Response to Public Comments
Golden Valley Electric Association (GVEA)
Best Available Retrofit Technology (BART) Determination
Response to Comments
January 15, 2010

Prepared by:
Enviroplan Consulting
Tom Turner
Rebecca Smith
Alan Schuler

In accordance with 18 AAC 50.260, the Alaska Department of Environmental Conservation (the Department) public noticed a proposed preliminary April 27, 2009 BART determination findings report for Golden Valley Electric Association's (GVEA) Healy Power Plant on May 12, 2009. This document responds to comments received during the public comment period.

Overview: GVEA submitted a BART control analysis in July 2008 to meet the requirements of 18 AAC 50.260(e) through (h). The BART eligible units at the source consist of one primary power generating unit, the 25-MW Foster-Wheeler Unit No. 1 (Healy 1), and one Cleaver Brooks standby building heater.

The Department contracted with Enviroplan to conduct a technical review of the GVEA BART control analysis. The July 2008 GVEA analysis report was revised and resubmitted by GVEA in January 2009; GVEA provided additional relevant supplemental information on March 18, 24 and 30, 2009 and June 19, 2009.

Enviroplan recommended preliminary BART determinations for each BART-eligible source at this facility, consistent with 18 AAC 50.260(j). Their recommendations were described in an April 27, 2009 "Findings" report, which concluded that the GVEA BART control analysis complied with 18 AAC 50.260(e) through (h); and it recommended BART for Healy 1 as the existing dry sorbent injection system (SO_2); the addition of a SCR system (NO_x); and the existing reverse gas baghouse system (PM_{10}). For Auxiliary Boiler #1, the existing configuration, which is no air pollution control systems, was recommended as BART.

The Department reviewed, accepted and public noticed Enviroplan's recommended preliminary BART determinations, as described in their April 27 Findings report. The Department accepted public comments from May 12, 2009 until June 15, 2009.

This document provides the Department's response to the comments received during the public comment period. The Department asked Enviroplan to incorporate the decisions in this Response to Comment document into their BART Determination Report regarding Golden Valley Electric Association's Healy Power Plant. This allows for consistency between the final decision documents. **The Department therefore considers Enviroplan's Final BART Determination Report as a valid description of the**

technical basis for the BART emission limits established under 18 AAC 50.260(l) for Healy #1 and Auxiliary Boiler # 1.

Comments received:

The Department received written comments from the following by the June 15, 2009 deadline:

A) Frank Abegg, Fairbanks
B) Alaska State Representative Mike Kelly, Fairbanks
C) Don Shepherd, National Park Service
D) Sanjay Narayan, Sierra Club
E) Kristen DuBois, GVEA

Further, on June 19, 2009 Kristen DuBois with GVEA submitted additional information to support the economic analysis summary contained in Attachment 3 of their June 15, 2009 comments. As necessary, this document responds to the additional information received from GVEA on June 19, 2009.

Comments received on the proposed preliminary BART determination reflected two general categories as follows:

A) The proposed determination is not stringent enough; or
B) The proposed determination is too stringent and will be economically infeasible to implement.

Comments from the Sierra Club and the National Park Service (NPS) focused on the preliminary determination being not stringent enough and requested that ADEC require more stringent and additional controls on the Healy Power Plant.

Comments from Mr. Frank Abegg, Representative Mike Kelly, and GVEA focused on the proposed determination being too stringent and too expensive to implement, particularly given that the burden will fall on the utility's rate payers.

Response to Comment Format:

This document contains the comments provided by each party specified above and the Department's response to each comment. Where practicable, a comment is reiterated verbatim; however, most of the comments along with reference to related support information are paraphrased. The Department's responses are shown in bold italics following each comment.

<u>Comments received by the Department on June 12, 2009 from Mr. Frank Abegg</u>

1. Comment (page 1 of letter, 3rd paragraph): Commenter indicates that the May 12, 2009 public notice specifies that the NPS is requiring selective catalytic reduction (SCR) equipment be installed at Healy Unit 1 to control NO_x emissions, along with increased sorbent injection to control SO_2 emissions.

   ***Response from the Department**: The public notice indicates the Department has made a preliminary BART determination for NO_x and SO_2 (and PM) emissions control at Healy Unit 1. The Department is responsible for the establishment of*

emission limits under the regional haze and BART rule, not the NPS. This response is provided for a purpose of clarification and it does not change the conclusions of the April 2009 Findings Report.

