 51.308(g) of the federal regional haze rule, ADEC commits to submitting a report on reasonable progress to EPA every five years following the initial submittal of the SIP, with the first report to be submitted by July 31, 2013. The reasonable progress report will evaluate the progress made towards the reasonable progress goal for each mandatory Class I area located within Alaska and in each mandatory Class I area located outside Alaska, which may be affected by emissions from Alaska.

Added text: *It will also assess whether emissions from any new major point source have the potential to impact Class I visibility. If this occurs, ADEC will reassess the need for control of these sources and further evaluate controls options during this five-year period to determine whether additional emission reductions in these sources would improve Class I area visibility in the next planning period.*

Comment K.5-2: ADEC should clarify if Alaska provided state-generated fire activity data to WRAP, or if the WRAP relied on wildfire data from federal records. In addition, ADEC should explain why the prescribed fire emissions appear to be extremely low, given the open burning discussion in Section K.9.C.1.

Response: As for all WRAP states, Alaska fire inventory data were generated with consideration of both Federal Fire History data (Fed-5 data) and WRAP Phase II data. WRAP Phase II data were compiled and refined by the Fire Emissions Joint Forum (FEJF) from state-provided fire activity data. For most WRAP states, baseline wildfire, prescribed burning, and wild land fire use emission inventories were created by scaling the respective Phase II inventory up or down based on an analysis of independently derived Fed-5 activity data across the baseline period. Unlike most other states, for Alaska in 2002 the two data sources differed greatly, with Fed-5 data exceeding Phase II acreages by a factor of 1.5. Implementing the scalar development techniques applied to other states would have produced unreasonably low baseline targets for Alaska (and Utah). Therefore, the contractor, with concurrence from the Emissions Task Team of the FEJF, elected to use the average of the Fed-5 acres (2000-2003), as the baseline targets for Alaska (and Utah). The state was directly consulted about land cover, fuel loading and blackened acreage distributions. The final reports and data are found at the FEJF site for *WRAP Phase III & IV Fire Emission Inventories for the 2000-04 Baseline Period and 2018 Projection Year*, Final Report Development of 2000-04 Baseline Period and 2018 Projection Year Emission Inventories (http://www.wrapair.org/forums/fejf/tasks/FEJFtask7Phase3-4.html).

From Section K.9.C.1 Prescribed fire emissions are very low because prescribed fire acreage is low, typically less than five percent of the entire burned acreage. Prescribed fires may be planned for large acreages, but only rarely do suitable conditions allow for their implementation. The Regional Haze rule requires that in developing it LTS the state consider smoke management techniques for agricultural and forestry management purposes, including plans as currently exist within the State for these purposes.

Comment K.6.1: This comment does not ask for a response.

Comment K.9.1: Identification of Sources for Four Factor Analysis. Alaska needs to demonstrate that it is making reasonable progress in reducing anthropogenic emissions within the state. Alaska"s approach to determine which source categories to evaluate is appropriate. Alaska should extend the analysis to consider feasible controls for individual sources within these source categories. Visibility impacts from sources exempted from BART and Healy Unit 2 are not negligible and controls for these sources should be considered as part of the reasonable progress analysis. CALPUFF could be used to consider the cumulative visibility impacts of the major industrial sources.

Response: In Sections III.K.9.E of the draft SIP, Determination of Reasonable Progress Goals, the variability in monitored visibility measurements is used to establish confidence bounds on the URPs. For the first milestone year, 2018, emission reductions due to ongoing air pollution programs, source retirement, and other controls described in this SIP result in visibility levels falling within the identifiable URP uncertainty. For this reason, ADEC does not see any current benefit in modeling of individual BART-exempt sources. This does not preclude addressing the issue in future SIP revisions.

Comment K.9-2: ADEC should clarify that the reasonable progress goals for 2018 were set by comparing the percentage changes in anthropogenic contributions between 2002 and 2018 from the WEP analyses to the target rate of uniform progress by 2018.

Response: The process by which reasonable progress goals were defined is described in section III.K.9-E, Determination of Reasonable Progress Goals. To further clarify, ADEC has added a summary paragraph to the end of the section: "*To summarize, RPGs for 2018 were set by first comparing the percentage change in anthropogenic contributions between 2002 and 2018 from the WEP analyses to the target uniform rate of progress for 2018, and then in addition evaluating the uncertainty of the URP targets relative to the forecasted WEP reductions*."

Comment K.9-3: In the Reasonable Progress section, the SIP should mention the anthropogenic sources near Bering Sea (e.g. oil and gas production) and how the emissions changes between 2002 and 2018 for these sources might affect visibility in the Bering Sea Wilderness area.

Response: Additional information about anthropogenic sources and potential impacts between 2002 and 2018 has been added to section III.K.4.E, Bering Sea Wilderness Area.

Comment K.6.2: Healy BART – Comments from both the August 23, 2010 letter and the March 11, 2010 letter are addressed below. The March 11, 2010 letter found at the end of this Appendix.

Response:
ADEC acknowledges the August 23, 2010, NPS comments regarding the potential to force GVEA to shutdown Healy Unit 1 in 2024:

> The major concern identified in the letter was Alaska‟s determination that Selective Non-catalytic Reduction (SNCR) is considered BART for Healy Unit 1 based on a remaining useful life of eight years (shutdown in 2024). The BART guidelines (40 CFR 51, Appendix Y, Section IV.D.4.k.2) require that if the shutdown date "affects the BART determination, this date should be assured by a federally- or State-enforceable restriction preventing further operation." Alaska must make the shutdown of Healy Unit 1 in 2024 legally enforceable. If the shutdown is not made legally enforceable, then BART would be the use of Selective Catalytic Reduction as previously determined by Alaska.

ADEC recognizes that under 40 CFR 51, Appendix Y, Section IV.D.4.k.2[1] there is a requirement to ensure that the BART determination is enforceable. However, Alaska Statutes do not allow forward regulation or forward permitting beyond the lifespan of the current permit. Title V permits are issued for a 5-year span, meaning that the Title V permit renewal that is currently in process for GVEA Healy Unit 1 will be issued for the time period of 2010-2015 or 2011-2016. It is not possible, therefore, to include language requiring the shutdown of the facility in 2024, if it is not already shutdown by that date, in the current renewal permit.

ADEC addressed the issue of including language in the final report which would require shutdown during the response to request for informal review received from GVEA. In GVEA‟s request for review, they asserted that there was nothing in the BART regulations that would permit the Department to shut down Unit I. In response, ADEC stated:

> The Department fully expects the useful life of Healy Unit I will end in 2024, based on GVEA‟s representations in their BART submittals. If circumstances change and it makes sense to operate Healy Unit I beyond 2024, the Department

[1] k. How does a state take into account a project‟s „„remaining useful life‟‟ in calculating control costs?

1. A state may decide to treat the requirement to consider the source‟s „„remaining useful life‟‟ of the source for BART determinations as one element of the overall cost analysis. The „„remaining useful life‟‟ of a source, if it represents a relatively short time period, may affect the annualized costs of retrofit controls. For example, the methods for calculating annualized costs in EPA‟s *OAQPS Control Cost Manual* require the use of a specified time period for amortization that varies based upon the type of control. If the remaining useful life will clearly exceed this time period, the remaining useful life has essentially no effect on control costs and on the BART determination process. Where the remaining useful life is less than the time period for amortizing costs, you should use this shorter time period in your cost calculations.
2. For purposes of these guidelines, the remaining useful life is the difference between:

   (1) The date that controls will be put in place (capital and other construction costs incurred before controls are put in place can be rolled into the first year, as suggested in EPA‟s *OAQPS Control Cost Manual*); you are conducting the BART analysis; and
   (2) The date the facility permanently stops operations. Where this affects the BART determination, this date should be assured by a federally- or State-enforceable restriction preventing further operation.

> will evaluate the situation at that time. The Regional Haze SIP provides additional opportunities to evaluate visible impacts of Healy Unit 1 under the reasonable progress process. In regards to a shutdown under the BART rules, GVEA should be aware that the BART guidelines (BART Guidelines 40 CFR 51, Appendix Y, Section IV.D.4.k.2) do provide for the implementation of BART or the shutdown of a BART eligible unit should that unit operate beyond the useful life presumed in the BART determination.

The language in the revised final report reads:

> **9.1 BART Emission Limits**
>
> The final BART emission limits recommended for Healy Unit 1 in accordance with 18 AAC 50.260(l) are summarized in Table 9-1 below. As discussed herein, the BART emission limits are based on an 8-year remaining useful life for Healy 1 (from calendar year 2016) which is provided for at Section IV.D.4.K of 40 CFR 51, Appendix Y. The BART emission limits are compared to current permitted pollutant emission limits which remain in effect.

The final BART determination to not require SCR was not dependant on Healy Unit 1 closing by 2024. In making the revised, final BART determination, ADEC opted for setting the emission limit based on what could be achieved with SNCR rather than SCR based on an evaluation of the cost factors and the other factor in the 5 Factor Analysis over an 8 year life span (after 2016). ADEC‟s evaluation of the data available at the time of the reevaluation showed that the costs of SNCR equivalent emission reductions fit with the goals of emission reductions without requiring technology that would be significantly more expensive without a significantly increased result.