2. Comment (page 1 of letter, 4th paragraph): Commenter indicates visibility modeling performed by the Western Regional Air Partnership (WRAP) showed predictions inside the Denali National Park and Preserve (DNPP) in excess of a significance metric of 0.5 deciviews and, based on this modeling, Enviroplan concluded (in the April 2009 Findings Report) that Healy 1 BART controls currently comply with 18 AAC 50.260 (i.e., Alaska regional haze and BART guidance rule). Commenter also indicates "at the insistence of the NPS, Enviroplan stated that an SCR unit should be added to the boilers' existing low NOx burner (LNB) and over-fire air (OFA) system…"

   ***Response from the Department**: The following two points of clarification are made.*

   First, the Findings Report was reviewed and approved by the Department and represents the Department's preliminary determination for GVEA BART. Enviroplan did not conclude, based on the WRAP modeling, that Healy 1 BART controls currently comply with 18 AAC 50.260. As described in Section 7 of the Findings Report, GVEA conducted visibility modeling independent from the WRAP modeling. Except as otherwise indicated in the Findings Report, the modeling was performed in accordance with 18 AAC 50.260 and 40 CFR 51, Appendix Y. The results of the GVEA modeling, along with other prescribed elements of the 5-Step BART determination process of 40 CFR 51, Appendix Y, which are described in Section 2 of the Findings Report, were considered when determining preliminary BART for Healy 1 and not the WRAP modeling results.

   Second, at no time during the preliminary determination process did the NPS "insist" that the Department or its contractor, Enviroplan, require SCR be added to Healy 1. As discussed in the Section 1 of the April 2009 Findings Report (and other report sections), the Department apprised the NPS and GVEA during February 2009 of the then draft preliminary BART findings for Healy 1. Initial comments were received by the Department from the NPS on February 12, 2009. In March 2009, composite cost data and BART determination summaries compiled by the NPS for multiple other BART eligible sources in the Western U.S. were also received by the Department. The Department similarly received initial comments from GVEA during February 2009; as well as relevant follow-up information, including ratepayer data, sorbent invoice data, and other information, from GVEA during March 2009. As discussed throughout the Findings Report, all NPS and GVEA data have been considered in accordance with the BART review procedures of 40 CFR 51, Appendix Y. Only the BART review procedures of 40 CFR 51, Appendix Y, along with the GVEA and NPS submitted information, have been considered in the findings review, and no directive of the NPS (or any other party) has resulted in the preliminary determination reflected in the Findings Report.

   This response is provided for a purpose of clarification and it does not change the conclusions of the April 2009 Findings Report.

3. Comment (page 2 of letter, 2nd paragraph): Commenter indicates that GVEA's 3/18/09 submittal (pertaining to increased ratepayer costs associated with BART SO_2 and NO_x controls) will require a 3.3% rate increase to pay for the "NPS mandate".

   ***Response from the Department**: As indicated in Response 2 above, the preliminary BART determination is not a result of an "NPS mandate". The BART determination is in response to the visibility protection requirements of the Clean Air Act, Sections 169A and 169B; related codified Regional Haze Rule requirements contained at 40 CFR 51.300 through 51.309 (including 40 CFR 51, Appendix Y); and State of Alaska rule 18 AAC 50.260.*

   Section 6.3 of the Findings Report discussed the potential cost increase to a residential ratepayer based on installation of SCR and increased sorbent injection. The 3.3% increase noted by the commenter is a total increase computed by GVEA for both control systems based on only non-fuel annual costs. As explained in Section 6.3, since BART is a pollutant specific regulatory program the cost impact of each control system must be determined separately for BART determination purposes, rather than cumulatively.

   Sections 6.1 and 6.2 of the Findings Report explain that the respective capital costs associated with SCR and increased sorbent injection provided by GVEA were revised by Enviroplan. These revised costs were utilized in the ratepayer analysis discussed in Section 6.3. Detailed comparisons of ratepayer increases (versus 2008 ratepayer costs) were shown in Tables 6-3-1 through 6-3-4. As indicated in Section 6.3 of the Report, GVEA did not include fuel costs in their comparative metric when assessing the ratepayer increase. This is a direct cost born by each ratepayer and its exclusion will lead to a bias (overstatement) in the percent increase computed in this analysis. As such, Enviroplan utilized the actual annual average 2008 ratepayer cost provided by GVEA to determine the percent ratepayer increase due to the SCR and increased sorbent injection control systems. Use of the 2008 ratepayer cost, which includes fuel and non-fuel charges, resulted in a potential ratepayer increase of 0.70% and 0.43% for the SO_2 and NO_x control systems, respectively.

   This response is provided for the purpose of clarification and it does not change the conclusions of the April 2009 Findings Report. However, as explained later in this document the ratepayer analysis has been revised to reflect GVEA comments (see GVEA comments/responses section herein).

4. Comment (page 2 of letter, 4th paragraph which carries onto page 3 of the letter): The commenter provides a brief historical summary of the Healy Clean Coal Project (HCCP) noting GVEA's receipt of construction permit approval in 1994; operation of a visibility monitoring program (VMP) which ran from December 1997 until May 2000 and included photographic, meteorological parameter and pollutant measurement monitoring at three sites; and installation in 1998 of Healy 1 NO_x controls (low NO_x burners and over-fire air (LNB/OFA)) and SO_2 controls (dry sorbent injection system). Based on the operation of the VMP, and the reduction in NO_x and SO_2 emissions due to Healy 1 controls, the commenter indicates he is not aware of any formal complaints associated with plume visibility impact or regional haze at Denali caused by Healy 1.

***Response from the Department**: Section 7.3 of the Findings Report provided a detailed overview of the GVEA VMP cited by the commenter. The Findings Report acknowledges the data collected during the VMP and the general results of the program, including no formal indication by the NPS or the Department of visible plume impacts from Healy 1 at the DNPP. This notwithstanding, Section 7.3 of the April 27 Findings Report also specifies the reasons that the general lack of complaints associated with the prior VMP does not satisfy the BART rule requirement for visibility modeling. This includes the fact that the visible impact modeling is conducted over a much larger geographic area (i.e., within all of DNPP) than the three locales represented in the VMP, and it considers the potential for haze throughout the park rather than the presence of an individual visible coherent plume as reflected in the VMP (i.e., plume blight). The modeling does not simply account for surface based transport, as suggested by the commenter with respect to valley orientation and dominant low-level wind direction, but instead it considers the effects of three-dimensional meteorology on plume transport and dispersion. More importantly, the BART rule does not provide an exemption from visible impact modeling regardless of the existence of visibility monitoring.*

This response is provided for purposes of clarification and it does not change the conclusions of the Findings Report.

5. Comment (page 3 of letter, 2nd, 3rd and 4th paragraphs of the letter): The commenter cites two documents that he reviewed wherein a discussion is provided on DNPP pollutant monitoring results and the basis for regional haze at DNPP. Based on these reports, the commenter attributed regional haze at DNPP to Arctic Haze, the long-range international transport of related aerosols, and area wildfires. The commenter notes the report on Artic Haze did not identify the Healy Power Plant as causing haze or impacting visibility within DNPP, and indicates the Plant is insignificant in comparison to natural and other "world sources" of emissions that cause haze in DNPP. As such, the commenter believes any reductions in NO_x or SO_2 from installing SCR or increasing sorbent injection would have no "noticeable" impact on visibility inside DNPP.

***Response from the Department**: The Department disagrees with the commenter's conclusions. Section 7.3 of the April 27 Findings Report provided a discussion on DNPP pollutant monitoring data, which is more current than the 1999 monitoring report summary cited by the commenter. Also, Section 7.3 of the Report provided a discussion on a final (rather than a draft) Department document pertaining to regional haze in Alaska. As indicated in Section 7.3 and based on available reviewed documentation, the Department agrees with the commenter that Arctic Haze is a contributor to regional haze at DNPP (even though the park is located in the sub-Arctic). However, also as indicated in Section 7.3, local anthropogenic emission sources exist at and around DNPP, e.g., Healy Power Plant, and such sources can potentially contribute to visibility impairment at DNPP. As specified in the BART rule, a source that can "reasonably be anticipated to cause or contribute to visibility impairment at a Class I area" is required to evaluate source emissions for BART control. Therefore, while the commenter notes that one of the reviewed reports did*

not specifically cite Healy 1 as causing regional haze at DNPP, an emission unit is still subject to BART control evaluation if it reasonably contributes to regional haze at a Class I area.

As explained in Section 7.3 of the April 27 Findings Report, GVEA's visibility modeling of Healy 1 demonstrated a significant contribution to visibility impairment at DNPP. Further, as discussed in Section 7.4 of the Report, GVEA's visibility modeling of Healy 1 with SCR installed resulted in a predicted significant improvement in visible impacts at DNPP (visibility modeling of increased sorbent injection did not demonstrate a significant improvement in visible impacts at DNPP). Therefore, the Department does not agree with the commenter's indication that reductions in NOx likely will have no noticeable impact on visibility at DNPP, as the predicted improvement has been shown to be significant (i.e., at or above 0.5 deciviews).

This response is provided for a purpose of clarification and it does not change the conclusions of the April 2009 Findings Report.

6. Comment (page 3 of letter, 4th paragraph which carries onto page 4 of the letter): The commenter suggests the regulatory agencies improve their management of forest fire suppression within Alaska to improve visibility and regional haze within DNPP.

***Response from the Department**: The comment is acknowledged. However, forest fire suppression is beyond the scope of the state and federal BART rule. No changes are made to the Findings Report due to this comment.*

7. Comment (page 4 of letter, 2nd paragraph): The commenter suggests the cost for installation of SCR to be prohibitive, and the existing NO_x emission limit for Healy 1 to be comparable to the BART limits for other similar sized power plants.