**Alaska Department of Environmental Conservation (ADEC) Response to National Park Service (NPS) Comments from March 11, 2010,
On ADEC's Final
Best Available Retrofit Technology (BART) Determination for
Golden Valley Electric Association (GVEA), Healy Power Plant, Unit 1
September 9, 2010**

The Alaska Department Of Environmental Conservation (ADEC) received your March 11, 2010, letter conveying the National Park Service"s concerns regarding the ADEC"s Best Available Retrofit Technology (BART) determination for Golden Valley Electric Association"s (GVEA) Healy Unit 1, dated February 9, 2010. ADEC recognizes that EPA"s Regional Haze rule requires consultation with the Federal Land Managers on the state"s Regional Haze State Implementation Plan (RH SIP) and appreciates your feedback on this important component of the plan. However, there was also a regulatory review process that the state adhered to and completion of that process delayed a formal response to your comments.

Under 18 AAC 50.260(m), an informal review of the final BART determination may be requested as prescribed in 18 AAC 15.185 and an adjudicatory hearing of the final BART determination may be requested as prescribed in 18 AAC 15.195 – 18 AAC 15.340. The deadline for submitting requests for informal reviews is within 15 days after receiving the department"s decision and the deadline for seeking an adjudicatory hearing is within 30 days after a decision is made. Your comments were received through email by my staff on March 11, 2010, and were outside the regulatory window for informal review and do not request an adjudicatory hearing. As a result, we are now addressing your comments as part of our on-going and required consultation on the SIP, outside of the regulatory review process in 18 AAC 50.260(m). We are addressing your concerns related to Steps 3, 4, and 5 of the BART determination process from your March 11, 2010 letter.

It is important to note that ADEC"s determination is based on the known analysis and information provided through the BART determination public comment period to complete the Regional Haze SIP. GVEA submitted the BART analysis, and ADEC reviewed the analysis following the 5 step BART process. Since the end of the public comment period, more information has become available regarding BART determinations throughout the nation. However, a reevaluation of the available existing data or new data would require more time, associated costs, and possible additional comments from the affected sources. The comments were considered in the context of: "Is this new information that would result in a change in the ADEC determination? " We recognize that the record should include a documented analysis of the BART process.

NPS Comments on ADEC's BART determination for NO_x Control at Healy Unit 1

STEP 3-- Evaluate Control Effectiveness of Remaining NO_x Control Technologies
ADEC cites the expected NO_x emission rates for these technologies in Table 5-1 of its final BART report.

NPS Comment: In the Response to Comments document, ADEC acknowledged our concerns that GVEA"s SCR NO_x control efficiency and related emission limit were understated, but noted the data we provided in June 2009 reflect SCR performance for systems operating only during the ozone season. ADEC determined, due to uncertainty in continuous system operation in a harsh Alaska environment, with only limited time for catalyst cleaning and system maintenance, the proposed GVEA emission limit of 0.07 lb/mmBtu assuming 75% NO_x control was adequate to evaluate the SCR retrofit option.

NPS continues to believe that SCR can achieve at least 90% NO_x control and reduce emissions to 0.05 lb/mmBtu or lower. We provided evidence in our June 2009 comments that vendors have quoted NO_x levels as low as 0.05 lb/mmBtu. The references below provide additional information from industry sources that supports our understanding that SCR can achieve 90% reduction[2] and reduce emissions to 0.05 lb/mmBtu or lower[3] on coal-fired boilers. EPA Clean Air Markets (CAM) data for 2009 (Appendix A.) show that SCR can achieve year-round emissions of 0.05 lb/mmBtu or lower at 19 coal-fired EGUs, two of which are wet-bottom, wall-fired units like Healy #1. Based on vendor guarantees, we continue to believe that SCR is capable of 0.05 lb/mmBtu (or lower) annual NO_x emissions at Healy #1.

Department Response: *The potential for other SCR systems capable of achieving an emission rate of 0.05 lb NOx/MMBtu (or less) is acknowledged, as reflected in both the March 11, 2010 submittal by the NPS and the Department's prior related discussion in the Response to Comments (RTC) document, NPS Comment 1 (page 35 of 50), and Section 5.1 of the Final Determination Report (as revised on June 1, 2010). However, it is emphasized that the Department has considered the entirety of information and the full array of results from the BART five-factor analysis and the conclusion remains the same pertaining to the SCR control option. By example, the following further consideration is offered:*

Assuming a more restrictive SCR option emission limit of 0.05 lb NOx/MMBtu would result in an average cost effectiveness of about $15,000/ton of pollutant removed (8-year amortization period; with about 342 tons NOx reduction at this emission limit. This cost effectiveness is only marginally lower than the $15,762/ton cost effectiveness (Table 6-1 of the Final BART Report), based on 313 tons NOx removed at 0.07 lb/MMBtu. This annualized cost does not affect the projected total installed capital and operating costs presented in Table 6-1 of the Final Report. The lowered annual cost effectiveness remains almost 10 times the presumptive cost metric

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[2] May 2009 Institute of Clean Air Companies white paper titled "Selective Catalytic Reduction (SCR) Control of NO_x Emissions form Fossil Fuel-Fired Electric Power Plants" and the June 13, 2009 "Power" magazine article "Air Quality Compliance: Latest Costs for SO2 and NOx Removal (effective coal clean-up has a higher–but known–price tag)" *by* Robert Peltier. http://www.masterresource.org/2009/06/air-quality-compliance-latest-costs-for-so2-and-nox-removal-effective-coal-clean-up-has-a-higher-but-known-price-tag/

[3] 12/15/09 presentation by Rich Abram of Babcock Power to the Minnesota Pollution Control Agency. Not only does Babcock Power say that SCR can achieve 0.05 lb/mmBtu, they are currently designing systems to go as low as 0.02 lb/mmBtu.

established by EPA in the BART rule preamble (i.e., $1,500/ton). For the reasons provided in the RTC document (page 39 of 50, Comment 4), visibility predictions are not linear with respect to emission rate and are not readily revised versus the values shown in Final Report Table 8-1 for this control option; however, based on results already predicted, the decreased emission rate would result in an approximate 0.025 deciview improvement which is deemed insignificant. In general, this lower rate results in the same conclusion presented in the Final Report.

NPS Comment from March 11, 2010: We assert that this provision of the BART guidelines requires ADEC, if it accepts the 2024 shutdown as a basis for an eight-year amortization period, to include this shutdown date as a federally or State enforceable permit condition. The provision (40 CFR 51, Appendix Y, Section IV.D.4.k.2) states:

> For purposes of these guidelines, the remaining useful life is the difference between:
>
> (1) The date that controls will be put in place . . . .; and
> (2) The date the facility permanently stops operations. **Where this affects the BART determination, this date should be assured by a federally- or State-enforceable restriction preventing further operation.** (Emphasis added)

If ADEC has the authority to require installation of BART in less than five years after SIP approval, then ADEC should exercise that authority. It is likely that the less capital-intensive control options could be implemented more quickly than five years. If the remaining useful life is extended because the control technology becomes operational before 2016, that control option would be less expensive on an annualized basis. ADEC should pursue this option.

ADEC is currently working to reissue the Title V permit for Healy Unit 1. We recommend that this permit revision include shutdown of Healy Unit 1 by 2024 as a permit condition, if the BART determination for NO_x control at Healy Unit 1 is a control technology other than SCR.

NPS Comment from August 23, 2010: The major concern identified in the August 23, 2010, letter was Alaska‟s determination that Selective Non-catalytic Reduction (SNCR) is considered BART for Healy Unit 1 based on a remaining useful life of eight years (shutdown in 2024). The BART guidelines (40 CFR 51, Appendix Y, Section IV.D.4.k.2) require that if the shutdown date "affects the BART determination, this date should be assured by a federally- or State-enforceable restriction preventing further operation." Alaska must make the shutdown of Healy Unit 1 in 2024 legally enforceable. If the shutdown is not made legally enforceable, then BART would be the use of Selective Catalytic Reduction as previously determined by Alaska.

Department Response: *ADEC acknowledges the NPS comments of March 11, 2010 (above top) and the August 23, 2010,(above below) regarding the potential to require GVEA to shutdown Healy Unit 1 in 2024; ADEC recognizes that under 40 CFR 51, Appendix Y, Section IV.D.4.k.2*[4]

[4] k. How do I take into account a project‟s „„remaining useful life‟‟ in calculating control costs?

3. For purposes of these guidelines, the remaining useful life is the difference between:

EPA recommends that if the date a facility permanently stops operation is used to calculate control costs that the date should be used to establish an enforceable restriction on operations. However, this is a recommendation in the BART Rule and not a requirement.

ADEC addressed the issue of including language in the final report which would require shutdown during the response to request for informal review received from GVEA. In GVEA's request for review, they asserted that there was nothing in the BART regulations that would permit the Department to shut down Unit 1. In response, ADEC stated:

> *The Department fully expects the useful life of Healy Unit 1 will end in 2024, based on GVEA's representations in their BART submittals. If circumstances change and it makes sense to operate Healy Unit 1 beyond 2024, the Department will evaluate the situation at that time. The Regional Haze SIP provides additional opportunities to evaluate visible impacts of Healy Unit 1 under the reasonable progress process. In regards to a shutdown under the BART rules, GVEA should be aware that the BART guidelines (BART Guidelines 40 CFR 51, Appendix Y, Section IV.D.4.k.2) do provide for the implementation of BART or the shutdown of a BART eligible unit should that unit operate beyond the useful life presumed in the BART determination.*

The language in the revised final report reads:

> ***9.1 BART Emission Limits***
>
> *The final BART emission limits recommended for Healy Unit 1 in accordance with 18 AAC 50.260(l) are summarized in Table 9-1 below. As discussed herein, the BART emission limits are based on an 8-year remaining useful life for Healy 1 (from calendar year 2016) which is provided for at Section IV.D.4.K of 40 CFR 51, Appendix Y. The BART emission limits are compared to current permitted pollutant emission limits which remain in effect.*

As discussed in the Response to Comments document (page 37 of 49) and the tables found at the end of the document, ADEC established the BART determination based on a comparison of the costs of control between an 8 year expected life span and a 15 year expected life span of Healy Unit 1. The tables show that the costs did not differ significantly, and the considerably higher costs of an SCR system over other control options, regardless of either expected life span, resulted in ADEC determining that the benefits to be achieved at the higher cost of SCR would not result in a significant visibility improvement/cost.