***Response from the Department**: A detailed discussion of the cost analysis and comparative cost metrics for SCR was provided in Section 6.1 of the Findings Report. However, as explained in the response to GVEA comments section of this document, revised site-specific cost information has been provided by GVEA. The related cost analysis for Healy 1 has been revised (see GVEA comments section and the revised cost summary at the end of this document).*

With respect to the comment pertaining to the Healy 1 NOx emission limit, it is emphasized that each BART-eligible unit must be evaluated for potential control in accordance with the 5-Step process prescribed at 40 CFR 51, Appendix Y. This requires a case-by-case consideration of costing, proximity of an affected unit to the Class I area, and visible impacts and related improvements through retrofits. Such considerations are different from affected plant to affected plant. While BART related information for other plant determinations has been considered in the review, visibility modeling of Healy 1 (required by the BART rule) does demonstrate a significant visibility improvement at an emission rate achievable with SCR (i.e., 0.07 lb/MMBtu). Therefore, no changes are made to the conclusions of the April 2009 Findings Report due to this comment.

8. Comment (page 4 of letter, 3rd paragraph): The commenter indicates the use of ammonia, which is used within the SCR control system, will likely result in some atmospheric emissions (i.e., ammonia slip) that could cause increased haze at DNPP. The commenter further speaks to the risk of an ammonia release during material transport and storage at the plant.

***Response from the Department**: The Department agrees that the potential does exist for ammonia slip when operating a SCR control system. This situation is well documented in practice, as acknowledged at Section 3.1 of the Findings Report for Selective Catalytic Reduction (SCR). This notwithstanding, the potential for such emissions was not quantified by GVEA, nor was the potential impact on visibility considered in the GVEA modeling protocol or modeling demonstration. Therefore, no further considerations on the potential effects of ammonia slip emissions were considered in the Healy 1 visibility modeling at DNPP. This is indicated in Section 8.1, Item 9 of the Findings Report.*

Regarding the comment on risk associated with ammonia handling (and storage) Ammonia is considered by EPA to be a hazardous substance, e.g., 40 CFR Part 68. The BART rule provides for the consideration of non-air quality environmental impacts when considering various retrofit options, as discussed in Section 6.1.3 of the Report. While GVEA provided only limited discussion on this aspect of the SCR system, the risk posed by the handling of this material is acknowledged. However, since ammonia is a widely used material in industrial applications industrial safeguards and procedures, such as those required and prescribed by 40 CFR Part 68, can be implemented by GVEA in order to minimize risk from SCR ammonia use.

As indicated in Section 8.1 of the April 27 Findings Report, the NO_x reductions and visibility improvements associated with the installation of SCR on Healy 1 comport with the requirements of the BART rule, even when considering the possible environmental impact of the ammonia associated with the SCR. Therefore, no changes are made to the conclusions of the April 2009 Findings Report due to this comment.

9. Comment (page 4 of letter, 4th paragraph): The commenter indicates non-support of increased sorbent injection as SO_2 BART for Healy 1 based on relatively high costs, inherent low sulfur content of Usibelli Mine coal, and uncertain improvement in haze or visible impacts at DNPP.

***Response from the Department**: Based on the respective cost effectiveness and visibility modeling results presented in Sections 6 and 7 of the Findings Report, the Department agrees with the commenter and has recommended SO_2 BART for Healy 1 as the existing dry sorbent injection system. No changes are made to the conclusions of the April 2009 Findings Report due to this comment. However, based on comments received from the Sierra Club and GVEA as presented later in this document, the cost analysis for increased sorbent injection has been revised (see the respective comments sections and cost summary revision at the end of this document).*

10. Comment (page 4 of letter, 5th paragraph): The commenter reiterates that the proposed preliminary BART emission limits (i.e., SCR) would substantially increase the financial burden on the operation of the Healy Power Plant and their customers.

    Response from the Department*: See Responses 3 and 7 above. There are no changes to the Findings Report due to this comment.*

11. Comment (page 5 of letter, 1st paragraph): The commenter indicates that for decades the NPS has had serious fugitive dust emissions problems inside DNPP in association with vehicle travel on unpaved DNPP roads, and references a NPS document pertaining to this issue. The commenter requested the status of what the NPS is doing to resolve this problem and reduce likely related visibility problems.

    Response from the Department*: The Department is responsible for setting the BART eligible unit emission limits. Conversely, the NPS is responsible for the administration of the DNPP and activities therein. As such, this query must be submitted to, and responded by, the NPS. This response is provided for a purpose of clarification and it does not change the conclusions of the April 2009 Findings Report.*

Comments received by the Department on June 12, 2009 from Alaska State Representative Mike Kelly (House District 7)

1. Comment (page 1 of letter, 1st paragraph): The commenter indicates that the (BART) emission limits were proposed by the NPS; SCR installation and increased sorbent injection are being proposed by ADEC for Healy 1; and these control requirements ignore permitting aspects associated with HCCP (approved for permitting in 1994).

   ***Response from the Department**: The Department and not the NPS is responsible for establishing emission limits for BART-eligible units. The preliminary BART retrofit option proposed by the Department in the April 27 Findings Report for Healy 1 NOx control is SCR as indicated by the commenter. However, for SO_2 emissions control at Healy1 the Department proposed the existing FGD system configuration as BART, not an increased sorbent injection system. Further, HCCP was not specifically considered in the BART review for Healy 1 since HCCP is not a BART affected emission unit; however, indirect consideration was done through review of the VMP and related materials (see Response 4 to comments from Mr. Abegg).*

   This response is provided for a purpose of clarification and it does not change the conclusions of the April 2009 Findings Report.

2. Comment (page 1 of letter, 2nd paragraph): The commenter indicates that the control costs are prohibitive; will not result in a discernable visibility benefit; and the retrofits are disingenuous given the prior (late-1990's, early 2000's) control retrofit to Healy 1 in response to the HCCP approval.

   ***Response from the Department**: The cost effectiveness of SCR was determined in the April 27, 2009 Findings Report not to be cost prohibitive (see Responses 3 and 7 to the preceding set of comments). A predicted significant improvement in visible impacts has been demonstrated (through modeling) when installing SCR on Healy 1 (see Response 5 to the preceding set of comments). The BART retrofit options are not considered to be disingenuous with respect to the regional haze program and BART rule since existing source controls are reflected in the baseline emission rates for both the BART costing analysis (see Section 6 of the Findings Report) and the visibility modeling analysis (see Section 7 of the Findings Report). As such, the existing Healy 1 control systems are accounted for in the BART determination review and findings.*

   While this comment does not change the conclusions of the April 2009 Findings Report, GVEA comments received by the Department included a revised site-specific costing analysis for the SCR control system. The SCR costing analysis has been revised accordingly (see GVEA comments section herein) in the Final BART/GVEA Determination Report.

3. Comment (page 1 of letter, 2nd paragraph): The commenter indicates that the initial capital costs for the proposed retrofit controls (SCR) would be in the millions of dollars; the costs would be borne by the GVEA Co-op customers and would be a significant energy cost increase; and, in essence, requests the NPS and EPA be told the proposal is excessive in light of the cost and existing plant controls.

***Response from the Department**: The final BART determination is made by the Department and not by the NPS and/or EPA, in accordance with the BART rule and 18 AAC 50.260. The preliminary BART determination for Healy 1 is predicated on information provided by GVEA and the regulatory requirements of the regional haze program/BART rule, both of which were detailed in the April 27 Findings Report. Comments made by all parties to the preliminary BART determination, including those of the NPS and EPA, must be considered and addressed as part of the review and determination process (18 AAC 50.260(k) and (l)).*

Section 6 of the April 27 Findings Report did acknowledge the initial capital cost for the proposed SCR control system, and these initial costs were considered in the preliminary BART determination. Further, the annual average incremental cost increase to the system's residential ratepayers was considered and shown to be less than a 1% increase for installation of SCR (see Response 3 to the preceding set of comments), which was not deemed as a prohibitive cost increase.

This response is provided for a purpose of clarification and it does not change the conclusions of the April 2009 Findings Report.

4. Comment (page 1 of letter, 3rd paragraph which carries onto page 2 of the letter): The commenter indicates that prior retrofit controls were installed on Healy 1 to offset new emissions from HCCP; the plant uses the lowest sulfur coal in the U.S.; special cameras located in DNPP registered no negative (visible) impact; reports issued by ADEC on regional haze concluded the likely contributors to haze (in DNPP) are forest fires and international transport; and the same reports do not cite the Healy Power Plant as the cause for haze or decreased visibility in DNPP.

***Response from the Department**: See Responses 1 and 2 above for a related discussion on prior Healy 1 retrofits for HCCP permitting, and the relation to cameras (i.e., the VMP) at DNPP. Also see Responses 4 and 5 to the preceding set of comments (Mr. Frank Abegg) regarding the VMP and contributions to regional haze at DNPP. The use of low sulfur coal at Healy 1 is understood, and the related SO_2 emissions are inherently accounted for in the BART determination through the baseline and retrofit control emission rates provided by GVEA.*

This response is provided for a purpose of clarification and it does not change the conclusions of the April 2009 Findings Report.

5. Comment (page 2 of letter, 2nd paragraph): The commenter requests the Department "stand-up" "against the over-reaching NPS when it comes to Healy #1 and HCCP regulation."