NPS Comment: Re-evaluate Control Costs

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(1) The date that controls will be put in place (capital and other construction costs incurred before controls are put in place can be rolled into the first year, as suggested in EPA"s *OAQPS Control Cost Manual*); you are conducting the BART analysis; and

(2) The date the facility permanently stops operat*ions. Where this affects t*he BART determination, this date should be assured by a federally- or State-enforceable restriction preventing further operation.

We commend GVEA for retaining the services of a reputable vendor of NO_x control equipment and systems to provide a site-specific estimate of the costs of SNCR and SCR. However, we note that an additional $8.6 million in capital costs was added to the Fuel Tech SCR Capital Cost Estimate Total of $13.3 million and additional 20% contingency costs were applied to both the Capital and Operation and Maintenance (O&M) costs. The costs used by Fuel Tech were substantially higher than provided by GVEA in Appendix A of its initial BART submittal. We request a more detailed explanation for those additional costs.

Department Response: *Except for minor discrepancies with the GVEA June 2009 revised cost analysis that we cited in Section 6.1 of the Final Report, we conducted a general review of the information presented by GVEA and found it to be reasonable. ADEC did conduct a review in consideration of the 5 step BART process, the reputable GVEA vendor, increased costs, and the required time elements for the BART/RH SIP submittal. The NPS has the same Fuel Tech report and detailed SCR cost spreadsheets (prepared by CH2M Hill) that we received as part of the GVEA June 2009 comments submittal.*

The Fuel Tech Study had the following cost elements (all are costs associated with the SCR installation): $13.3 million for the purchase price of the SCR, plus $5 Million for miscellaneous capital costs based on the re-design to retrofit the SCR unit. These costs include other equipment, fans, duct work, bracing, and other elements related to the retrofit on the 25 MW unit. An additional 20% contingency was applied to the combined capital cost basis of $3.6 million. The total SCR installed capital cost, therefore, would be $21,860,887.

NPS Comment: We continue to disagree with GVEA"s use of the CUECost tool rather than the EPA Control Cost Manual to develop cost estimates for SCR. The EPA Control Cost Manual is more appropriate for units as small as 25 MW. ADEC in the Response to Comments document acknowledges that the SCR cost information in the CUECost manual is most applicable to units with capacities ranging from 100 to 200 MW, units that are larger than Healy Unit 1.

Department Response*: The NPS concern about the use of CUECost is noted. ADECs Response to Comment document addresses the use of the CUECost tool in the responses to the GVEA comments (page 18 of 49) and to the NPS comment 2 (page 38 of 50).*

The CUECost was used in conjunction with specific data. The BART Guideline supports the use of site–specific design and conditions that affect the cost of particular BART analyses. GVEA used a reputable contractor, Fuel Tech, to conduct their site specific study and revised their SCR cost evaluation using the Fuel Tech data for their CUECost cost analysis. GVEA included a revised economic analysis for SCR based on the Fuel Tech information with their June 15 and June 19, 2009, comment letters.

ADEC's contractor reviewed Appendix B submitted by the NPS. When the NPS used the EPA cost control with the same numbers that ADEC used in the CUECost analysis, the results were $15,782/ton and the NPS results were $15,748/ton. The lower cost shown in NPS comments of $12,794 was achieved using a combination of numbers from the ADEC analysis and default numbers, not data specific to the site. ADEC finds it unlikely that using the EPA control cost manual estimation tool would result in a different conclusion for BART.

NPS Comment: Finally, ADEC used an 8% interest rate instead of the 7% rate specified by the EPA Cost Manual.

Because the OFA w/ROFA® option is only marginally more expensive (on a $/ton basis) that the proposed SNCR, and because the $/dV is still well below the national average, we request that ADEC provide information on how those costs were derived and re-evaluate this option using the 7% interest rate recommend by the EPA Control Cost manual. In conducting that re-evaluation, we ask that ADEC provide information on the amount of time necessary to install this option.

Department Response: *ADEC's BART determination was based on the full analysis using the 5 step process. Please review Section 8 of the Final Report, in particular pages 41 & 42, that spells out the bases for the determination, items1-13. ADEC has concerns that the time and expense required to continue to reanalyze the data will do little to advance the BART determination and would further delay the submittal of the Regional Haze SIP. At the time the analysis was submitted by GVEA, the 8% rate appeared to be reasonable for the cost of capital for a co-op utility the size and scope of GVEA.*

The change to the 7% rate would affect the cost but not the end conclusion. The 7% rate would apply to all control options; therefore the ratio of cost vs. benefit would remain the same. An emission rate based on SNCR control technology was determined not solely on cost, but for the reasons listed on pages 41 & 42 in the Final Report. The costs of three control options (Table 8-1) were within range of one another, and the SCR option was a significant magnitude higher. NPS has often commented that cost is not the only factor for a BART determination but now is requesting that one option be reevaluated based solely on cost. In addition, there is a request that a study or increased analysis be done at the time for installation. ADEC would need to solicit a contractor or request the analysis from GVEA. This will only cause delay in the Regional Haze SIP with no clear evidence that the conclusion will change.

NPS Comment: In January 2009, we provided a summary of SCR retrofit capital investment costs for BART eligible boilers in the range of $80/kW to $270/kW. The site-specific SCR cost ($874/kW) shown in Table 6-1 is more than three times greater than the upper bound of this cost range. We continue to believe that the $874/kW cost estimate provided by ADEC is overestimated. Industry data cited in footnote 1 continue to indicate that capital costs greater than $200/kW are very unusual. We recognize that the size and location of Healy #1 would likely result in higher SCR costs, but we continue to question the $874/kW capital cost estimate.

ADEC estimates the average annual cost-effectiveness for NO_x control on Healy 1, based on eight-year amortization of capital costs, ranges from $847/ton for the optimization of the current

LNB+OFA system to over $15,700 for existing combustion controls plus SCR on Healy 1. Using the ADEC estimates for Capital and certain O&M costs, and assuming that SCR would reduce NO_x emissions to 0.05 lb/MMBtu, our application of the EPA Cost Manual yielded $12,794/ton for SCR at Healy Unit 1 (Please see Appendix B.).

***Department Response**: ADEC addressed the cost of SCR option in the Response to Comment Document, Comment 2, (page 38 of 50). The Fuel Tech report is a site-specific study conducted by a reputable contractor. While an exhaustive study might have resulted in the adjustment of specific elements of the report, the final conclusion is not likely to change. The example of the $874/kW capital cost is based on the Fuel Tech report and their analysis.*

Even if the NPS figures represent the cost of SCR, those figures result in a cost of $12,794/ton for SCR -- 8.5 times greater than the presumptive BART cost of $1,500/ton. Thus, further refinement of the cost figure would not change the department's conclusion that SCR does not represent BART.

STEP 5 – Evaluate Visibility Impacts.

NPS Comment: BART is not necessarily the most cost-effective control option. All of the options evaluated result in cost/deciview values that are well below the $13 - $20 million average $/dV costs that are being proposed as BART by other sources and states.[5]

***Department Response:** The BART analysis is a case by case determination using the 5 factors in the BART Guideline. With respect to the emission limit content, please see the Response to Comment Document, NPS comment 1. ADEC acknowledges the NPS comment; however, the average cost of BART projects nationwide is certainly a moving target. NPS's compilation table is updated on a regular basis with national data from units of various size. The summary statistics provided in Appendix A to the Findings Report, and the related discussions in Sections 8.1 and 8.2, would not be altered based on the new summary data. In addition, the GVEA analysis includes a site specific SCR cost study. ADEC's analysis compared "apples to apples" when we first reviewed the NPS summary data, meaning we looked at units similar to Healy, not the total range of much larger units. The cost of $13-$20 million average for $/dV is for BART sources of much larger size than the GVEA 25 MW source.*

NPS Comment: It is likely that GVEA has underestimated the visibility improvement that would result from any NO_x reductions. This is because time is required for NO_x to react with atmospheric ammonia to form the ammonium nitrate particles that impair visibility. Unless transport winds from Healy #1 to DNPP are very slow, it is unlikely that the NO_x would have had sufficient transport time to react to form secondary aerosol particles by the time it reaches the nearest boundary of the park.

***Department Response:** All the Alaskan BART eligible sources were evaluated using the CALPUFF modeling suite, in accordance with 18 AAC 50.260. GVEA has evaluated visibility impacts consistent with the rule, as discussed in Section 7 of the Findings Report.*

[5] Our most recent compilation of BART projects was sent to ADEC recently.

NPS Comments on ADEC's BART determination for SO_2 Control at Healy Unit 1

NPS Conclusions and Recommendations on SO_2 BART

- In general, the ADEC report was well-written, clearly followed the five-step BART process, and thoroughly explained ADEC"s conclusions.
- It is essential that any evaluation that is contingent upon shutdown of Healy #1 by a specific date must contain an enforceable condition to validate that evaluation.
- ADEC presented a full suite of SO_2 control options but did not adequately assess the effectiveness of the LSD and WLS options. As a result, ADEC has underestimated the benefits of adding LSD or WLS scrubbers.
- ADEC has overestimated the costs associated with adding LSD or WLS scrubbers.
- It is likely that visibility improvement greater than those predicted by GVEA would be found if a more-refined, receptor-by-receptor analysis is conducted throughout DNPP. This would result in an even lower cost/deciview.
- BART is not necessarily the most cost-effective option. The increased sorbent injection option evaluated results in a cost/deciview value that is well below the $13 - $20 million average $/dV costs that are being proposed as BART by sources and states. Increased sorbent injection should be considered as a viable BART option.