***Response from the Department**: As indicated in Responses 1 and 3 above, the Department is responsible for establishing emission limits under the regional haze program and BART rule, not the NPS. The NPS, however, can provide comment on the proposed limits. Further, as indicated in Response 3 to the preceding set of comments (Mr. Abegg), the preliminary BART determination is proposed in response to the visibility protection requirements of the Clean Air Act, Sections 169A and*

169B, related codified Regional Haze Rule requirements contained at 40 CFR 51.300 through 51.309 (including 40 CFR 51, Appendix Y), and State of Alaska rule 18 AAC 50.260. Therefore, the Department is legally obligated to comply with these requirements and cannot otherwise obviate these obligations. The preliminary NO_x BART determination for Healy 1 (SCR) reflected in the Findings Report is in response to these same statutory and regulatory requirements.

This response is provided for a purpose of clarification and it does not change the conclusions of the April 2009 Findings Report.

Comments received by the Department on June 15, 2009, with supplemental information received from Kristen DuBois of Golden Valley Electric Association on June 19, 2009; and on August 27, 2009 in response to an August 17, 2009 Department request for additional information

1. Comment (page 3 of the letter): The commenter indicates the April 27 Findings Report failed to reflect the realities of operating a small coal-fired power plant in the central interior of Alaska and the lack of actual impacts on a Class I area. The commenter also indicates additional potential NO_x control cost information has been provided to the Department, along with further explanation of previously provided information.

   Response from the Department*: The content and determinations presented in the April 27 Findings Report considered all information provided by GVEA during the BART evaluation process. This notwithstanding, the comments and information provided by GVEA during the public comment period are considered herein as reflected in the comments/responses for this commenter (below).*

2. Comment (page 3 of the letter, ***The Regional Haze Rule***): The commenter provides an overview of the federal regional haze rule (40 CFR 51.300 to 51.309), the related Appendix Y (*Guideline for Best Available Retrofit Technology Determinations under the Regional Haze Rule*), and the Alaska rule requiring a BART determination (18 AAC 50.260). The commenter concludes that "GVEA believes the proposed preliminary BART for Unit No. 1 is untimely and untenable."

   Response from the Department: *The comment is unclear with respect to "untimely and untenable." The timing on the review for, and issuance of, the preliminary BART determination for the Healy Power Plant was conducted in accordance with 18 AAC 50.260. GVEA was notified by the Department during December 2007 of their subjectivity to the rule; the Department conducted two public workshops and one public hearing from January – March 2008; GVEA submitted their initial BART determination during July 2008; additional information submittals and conversations occurred through March 2009; and a preliminary April 27 BART determination was prepared and a 35 day public comment period was public noticed on May 12 2009. In terms of being "untenable", the department and its contractor, Enviroplan, evaluated all information submitted by GVEA in determining preliminary BART for Healy 1.*

   The preliminary BART determination was conducted in accordance with 40 CFR 51, Appendix Y, Section IV (5-step evaluation process), as required at 18 AAC 50.260(e), including the feasibility of various control options and their associated costs. However, as indicated in Response 1 above, additional refined information provided by GVEA during public notice is considered herein (below) in terms of the BART determination for Healy 1.

   This response is provided for a purpose of clarification and it does not change the conclusions of the April 2009 Findings Report.

3. Comment (page 4 of the letter, ***BART and Healy Unit 1***): The commenter references 40 CFR 51.308(e)(1)(ii)(B), which requires that a fossil-fuel fired power plant having a total rating of greater than 750 MW must follow the procedures found in Appendix Y when determining BART (i.e., the procedures used in the Healy 1 evaluation). The commenter specifies that Healy 1 is only 25 MW. Nonetheless, the commenter does acknowledge Enviroplan's application of Appendix Y in making the preliminary BART determination for Healy 1.

   Response from the Department*: While the Department acknowledges the citation and rated capacity for Healy 1 noted by the commenter, the department notes that 18 AAC 50.260(e) requires the owner/operator to conduct an analysis of control options for an affected source (regardless of type or capacity) consistent with Appendix Y, Section IV. This is the basis for the BART evaluation for Healy 1, as described in the Findings Report.*

   This response is provided for a purpose of clarification and it does not change the conclusions of the April 2009 Findings Report.

4. Comment (page 4 of the letter, ***BART and Healy Unit 1***): The commenter indicates the use of peak 24-hour emission rates for the visibility modeling pre-control (baseline) scenario, as required by the BART guideline, instead of using annual average emission rates, results in a "distorted" or larger degree of improvement of visible impacts when evaluating various control options. The commenter suggests that the Department has the discretion to consider this situation when considering a BART determination.