Department Response: *The Department addressed the NPS comments on SO_2 in the Response to Comment Document of January 15, 2010. Please refer to NPS comments 7 -9 (pages 40-43 of 49) and Sanjay Narayan's comments (pages 29-31 of 49)*

There were several key considerations which factored in the Department's determination.

In regards to the effectiveness of the wet scrubbing, the NPS acknowledges the lack of evidence and the content of the fuel as factor. Page 9 of the NPS March 11 comment letter states:

> *"*However, we also understand that ADEC would be reluctant to assume that either type of scrubber can achieve such low limits without evidence that scrubbers have achieved or been permitted at these rates. And, we recognize that SO_2 removal efficiency and the controlled emissions are highly dependent upon the fuel quality and the resulting uncontrolled SO_2 emissions."

In consideration of the cost impact on the tiny 25MW facility without specific site data and clear indications that the fuel sulfur content is an issue, additional analysis which would result in increased costs and extend the time for the SIP submittal is not likely to result in a change in the final conclusion.

*NPS commented that, "*visibility improvement greater than those predicted by GVEA would be found if a more-refined, receptor-by-receptor analysis is conducted throughout DNPP."

A receptor-by-receptor analysis is not required in the BART Guideline.

GVEA used the full range of DNPP receptors in the CALPUFF visibility modeling analysis, as taken from http://www2.nature.nps.gov/air/maps/Receptors/index.cfm (see Section 7.1 of the Findings Report). Ranked delta-deciview visibility impacts were determined by GVEA using CALPOST for the pre- and post-control scenarios. While the BART Guideline requires a comparison of the 98th percentile days for the pre- and post-control scenarios, GVEA conducted the required comparative assessment using maximum delta-deciview values (pre- versus post-control) since only one year of meteorological data was used in the analysis. This is consistent with Department BART modeling requirements. The comparative analysis results were presented in Section 7.4 of the Findings Report. Although the comment on the full range of receptors is acknowledged, a receptor-by-receptor analysis is not required in the BART Guideline.

In addition, the increase potential of a brown plume only 8km from the DNPP must be considered in the BART determination.

Alaska Regional Haze Rule State Implementation Plan
Technical Corrections

Comment : Page (III.K.) 2-19: It would be helpful if Table III.K.2-2 were repeated immediately before the charts and graphs in section III.K.4, to serve as a key to the IMPROVE abbreviations.
Response: This table is a key to pollutant species, abbreviations, and color representation in charts and figures throughout the document. We have chosen not to repeat the table, because it would lengthen the document substantially. Instead we rely on legends embedded in images, and textual identification of aerosol species and color relationships.

Comments:

Page 3-10: "Bettles" is the correct spelling.

Page 3-11: Please correct the following errors in the description of Denali NP&P:

- The park is not "almost treeless." A large portion of the park is forested.
- The park road is 92 miles long, not 89, and it extends into the center of the park, not the northeastern corner.
- The 130-yard access road to the air quality monitoring site also provides access to a water treatment facility, not a single-family residential cabin.
- The main visitor season runs mid-May to mid-September, not the other way around.

Page 3-12: Site description, continued:

- The Denali NP&P monitoring site, not the highest point of Healy Ridge, is located approximately two miles west of the Nenana River.
- Windy Pass is nowhere near the monitoring site (and it is south, not east, of the monitoring site).

Page 3-13: There are no longer any Federal Reference Method PM $_{2.5}$ monitors located at Denali NP&P.

Page 4-2: second to last paragraph: monitoring began at three sites in 2001, not 2002 (2002 was the first full year of sampling).

Page 4-20: Typo in the note for Figure 4-7: Total aerosol extinction should be 26.6, not 26.2.

Page 4-46: Available baseline data, first paragraph:

- The Denali NP&P monitoring site is not located in or near a canyon.
- It is incorrect to describe the Trapper Creek site as being on the "southern border" of the park. The Trapper Creek station is located more than 20 miles from the park boundary.
- Monitoring began at Trapper Creek in 2001, not 2002.

Page 4-46, second to last paragraph: The second reference to Trapper Creek baseline extinction should be 8.8 Mm^{-1}, not 6.8.

Page 8-4: Healy Unit 2 is located 3.8 miles from Denali NP&P, not 8 miles.

Response: These details have been checked, and changes have been made including slight changes to the surrounding text. Because the park road falls entirely in the northeastern area of the Park, it cannot be described as "the center of the park".

Comment: Page 4-8: Table 4-3 appears to contain a typo and an apparent rounding error. The Simeonof worst haze natural conditions should be 15.6 dv, not 5.6. The Tuxedni 10-year glide slope should be 0.5 dv, rounded up from 0.465 or 0.467. If the Tuxedni 10-year glide slope is 0.5 dv, then on Page 4-6, the last sentence should indicate that only Denali falls below the ranges for the rest of the country. This will also affect the notation at the bottom of Figure 4-2 and the text on Page 4-18.

Response: The Simeonof figure has been corrected. A slight discrepancy in natural conditions estimates and 10-year glide slopes originated in the Final Report of the Natural Haze Levels II committee to the RPO Monitoring/Data Analysis Workgroup. This discrepancy has been resolved, and now affects only Figures III.K.4-1&2.

Comment: Pages 3-3 to 3-6: Please consider referring to Asian anthropogenic emissions separately from Asian dust. Both are transported across the Pacific Ocean into Alaska, but not all transport events contain both components.

Response: Asian anthropogenic emissions and Asian dust do contribute separately to trans-boundary pollution entering Alaska. Sources of these emissions are discussed in sections

United States Department of the Interior

FISH AND WILDLIFE SERVICE
National Wildlife Refuge System
Branch of Air Quality
7333 W. Jefferson Ave., Suite 375
Lakewood, CO 80235-2017

IN REPLY REFER TO:

FWS/ANWS-AR-AQ

August 23, 2010

Ms. Alice Edwards, Acting Director
Division of Air Quality
Alaska Department of Environmental Conservation
PO Box 111800
Juneau, AK 99501

Subject: Regional Haze State Implementation Plan Comments

Dear Ms. Edwards:

On June 23, 2010, the State of Alaska submitted for Federal Land Manager review the proposed revisions to the Alaska State Air Quality Control Plan [State Implementation Plan (SIP)], describing its proposal to improve air quality regional haze impacts at mandatory Class I areas across your region. We appreciate the opportunity to work closely with the State through the initial evaluation, development, and, now, subsequent review of this plan. Cooperative efforts such as these ensure that, together, we will continue to make progress toward the Clean Air Act's goal of natural visibility conditions at all of our most pristine National Parks and Wilderness Areas for future generations.

This letter acknowledges that the U.S. Department of the Interior, U.S. Fish and Wildlife Service (FWS) and the National Park Service (NPS), have received and conducted a substantive review of your proposed Regional Haze Rule implementation plan in fulfillment of your requirements under the federal regulations 40 CFR 51.308(i)(2). Please note, however, that only the U.S. Environmental Protection Agency (EPA) can make a final determination regarding the document's completeness and, therefore, ability to receive federal approval from EPA.

As outlined in a letter to each State dated August 1, 2006, our review focused on eight basic content areas. The content areas reflect priorities for the Federal Land Management agencies, and we have enclosed comments associated with these priorities. We look forward to your response, as per section 40 CFR 51.308(i)(3). For further information, please contact Tim Allen (FWS) at (303) 914-3802 or Pat Brewer (NPS) at (303) 969-2153.

TAKE PRIDE IN AMERICA

Again, we appreciate the opportunity to work closely with the State of Alaska and compliment you on your hard work and dedication to significant improvement in our nation's air quality values and visibility.

Sincerely,

Sandra V. Silva, Chief
Branch of Air Quality
Fish and Wildlife Service

John Bunyak, Acting Chief
Air Resources Division
National Park Service

Enclosure (1)

cc:

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Research Triangle Park, NC 27711

U.S. Fish and Wildlife Service
And
National Park Service
Comments Regarding
Alaska Regional Haze Rule State Implementation Plan
August 23, 2010

On June 23, 2010, the State of Alaska submitted the Alaska State Air Quality Control Plan [State Implementation Plan (SIP)] Revision for the Regional Haze Program, pursuant to the requirements codified in Federal rule at 40 CFR 51.308(i)(2), to the U.S. Department of the Interior, U.S. Fish and Wildlife Service (FWS) and National Park Service (NPS).

The air program staff of the FWS and NPS has conducted a substantive review of the Alaska plan and provides the comments listed below. We are providing these comments to the State and ask that these be included in the official public record. We look forward to a response as per section 40 CFR 51.308(i)(3), and we are willing to work with the Alaska Department of Environmental Conservation (ADEC) staff towards resolving any of the issues discussed below. For further information, please contact Tim Allen with FWS at (303) 914-3802 or Pat Brewer (NPS) at (303) 969-2153.

Overall Comments

Overall the Alaska draft SIP is comprehensive and well written. It has a descriptive Executive Summary, a detailed discussion of monitoring data, source contributions, and existing regulations.

Specific Comments

Chapter K.3 Alaska and Air Quality

1. The SIP should include a commitment to future air quality monitoring to support the regional haze demonstration.

2. *Page K.3-12 and page K.4-46:* EPA's *Guidance for Tracking Progress under the Regional Haze Rule* lists Denali Headquarters as the official IMPROVE site and Trapper Creek as the protocol site. NPS will be providing additional comments in a separate letter regarding the IMPROVE monitoring sites and park description.

3. *Section E. Bering Sea Wilderness Area (pg K.4-118*): While monitoring data are not available for the Bering Sea, Alaska needs to consider source contributions and potential impacts to this wilderness area.

Chapter K.5 Emissions Inventory

1. *Section A: Baseline and Future-Year Inventories*: ADEC should clarify the emissions assumed for 2018 for the Golden Valley Electric Association (GVEA) – Healy Power Plant [Healy] Units 1 and 2, located less than four miles from Denali National Park. The Denali Borough 2018 emissions listed in Appendix III.K5 are much lower than the allowable emissions for Healy Unit 2, and supporting documentation in the current Title V renewal permit indicates Unit 2 will be restarted before the year 2018. If the Healy Unit 1 and 2 emissions were not included in the 2018 emission inventory, then the implications of not including the emissions should be discussed in the interpretation of the Weighted Emissions Potential (WEP) analysis for Denali.

2. *Section B: 2002 Baseline Inventory and Section D Inventories for Specific Source Categories (pg K.5-3 and K.5-4):* Alaska states that fire data were obtained from the WRAP Fire inventory efforts. ADEC should clarify if Alaska provided state-generated fire activity data to WRAP or if the WRAP relied on wildfire data from federal records. In addition ADEC should explain why the prescribed fire emissions appear to be extremely low, given the open burning discussion in Section K.9.C.1.

Chapter K.6 Best Available Retrofit Technology (BART)

1. Regarding the Agrium, Kenai Nitrogen Operations Plant, ADEC proposed that BART emission limits for nitrogen oxides, sulfur dioxide, and particulate matter for BART eligible units be set at zero, since the plant is not currently operating. Reducing the federally-enforceable emission limits for these units to zero, and specifying that a new Prevention of Significant Deterioration (PSD) permit application, review, and approval, would be needed prior to any future operation of the units, is acceptable to us for meeting the Regional Haze Rule obligations for this source.

2. In a letter dated March 11, 2010, the National Park Service commented on Alaska's BART determination for GVEA's Healy Plant Unit 1. At this time, a response to these comments has not been received. The major concern identified in the letter was Alaska's determination that Selective Non-catalytic Reduction (SNCR) is considered BART for Healy Unit 1 based on a remaining useful life of eight years (shutdown in 2024). The BART guidelines (40 CFR 51, Appendix Y, Section IV.D.4.k.2) require that if the shutdown date "affects the BART determination, this date should be assured by a federally- or State-enforceable restriction preventing further operation." Alaska must make the shutdown of Healy Unit 1 in 2024 legally enforceable. If the shutdown is not made legally enforceable, then BART would be the use of Selective Catalytic Reduction as previously determined by Alaska.

Chapter K.9 Reasonable Progress Goals

1. *Section 2. Identification of Sources for Four Factor Analysis (pg K.9-4):* Alaska needs to demonstrate that it is making reasonable progress in reducing anthropogenic emissions within the state. Alaska's approach to determine which source categories to evaluate is appropriate. Alaska should extend the analysis to consider feasible controls for individual sources within these sources categories. The WRAP point source pivot tables identify the major individual sources within each source category. Visibility impacts from sources exempted from BART (e.g., Anchorage Municipal Light &Power, and Conoco Phillips Alaska Inc) and Healy Unit 2 are not negligible and controls for these sources should be considered as part of the reasonable progress analysis. CALPUFF could be used to consider the cumulative visibility impacts of the major industrial sources.

2. *Section E:* ADEC should clarify that the reasonable progress goals for 2018 were set by comparing the percentage changes in anthropogenic contributions between 2002 and 2018 from the WEP analyses to the target uniform rate of progress by 2018.

3. In the Reasonable Progress section, the SIP should mention the anthropogenic sources near Bering Sea (e.g. oil and gas production) and how the emissions changes between 2002 and 2018 for these sources might affect visibility in the Bering Sea Wilderness area.

United States Department of the Interior
NATIONAL PARK SERVICE
Air Resources Division
P.O. Box 25287
Denver, CO 80225

IN REPLY REFER TO:

March 11, 2010

N3615 (2350)

Alice Edwards, Director
Division of Air Quality
Alaska Department of Environmental Conservation
410 Willoughby Ave., Suite 303
P. O. Box 111800
Juneau, Alaska 99811-1800

Dear Ms. Edwards:

The purpose of this letter is to convey the concerns of the National Park Service (NPS) with the Alaska Department of Environmental Conservation's (ADEC's) final Best Available Retrofit Technology (BART) determination for Golden Valley Electric Association's (GVEA's) Healy Unit 1. Healy Unit 1 is located approximately six km from Denali National Park and Preserve (DNPP), a Class I air quality area administered by the NPS. Based on GVEA's air quality modeling analyses, emissions from Unit 1 cause visibility impairment at DNPP. We would like to work with ADEC and GVEA to further mitigate these impacts.

ADEC published a preliminary BART determination on May 12, 2009, that proposed Selective Catalytic Reduction (SCR) technology as BART for nitrogen oxide (NO_x) emissions controls for Healy Unit 1. In addition, ADEC proposed the existing dry sorbent injection system for sulfur dioxide (SO_2) controls and the existing reverse gas baghouse system for particulate matter controls as BART for Unit 1. During public comment on the preliminary BART determination, the NPS commented in support of SCR for NO_x controls and recommended additional evaluation of SO_2 controls. Following public comment, ADEC revised its BART determination for NO_x controls at Healy Unit 1 to be Selective Non-Catalytic Reduction (SNCR) technology rather than SCR. This decision was documented in ADEC's Final BART Determination Report dated January 19, 2010, which was released on February 9, 2010. We have several concerns with this decision. Our detailed comments are enclosed, and summarized below.

A key factor in ADEC's revised BART determination is GVEA's revised assumption that the remaining useful life for Healy Unit 1 is approximately 15 years from 2009 (i.e., a 2024 unit shutdown). If EPA approves the Alaska Regional Haze State Implementation Plan in 2011 and five years are allowed for installation of control technology, then control equipment would begin operation in 2016. If Unit 1 shuts down in 2024, then the appropriate cost amortization period for capital costs is eight years. ADEC accepted the eight-year amortization period, and based its control cost calculations on that assumption. The BART guidelines (40 CFR 51, Appendix Y, Section IV.D.4.k.2) require:

> For purposes of these guidelines, the remaining useful life is the difference between:
>
> (1) The date that controls will be put in place. . . . ; and
> (2) The date the facility permanently stops operations. **Where this affects the BART determination, this date should be assured by a federally- or State-enforceable restriction preventing further operation.** (emphasis added)

Because ADEC accepted the 2024 shutdown as a basis for an eight-year amortization period, it should include this shutdown date as a federally-or State-enforceable permit condition. Without enforceable shutdown in 2024, SNCR is not an acceptable BART determination, and ADEC should revert back to its original determination that SCR is BART. Since the Title V operating permit for the Healy Power Plant is partway through the renewal process, we recommend that ADEC include such a shutdown provision in the final Title V permit.

We remain concerned that GVEA and ADEC are understating the potential efficiency of NO_x and SO_2 controls and overstating the potential costs of these controls. In the enclosed comments, we provide additional references to industry cost and efficiency data. Using the approved EPA Control Cost Manual, we find lower costs per ton and costs per deciview than those reported by GVEA and ADEC. Because Unit 1 is so close to Denali National Park and Preserve, the cost per deciview of visibility improvement for SCR is very favorable, at $5.5 million/dv. Therefore, we still believe that SCR technology for Healy Unit 1 is feasible. We also request that ADEC reconsider the additional benefits of the ROFA® and Rotamix® NO_x control technologies and reassess those technologies as BART alternatives to SNCR. Furthermore, we request that ADEC consider additional SO_2 emissions reductions through increased injection of dry sorbent.

Finally, we are concerned that because ADEC made a substantive change from its proposed SCR BART determination to its final SNCR determination, ADEC should have provided us and the public an opportunity to comment on the change before making a final BART determination. Nevertheless, we understand that ADEC intends to consider public comments on this final BART determination as part of the comment period for the Regional Haze State Implementation Plan. We appreciate the additional comment opportunity and will provide any follow-up comments at that time.

We would welcome the opportunity to continue discussions of BART control options for Unit 1. In the meantime, if you have any questions regarding this matter, please contact Don Shepherd of my staff at (303) 969-2075.

Sincerely,

John Bunyak

John Bunyak
Chief, Policy, Planning and Permit Review Branch

Enclosure

cc: (w/enc.)
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National Park Service (NPS) Comments on
Alaska Department of Environmental Conservation (ADEC)'s Final
Best Available Retrofit Technology (BART) Determination for
Golden Valley Electric Association (GVEA), Healy Power Plant, Unit 1
March 11, 2010

Description and Background

Healy #1 is a 25-MW unit located in Healy, Alaska, approximately six kilometers from Denali National Park and Preserve (DNPP), a Class I area administered by the NPS. The Healy plant is operated by Golden Valley Electric Association (GVEA). Unit #1 is a wall-fired, wet-bottom boiler manufactured by Foster Wheeler. Low NOx burners (LNB) and over-fired air (OFA) ports were installed in 1996. Particulate emissions are collected by a reverse gas baghouse installed in the early 1970s. Sulfur oxides are controlled by a dry sorbent injection system installed in 1999. At the present time sodium bicarbonate is the sorbent which is injected into the flue gas after the air heater.