   Response from the Department*: The comment pertaining to the Department's ability to use "discretion" when considering the visibility modeling emission rates and impacts is unclear. The regulatory basis for the modeling, as noted by the commenter, is found in the federal BART rule. Additionally, 18 AAC 50.260(h)(2) requires that the visibility impact analysis determine the maximum change in visibility impacts in daily deciviews, between the current or pre-control technology and each potential BART control option. Maximum daily change would not be determined though the use of annual emission rates. The Department is required to determine BART in accordance with the federal and state BART rule, and this is predicated on the use of peak 24-hour emission rates for visibility modeling. Since the use of peak 24-hour emission rates is reflected in the preliminary BART determination, there is no change to the conclusions of the April 2009 Findings Report due to this comment.*

5. **Comment (page 4 of the letter, *BART and Healy Unit 1*)**: The commenter suggests that Enviroplan was "under pressure" from the NPS when determining BART. The commenter further indicates Enviroplan let the proximal location of Healy 1 to DNPP (i.e., approximately 8km) "hijack" the BART analysis. The commenter also suggests that the BART determination (for NOx) as SCR was predetermined, and that Enviroplan ignored the language of the regulations and the statutory purpose of protecting visibility. Finally, the commenter concludes that Enviroplan's determination was "arbitrary and capricious" as applied to Healy 1.

***Response from the Department**:*
The Department's is responsible for BART determination after a BART control technical analysis for the BART sources. The BART technical control analysis is an open process. Both the NPS and GVEA offered their opinions and information regarding the BART technical analysis; Enviroplan considered all available information in making the recommendation; and the Department likewise considered all available information in making their preliminary decision.

No communication between the NPS and Enviroplan occurred between the start of Enviroplan's contractual obligation to the Department for this project, through public noticing of the April 27, 2009 Findings Report. The proximity of Healy 1 to DNPP is a fact that must be considered within the proscribed procedures of the BART rule. The Department has considered this fact based on the visibility modeling results and other information provided by GVEA. The Department has documented the basis for the decisions made for preliminary BART. It would be "arbitrary and capricious" at best, and remiss and non-compliant with the regulation at worst, for the Department to ignore the cost effectiveness results and degree of predicted visibility improvement at DNPP. The preliminary BART determination for Healy 1 was based solely on the information provided to the Department or to its contractor during this review, including draft determination comments and related additional information provided by, GVEA and the NPS ; therefore, this was not a "predetermined" outcome as claimed by the commenter. There is no change to the conclusions of the April 2009 Findings Report due to these comments.

6. Comment (pages 5 - 8 of the letter, ***NOx - Cost***): The commenter notes a series of potential errors in the April 2009 Findings Report pertaining to Enviroplan's SCR cost assessment for Healy 1 versus that provided by CH2M Hill on behalf of GVEA, based on the following:

   a. CH2M Hill provided cost information based on the use of EPA's CUECost manual[1], supplemented with vendor cost data and proprietary information from other engineering design projects. Enviroplan computed control cost information using generic data and EPA's Cost Manual[2]. It is not clear if Enviroplan accounted for cost escalation from the Cost Manual's 1997 cost basis; regardless, escalation of costs since 1996 is inaccurate. The NPS also stated a preference for use of the Cost Manual in part to provide consistency in BART determinations. CH2M Hill believes its actual experience and approach to CUECost provides a more accurate representation of anticipated SCR costs for Healy 1.

   b. Enviroplan failed to consider the unique costs associated with installation and operation of SCR on Healy 1, including additional insulation, heat tracing, freeze protection, heater enclosures, high Alaska construction costs, higher Alaska materials transportation costs and other factors associated with site remoteness.

   c. Enviroplan's costs failed to scale costs to a 25 MW plant. The commenter suggests the use of an equipment cost capacity adjustment factor of 0.8 (i.e., size

[1] U.S. EPA, *Coal Utility Environmental Cost (CUECost) Workbook User's Manual,* developed for EPA by Raytheon Engineers & Constructors and Eastern Research Group, Version 1, November 1998, with revision February 9, 2000..
[2] U.S. EPA, *EPA Air Pollution Cost Control Manual*, 6th Ed., Publication Number EPA 452/B-02-001, January 2002.

ratio raised to the power of 0.8 to determine comparative cost), based on American Association of Cost Engineers (AACE) published cost capacity factors[3]. The commenter provides a graphic (as Attachment 1 to their June 15 letter) showing the increased cost ($/kW) for a 25 MW plant versus a 100 MW plant, and indicates the Enviroplan cost of $241/kW incorrectly omits the cost escalation for plants less than 100 MW.