ADEC contracted with Enviroplan Consulting to review the BART control analysis submitted in July 2008 by GVEA. ADEC published a preliminary BART determination on May 12, 2009, that proposed Selective Catalytic Reduction (SCR) technology as BART for nitrogen oxide (NO_x) emissions controls for Healy Unit 1. ADEC proposed the existing dry sorbent injection system for sulfur dioxide (SO_2) controls and the existing reverse gas baghouse system for particulate matter (PM_{10}) controls as BART for Unit 1. During public comment on the preliminary BART determination, the NPS commented in support of SCR and recommended additional evaluation of SO_2 controls. Following public comment, ADEC revised the BART determination for NO_x controls at Healy Unit 1 to be Selective Non-Catalytic Reduction (SNCR) technology rather than SCR. This decision was documented in ADEC"s Final BART Determination Report dated January 19, 2010. We have several concerns with this decision. Our comments are discussed in detail below.

NPS Comments on ADEC's BART determination for NO_x Control at Healy Unit 1

STEP 1 -- Identify All Available Retrofit NO_x Control Technologies,

NPS agrees with the ADEC"s conclusions on available technologies:

- Optimizing the Existing Low NO_x Burner/Over-Fire Air System (LNB/OFA)
- Rotating Opposed Fire Air (ROFA®)
- ROFA® with Rotamix®
- Selective Non-Catalytic Reduction (SNCR)
- Selective Catalytic Reduction (SCR)

STEP 2-- Eliminate Technically Infeasible Options,

We agree with the ADEC"s approach.

STEP 3-- Evaluate Control Effectiveness of Remaining NO_x Control Technologies

ADEC cites the expected NO_x emission rates for these technologies in Table 5-1 of its final BART report.

Table 5-1: Control Effectiveness of the NOx Control Options for Healy 1

Control Technology	Control (1) Efficiency (%)	Projected Emission Rate (lb/mmBtu)
Current Operation (LNB w/OFA)	-	0.28
Optimize Existing LNB w/OFA	18	0.23(2)
LNB w/OFA & SNCR	32	0.19
Replace OFA with ROFA®	46	0.15
ROFA and Rotamix®	61	0.11
LNB w/OFA & SCR	75	0.07

(1) Relative to the current controlled baseline emission rate of 0.28 lb/mmBtu.
(2) Presumptive limit for > 200 MW wall fired boilers burning sub-bituminous coal

In the Response to Comments document, ADEC acknowledged our concerns that GVEA"s SCR NO_x control efficiency and related emission limit were understated, but noted the data we provided in June 2009 reflect SCR performance for systems operating only during the ozone season. ADEC determined, due to uncertainty in continuous system operation in a harsh Alaska environment, with only limited time for catalyst cleaning and system maintenance, the proposed GVEA emission limit of 0.07 lb/mmBtu assuming 75% NO_x control was adequate to evaluate the SCR retrofit option.

NPS continues to believe that SCR can achieve at least 90% NO_x control and reduce emissions to 0.05 lb/mmBtu or lower. We provided evidence in our June 2009 comments that vendors have quoted NO_x levels as low as 0.05 lb/mmBtu. The references below provide additional information from industry sources that supports our understanding that SCR can achieve 90% reduction[6] and reduce emissions to 0.05 lb/mmBtu or lower[7] on coal-fired boilers. EPA Clean Air Markets (CAM) data for 2009 (Appendix A.) show that SCR can achieve year-round emissions of 0.05 lb/mmBtu or lower at 19 coal-fired EGUs, two of which are wet-bottom, wall-fired units like Healy #1. Based on vendor guarantees, we continue to believe that SCR is capable of 0.05 lb/mmBtu (or lower) annual NO_x emissions at Healy #1.

We agree with the GVEA assumptions for performance of the SNCR, ROFA®, and ROFA and Rotamix® technologies.

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[6] May 2009 Institute of Clean Air Companies white paper titled "Selective Catalytic Reduction (SCR) Control of NO_x Emissions form Fossil Fuel-Fired Electric Power Plants" and the June 13, 2009 "Power" magazine article "Air Quality Compliance: Latest Costs for SO2 and NOx Removal (effective coal clean-up has a higher–but known–price tag)" by Robert Peltier. http://www.masterresource.org/2009/06/air-quality-compliance-latest-costs-for-so2-and-nox-removal-effective-coal-clean-up-has-a-higher-but-known-price-tag/

[7] 12/15/09 presentation by Rich Abram of Babcock Power to the Minnesota Pollution Control Agency. Not only does Babcock Power say that SCR can achieve 0.05 lb/mmBtu, they are currently designing systems to go as low as 0.02 lb/mmBtu.

STEP 4-- Evaluate Impacts and Document the Results

Set Federally- or State-enforceable permit condition for shutdown of Healy Unit 1
In comments provided in June 2009 on the proposed BART determination, GVEA indicated that the remaining useful lifetime of Healy #1 is approximately 15 years from current (2009). GVEA requested that ADEC approve revised cost analyses that used an eight-year cost amortization period in accordance with the BART guidelines (40 CFR 51, Appendix Y, Section IV.D.4.k). This request is based on the assumptions that the EPA will approve the Alaska regional haze State Implementation Plan (SIP) in 2011 and that GVEA will have five years to install BART controls, with BART emission limits effective by 2016. If Healy Unit 1 shuts down in 2024 (15 years from 2009), the cost amortization period for BART controls would be eight years.

ADEC in the Response to Comments supports GVEA"s use of the eight-year amortization period. ADEC notes that pursuant to the same provision of the BART rule (40 CFR 51, Appendix Y, Section IV.D.4.k), the Department could require the shutdown of Healy #1 should GVEA otherwise plan to operate the unit beyond the stated useful lifetime (2024).

We assert that this provision of the BART guidelines requires ADEC, if it accepts the 2024 shutdown as a basis for an eight-year amortization period, to include this shutdown date as a federally or State enforceable permit condition. The provision (40 CFR 51, Appendix Y, Section IV.D.4.k.2) states:

> For purposes of these guidelines, the remaining useful life is the difference between:
>
> (1) The date that controls will be put in place . . . .; and
> (2) The date the facility permanently stops operations. **Where this affects the BART determination, this date should be assured by a federally- or State-enforceable restriction preventing further operation.** (emphasis added)

If ADEC has the authority to require installation of BART in less than five years after SIP approval, then ADEC should exercise that authority. It is likely that the less capital-intensive control options could be implemented more quickly than five years. If the remaining useful life is extended because the control technology becomes operational before 2016, that control option would be less expensive on an annualized basis. ADEC should pursue this option.

ADEC is currently working to reissue the Title V permit for Healy Unit 1. We recommend that this permit revision include shutdown of Healy Unit 1 by 2024 as a permit condition, if the BART determination for NO_x control at Healy Unit 1 is a control technology other than SCR.

Re-evaluate Control Costs
During the June 2009 comment period, GVEA provided a refined cost analysis for the SCR retrofit option that was prepared by Fuel Tech, a consulting company that specializes in SNCR and SCR application. GVEA contracted with Fuel Tech to inspect the Healy plant; gather additional site-specific data; and more fully assess the capital cost impact associated with a

retrofit SCR system designed to meet the 0.07 lb/mmBtu preliminary BART NO_x emission limit. Fuel Tech issued a findings report and cost evaluation on June 10, 2009.

We commend GVEA for retaining the services of a reputable vendor of NO_x control equipment and systems to provide a site-specific estimate of the costs of SNCR and SCR. However, we note that an additional $8.6 million in capital costs was added to the Fuel Tech SCR Capital Cost Estimate Total of $13.3 million and additional 20% contingency costs were applied to both the Capital and Operation and Maintenance (O&M) costs. The costs used by Fuel Tech were substantially higher than provided by GVEA in Appendix A of its initial BART submittal. We request a more detailed explanation for those additional costs.

We continue to disagree with GVEA"s use of the CUECost tool rather than the EPA Control Cost Manual to develop cost estimates for SCR. The EPA Control Cost Manual is more appropriate for units as small as 25 MW. ADEC in the Response to Comments document acknowledges that the SCR cost information in the CUECost manual is most applicable to units with capacities ranging from 100 to 200 MW, units that are larger than Healy Unit 1. Finally, ADEC used an 8% interest rate instead of the 7% rate specified by the EPA Cost Manual. The table below summarizes those differences, and we request explanations for these increased costs relative to the Cost Manual or the previous GVEA submittal.

Cost Item	**EPA Cost Manual**	**Enviroplan (ADEC) report**
Annual Interest Rate	7%	8%
Cost Item	**EPA Cost Manual**	**Fuel Tech**
Annual Maintenance Cost	$ 327,913	$ 433,512
Annual Reagent Cost	$ 46,536	combined w. maint.
Annual Electricity Cost	$ 105,963	$ 414,131
Catalyst Replacement Cost	$ 61,802	$ 90,000
Operating Life of Catalyst (hours)	24,000	16,000
Cost Item	**GVEA Appendix A**	**Fuel Tech**
Catalyst Cost, Initial ($/m3)	$ 3,000	$ 8,000
Catalyst Cost, Replacement ($/m3)	$ 3,000	$ 8,000
Electrical Power Cost ($/MWh)	$ 50.00	$ 107.34
29% Ammonia Solution Cost ($/ton)	$ 400.00	$ 450.00

Table 6-1 provides a summary of annual costs using an eight-year capital cost amortization period, the total tons of NO_x removed, and the average annual cost effectiveness for each NO_x retrofit control system.

Table 6-1: NOx Cost Effectiveness Summary for Healy 1

Remaining Useful Life	Cost Item	Optimize Existing LNB w/OFA	SNCR	ROFA	ROFA/ Rotamix	SCR(1)
8 Years(2)	Total Installed Capital Cost	$20,000 ($1/kw)	$2,538,900 ($102/kw)	$4,572,000 ($183/kw)	$6,912,000 ($276/kw)	$21,860,887($874/kw)
	Capital(3) Recovery	$3,480	$441,794	$795,574	$1,202,757	$3,804,013
	Fixed and Variable O&M Costs	$0	$122,191	$138,852	$287,309	$1,125,172
	Total Annualized Cost	$3,480	$563,985	$934,426	$1,490,066	$4,929,185
	Tons NOx (4) Removed	74	134	194	253	313
	Average Cost Effectiveness ($/ton)	$47	$4,208	$4,827	$5,886	$15,762
	Incremental Cost Effectiveness ($/ton)	$47	$9,409	$6,219	$9,328	$57,734

Notes:
(1) Based on the 0.28 lb/mmBtu scenario as presented in the June 15, 2009 letter to ADEC from Kristen DuBois of GVEA.
(2) Based 40 CFR 51, Appendix Y, Section IV.D.4.k (i.e., a 15-year remaining useful lifetime (from 2009) for Healy 1 specified by GVEA and an expected AK regional haze SIP emission limit and pollution control install applicability date of 2016).
(3) Based on a capital recovery factor of 0.17401 for 8 years at 8%.
(4) Relative to baseline emission rate of 0.28 lb/mmBtu.

In January 2009, we provided a summary of SCR retrofit capital investment costs for BART eligible boilers in the range of $80/kW to $270/kW. The site-specific SCR cost ($874/kW) shown in Table 6-1 is more than three times greater than the upper bound of this cost range. We continue to believe that the $874/kW cost estimate provided by ADEC is overestimated. Industry data cited in footnote 1 continue to indicate that capital costs greater than $200/kW are very unusual. We recognize that the size and location of Healy #1 would likely result in higher SCR costs, but we continue to question the $874/kW capital cost estimate.

ADEC estimates the average annual cost-effectiveness for NO_x control on Healy 1, based on eight-year amortization of capital costs, ranges from $47/ton for the optimization of the current LNB+OFA system to over $15,700 for existing combustion controls plus SCR on Healy 1. Using the ADEC estimates for Capital and certain O&M costs, and assuming that SCR would reduce NO_x emissions to 0.05 lb/MMBtu, our application of the EPA Cost Manual yielded $12,794/ton for SCR at Healy Unit 1 (Please see Appendix B.).

STEP 5 – Evaluate Visibility Impacts.
Table 7-1 below, from ADEC‟s Final BART Determination Report, shows the visibility improvement and annual costs for NO_x control options.

Table 7-1: Visibility Improvement and Annual Costs for NOx Control Options*

BART Controls	Highest dV Reduction (ΔdV)	Reduction in Avg. No. of Days Above 0.5 dV (Days)	Annualized Cost ($/Year)	Cost per dV Reduction ($/dV Reduced)	Cost per Reduction in No. of Days Above 0.5 dV ($/Day Reduced)
Optimizing Existing LNB w/ OFA	0.560	43	$3,480	$6,214	$81
Replace OFA w/ ROFA®	0.671	56	$934,426	$1,392,587	$16,686
Replace OFA w/ ROFA® and Rotamix®	0.736	67	$1,490,066	$2,024,546	$22,240
LNB/OFA/SNCR	0.620	51	$563,985	$909,653	$11,059
LNB/OFA/SCR	0.786	71	$4,929,185	$6,271,228	$69,425

*Reflects 8-year capital cost amortization period.

BART is not necessarily the most cost-effective control option. All of the options evaluated result in cost/deciview values that are well below the $13 - $20 million average $/dV costs that are being proposed as BART by other sources and states.[8]

It is likely that GVEA has underestimated the visibility improvement that would result from any NO_x reductions. This is because time is required for NO_x to react with atmospheric ammonia to form the ammonium nitrate particles that impair visibility. Unless transport winds from Healy #1 to DNPP are very slow, it is unlikely that the NO_x would have had sufficient transport time to react to form secondary aerosol particles by the time it reaches the nearest boundary of the park.

ADEC proposed NO_x BART for Healy Unit #1

Table 8-1 from ADEC"s Final BART Determination Report presents the BART five-step review process for each NO_x control option considered by GVEA. The cost effectiveness information is based on an eight-year remaining useful lifetime of Healy #1.

ADEC"s final BART determination for Healy Unit #1 was based on a NO_x emission limit consistent with a new SNCR system. The finding is not the installation of SNCR; rather, it is the NO_x emission limit that would be achieved should GVEA opt to install an SNCR system on Healy 1 to comply with this limit. ADEC believes the NO_x emission limit equivalent to the SNCR control retrofit option for Healy #1 represents the best combination of factors (steps evaluated) under the BART rule and regional haze program for the purpose of improving visibility impairment at DNPP.

ADEC has determined the NO_x BART emission limit for Healy #1 to be the equivalent of the existing LNB/OFA system with a new SNCR system; however, ADEC has set the NO_x emission limit at 0.20 lb/mmBtu rather than 0.19 lb/mmBtu. This determination is based on consideration of all elements of the BART five-step evaluation process, including the general cost acceptability ($/ton and $/dV); the proximity of Healy #1 to DNPP; the additional reduction in NO_x emissions; and related predicted visibility improvement at DNPP necessary for ADEC to meet the reasonable progress compliance goals by 2064.

[8] Our most recent compilation of BART projects was sent to ADEC recently.

Table 8-1: Comparison Matrix of the GVEA-Evaluated NOx Control Options as they Relate to the BART 5-Step Evaluation Process

Control Option	BART Analysis Steps				
	Identify All Control Options (Step 1)	**Eliminate Technically Infeasible Options (Step 2)**	**Evaluation of Control Effectiveness(2) (Step 3)**	**Cost-Effectiveness and Impacts Analysis(3) (Step 4)**	**Visibility Impact Evaluation(4) (Step 5)**
Existing LNB w/OFA(1)	Option Identified	Option Accepted	0% (0.28 lb/mmBtu)	N/A	N/A
Optimize Existing LNB w/OFA	Option Identified	Option Accepted	18% (0.23 lb/mmBtu; 74 add'l tons NOx removed)	$47/ton NOx (annual) $47/ton NOx (incremental) $6,214/deciview	0.560 deciview improvement; 43 day improvement
LNB w/OFA, plus new SNCR system	Option Identified	Option Accepted	32% (0.19 lb/mmBtu; 134 add'l tons NOx removed)	$4,208/ton NOx (annual) $9,409/ton NOx (incremental) $909,653/deciview	0.620 deciview improvement; 51 day improvement
Replace OFA w/ROFA®	Option Identified	Option Accepted	46% (0.15 lb/mmBtu; 194 add'l tons NOx removed)	$4,827/ton NOx (annual) $6,219/ton NOx (incremental) $1,392,587/deciview	0.671 deciview improvement; 56 day improvement
Replace OFA w/ROFA® & Rotamix®	Option Identified	Option Accepted	61% (0.11 lb/mmBtu; 253 add'l tons NOx removed)	$5,886/ton NOx (annual) $9,328/ton NOx (incremental) $2,024,546/deciview	0.736 deciview improvement; 67 day improvement
LNB w/OFA, plus new SCR system	Option Identified	Option Accepted	75% (0.07 lb/mmBtu; 313 add'l tons NOx x removed)	$15,762/ton NOx (annual) $57,734/ton NOx (incremental) $6,271,228/deciview	0.786 deciview improvement; 71 day improvement

Notes:

(1) The existing controlled NOx baseline emission rate is 0.28 lb/mmBtu (30-day average).

No effectiveness, capital or operating costs, or visibility improvements are applicable to this existing control scenario.

(2) Percent control (%) is relative to the existing controlled baseline configuration for Healy 1, defined as LNB+OFA NOx control system; sodium bicarbonate sorbent dry FGD SO2 control system; and 12 compartment reverse-gas fabric filter particulate (with coincident SO2) control system.
The NOx emission limit corresponding to the option; and the additional amount of NOx removed (tons/year) for this control scenario versus existing baseline is also shown.

(3) Cost-effectiveness estimates based on 8-year Healy 1 remaining useful lifetime.

(4) Visibility impacts for each option are relative to existing baseline conditions.

NPS Conclusions and Recommendations on NO_x BART

- In general, the ADEC report was well-written, clearly followed the five-step BART process, and thoroughly explained ADEC"s conclusions.
- It is essential that any evaluation that is contingent upon shutdown of Healy #1 by a specific date must contain an enforceable condition to validate that evaluation.
- ADEC presented a full suite of NO_x control options and, except for SCR, adequately assessed their effectiveness.
- SCR can achieve a lower NO_x emission rate than evaluated by ADEC. As a result, ADEC has underestimated the benefits of adding SCR.
- ADEC has not fully explained, or justified, and, in some cases, has overestimated the costs associated with adding SCR We continue to believe that the $874/kW cost estimate

provided by ADEC/Enviroplan is overestimated. Industry data cited in footnote 1 continues to indicate that capital costs greater than $200/kW are very unusual. We recognize that the size and location of Healy #1 would likely result in unusually high SCR costs, but we continue to question the high capital costs estimated by ADEC.

- It is likely that visibility improvements greater than those predicted by GVEA would be found if a more-refined, receptor-by-receptor analysis is conducted throughout DNPP. This would result in an even lower cost/deciview.
- We commend ADEC for determining that NO_x emissions should be reduced below the level proposed by GVEA. However, BART is not necessarily the most cost-effective option. All of the options evaluated result in cost/deciview values that are well below the $13 - $20 million average $/dV costs that are being proposed as BART by other sources and states. Therefore, all of the NO_x control options evaluated represent reasonable alternatives for BART.
- Because the OFA w/ROFA® option is only marginally more expensive (on a $/ton basis) that the proposed SNCR, and because the $/dV is still well below the national average, we request that ADEC provide information on how those costs were derived and re-evaluate this option using the 7% interest rate recommend by the EPA Control Cost manual. In conducting that re-evaluation, we ask that ADEC provide information on the amount of time necessary to install this option.

NPS Comments on ADEC's BART determination for SO_2 Control at Healy Unit 1

We agree with ADEC"s selection of SO_2 control options and its assessments of their technical feasibility.

ADEC has underestimated the effectiveness of wet scrubbing.
ADEC should use expected annual emissions in estimating the annual emission reductions for each control option. If we assume that the uncontrolled SO_2 emissions are 0.6 lb/mmBtu, it is reasonable to expect that a Lime Spray Drier (LSD) can reduce those uncontrolled annual emissions by 90% down to 0.06 lb/mmBtu. Likewise, a Wet Limestone Scrubber (WLS) is generally assumed to be able to reduce emissions by 95% or down to 0.03 lb/mmBtu in this case. However, we also understand that ADEC would be reluctant to assume that either type of scrubber can achieve such low limits without evidence that scrubbers have achieved or been permitted at these rates. And, we recognize that SO_2 removal efficiency and the controlled emissions are highly dependent upon the fuel quality and the resulting uncontrolled SO_2 emissions. Our review of the CAM database (Appendix C) leads us to conclude that, for the purpose of these estimates, LSD can be assumed to achieve 0.07 lb/mmBtu and the WLS option 0.04 lb/mmBtu on an annual basis.

ADEC has overestimated the costs of the technically-feasible SO_2 control options.
The "Average Cost Effectiveness" values estimated by ADEC for the LSD and WLS scrubber options are incremental costs, not true average costs, and, as such, cannot be compared to any costs except other incremental costs. A more appropriate basis for estimating the cost-effectiveness of the LSD and WLS scrubbers is to compare the annual cost of each option to the total annual tons of SO_2 removed. For example, if the LSD has an annual cost of $2,201,647 and it removes 90% of 892 tons per year of uncontrolled potential SO_2 emissions, the cost-effectiveness of the LSD system becomes $2,591/ton, which is substantially lower than the $9,237 estimated by ADEC. Furthermore, ADEC used an 8% interest rate instead of the 7% rate specified by the EPA Cost Manual.

Proposed SO_2 BART for Healy #1

Table 8-2 summarizes the BART five-step review for the SO_2 control options. The cost effectiveness information is based on an eight-year remaining useful lifetime of Healy Unit 1.
We have the same concern as stated for the NO_x control analysis that if cost-effectiveness is based on an eight-year amortization period for capital costs, then shutdown of Unit 1 in 2024 must be made federally- or state-enforceable.

Table 8-2: Comparison Matrix of the GVEA-Evaluated SO2 Control Options as they Relate to the BART 5-Step Evaluation Process

	BART Analysis Steps				
Control Option	**Identify All Control Options (Step 1)**	**Eliminate Technically Infeasible Options (Step 2)**	**Evaluation of Control Effectiveness(2) (Step 3)**	**Cost-Effectiveness and Impacts Analysis(3) (Step 4)**	**Visibility Impact Evaluation(4) (Step 5)**
Existing Dry(1) FGD System (Sodium Bicarbonate Sorbent)	Option Identified	Option Accepted	0% (0.30 lb/mmBtu)	N/A	N/A
Optimize Existing FGD System by Increasing Sorbent Injection	Option Identified	Option Accepted	40% (0.18 lb/mmBtu; 179 add'l tons SO2 removed)	$4,218/ton SO2 (annual) $4,218/ton SO2 (incremental) $3,015,208/deciview	0.250 deciview improvement; 39 day improvement
Install Lime Spray Dryer Semi-Dry FGD System	Option Identified	Option Accepted	50% (0.15 lb/mmBtu; 223 add'l tons SO2 removed)	$9,337/ton SO2 (annual) $29,813/ton SO2 (incremental) - $2,397,400/deciview	-0.870 deciview improvement; 20 day improvement
Install Wet Limestone FGD System	Option Identified	Option Accepted	77% (0.07 lb/mmBtu; 343 add'l tons SO2 removed)	$10,275/ton SO2 (annual) $12,033/ton SO2 (incremental) - $3,033,847/deciview	-1.160 deciview improvement; 18 day improvement

(1) The existing controlled SO2 baseline emission rate is 0.30 lb/mmBtu (30-day average).
No effectiveness, capital or operating costs, or visibility improvements are applicable to this existing control scenario.
(2) Percent control (%) is relative to the existing controlled baseline configuration for Healy 1, defined as LNB+OFA NOx control system; sodium bicarbonate sorbent dry FGD SO2 control system; and 12 compartment reverse-gas fabric filter particulate (with coincident SO2) control system. The SO2 emission limit corresponding to the option; and the additional amount of SO2 removed (tons/year) for this control scenario versus existing baseline is also shown.
(3) Cost-effectiveness estimates based on 8-year Healy 1 remaining useful lifetime. Negative values ($/dV) for lime spray dryer and wet FGD reflects a worsening (i.e., increase) in maximum predicted visibility impacts compared to baseline.
(4) Visibility impacts for each option are relative to existing baseline conditions.

ADEC "has determined that final SO_2 BART for Healy 1 is the current FGD configuration and no additional controls are recommended for the Healy 1 boiler to reduce SO_2 emissions. The emission limit equivalent to the existing FGD system will be set by the Department as the BART emission limit for SO_2."

ADEC"s five-factor analysis for the increased sorbent injection option developed the following data:

- 40% reduction (0.18 lb/mmBtu; 179 additional tons SO_2 removed)
- $4,218/ton SO_2 (annual) $4,218/ton SO_2 (incremental)
- 0.250 deciview improvement; 39 day improvement
- $3,015,208/deciview

ADEC rejected the increased sorbent injection option because of "an insignificant predicted improvement in visibility at DNPP. ADEC found that the cost for this option is within the dollar per deciview ($/dv) metric for all EGUs as cited by the NPS survey (Appendix A of the ADEC/ENVIRONPLAN report); but it is about 2.5 to 3 times greater than the median and mean values ($/ton) in that database. ADEC also found a disparity when comparing the almost same NO_x and SO_2 cost effectiveness values. The final recommended NO_x BART option (emission limit equivalent to SNCR) has a cost effectiveness of $4,208/ton, with a coincident significant predicted visibility improvement of 0.620 dv; however, a similar SO_2 cost effectiveness for the optimized FGD option ($4,218/ton) results in only a 0.25 dv predicted improvement in visibility. ADEC stated that this cost disparity supports the NO_x control, but does not support the optimization SO_2 control option. ADEC also expressed concern that the increased sorbent injection option could result in the increased potential for visibility impairing brown plume."

The BART Guidelines state that an improvement in visibility need not be perceptible in order to be considered in the BART determination. Even though GVEA has estimated that increased sorbent injection would yield a 0.25 dV improvement, by ADEC"s calculations, this still results in a cost-effectiveness of $3.0 million/deciview, which is clearly cost-effective when compared to the $20 million/dV national average cost for SO_2 BART reductions.

ADEC reviewed the cost effectiveness data supplied by NPS (see Appendix A) for all EGUs that indicate respective median and mean SO_2 cost effectiveness values of $1379/ton and $1721/ton; and about $14.5 million/dv and $10.5 million/dv. ADEC concluded that there are few small EGUs (<100 MW) included in the data and that data were not easily compared to costs for Healy Unit 1. (There are only four EGUs in the NPS survey data with capacities less than 100 MW, and median and mean cost effectiveness values of about $5000/ton). Please note that the size of Healy Unit 1 is irrelevant when evaluating cost-effectiveness, whether in terms of $/ton or in $/dV, as size is already accounted for in the costing techniques and the survey.

The brown plume potential is not known, but can be tested by increasing the sorbent injection rate using the existing equipment.

NPS Conclusions and Recommendations on SO_2 BART

- In general, the ADEC report was well-written, clearly followed the five-step BART process, and thoroughly explained ADEC"s conclusions.
- It is essential that any evaluation that is contingent upon shutdown of Healy #1 by a specific date must contain an enforceable condition to validate that evaluation.
- ADEC presented a full suite of SO_2 control options but did not adequately assess the effectiveness of the LSD and WLS options. As a result, ADEC has underestimated the benefits of adding LSD or WLS scrubbers.
- ADEC has overestimated the costs associated with adding LSD or WLS scrubbers.
- It is likely that visibility improvement greater than those predicted by GVEA would be found if a more-refined, receptor-by-receptor analysis is conducted throughout DNPP. This would result in an even lower cost/deciview.
- BART is not necessarily the most cost-effective option. The increased sorbent injection option evaluated results in a cost/deciview value that is well below the $13 - $20 million average $/dV costs that are being proposed as BART by sources and states. Increased sorbent injection should be considered as a viable BART option.

NPS Appendices:

Appendix A. SCR less than 0.06 lb per mmbtu.xls

Appendix B. Modified NPS version of OAQPS Cost Manual CC+SCR for Healy.xls

Appendix C. CAM SO2 data 2000 - 2009.xls

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