d. CH2M Hill's previous economic evaluations were based upon order of magnitude cost estimates (i.e., accuracy of -30% to +50%), which the commenter deems consistent with the BART process since completion of a more detailed cost estimate was not intended or justified for the "BART screening analysis". As such, based on SCR determined as preliminary BART for NOx at Healy 1, a more detailed capital and operating cost estimate has been prepared. GVEA contracted Fuel Tech, a consulting company that specializes in SNCR and SCR application, 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 conducted the evaluation and issued a findings report on June 10, 2009 (Attachment 2 of the commenter's June 15 letter), which in turn allowed GVEA to refine their operating and maintenance (O&M) costs. While the Fuel Tech evaluation was not a detailed engineering study and cost analysis, it did account for actual current systems setup and plant retrofit design limitations and requirements. Fuel Tech indicates no SCR retrofits have been made in the U.S. on coal-fired boilers as small as Healy 1. As such, Fuel Tech believes their costing, while based on their current project experience for many other SCR systems on coal-fired boilers, may understate the actual cost to construct such a system on Healy 1.

e. CH2M Hill utilized the refined Fuel Tech and GVEA cost data to revise the BART economic analysis previously submitted for Healy 1, as summarized in Section 6 of the April 27 Findings Report. Aside from the revised capital and operating costs, the revised analysis includes an 8-year amortization scenario (in addition to the 15-year control equipment lifetime scenario) to account for the expected remaining useful life of Healy 1, as allowed pursuant to the BART rule (40 CFR 51, Appendix Y, IV.D.k.1). The commenter indicates that Enviroplan did not take into consideration the fact that the estimated remaining useful life of Unit 1 is 15 years. By the time of a 2016 installation (approximately) for an SCR control system, this will leave about 8 years of useful life for Healy 1 and require that an 8-year amortization be applied to the SCR cost analysis.

f. A revised BART economic analysis for SCR based on the Fuel Tech study and the remaining useful life of Healy 1 has been prepared by CH2M Hill. The commenter indicates the revised costs will produce a ratepayer increase of about 3.5% which they deem significant for a small ratepayer base, especially since implementation of the controls will have no effect on improved visibility degradation due to the predominating effects of wildfire events within or impacting DNPP.

[3] English, Lloyd M. & Humphreys, Kenneth K. (1993*), Project and Cost Engineers' Handbook*, Marcell Dekker, Inc. New York.

g. The commenter cites Enviroplan's reference to NPS cost information ($/kW) when considering Healy 1 costs, and suggests the reference to be misleading. The commenter notes there are no other BART eligible units of a capacity comparable to Healy 1. They also cite the ratepayer impact (discussed above); and they reference a May 13, 2009 NPS summary spreadsheet ("*EGUs with BART NOx Controls*") as indicating 42 BART eligible units with only 4 controlled by SCR and only one (375 MW tangentially-fired boiler in Minnesota) as having a 0.07 lb/MMBtu limit. They further indicate the BART rule provides for considering the existence and viability of other similar projects when determining BART. The commenter also makes an additional reference to a concluding statement made by Enviroplan in Section 6.1 of the April 2009 Findings Report (i.e., page 17, final bullet), indicating that statement to be without foundation given that no 25 MW coal fired boilers are subject to BART, particularly those requiring SCR retrofit control technologies in the Arctic.

***Response from the Department**: As a general response to this comment, it is noted that a teleconference was held on February 25, 2009 between the Department, GVEA, CH2M Hill and Enviroplan. Among other topics discussed, the Department indicated to GVEA that draft preliminary BART findings for Healy 1 included SCR for NOx control. As a result, GVEA requested the submittal of refined retrofit cost data, including the cost impact of the potential retrofit controls to their residential ratepayer base. The Department agreed to this request; however, given pending SIP submittal time constraints and the amount of time already provided for data submittal, the Department indicated that the retrofit cost refinements should be GVEA's last, best estimate on such data. Although acknowledging this request, GVEA's June 15 and 19, 2009 response to comments again included refined cost information and a new economic evaluation for SCR NOx control at Healy 1. This notwithstanding, the Department is considering the new information in response to this "comment" and final BART/GVEA Determination*

The following specific responses are provided to commenter paragraphs a through g above:

a. In the April 27 Findings Report, the purpose of Enviroplan's use of the Cost Control Manual was to provide a point of comparison between the costs reflected in both the GVEA analysis and the NPS Cost Control analysis, mainly to assess the relative accuracy of the cost of materials and services known to be relatively high in Alaska. The Department does not dispute the use of CUECost for the BART cost evaluation. It is recognized that, unlike the Cost Control Manual, CUECost was specifically developed by EPA to provide order-of-magnitude estimates of installed capital and annualized operating costs for SO_2, NO_x and particulate air pollution control systems to be installed on coal-fired power plants. The cost-basis year default in CUECost is 1998, which is the same as the Control Cost Manual. The Department agrees that current, vendor-based cost data is preferred for use in the cost evaluation analysis, as other recent information suggests both EPA cost tools understate the costs for SCR[4]. The use of contractor-developed site-specific refined

[4] State of Oregon, Department of Environmental Quality, "Agenda Item J, Action Item: 2008 Oregon Regional Haze Plan and new controls for PGE Boardman coal-fired power plant proposed rulemaking", Attachment B, Summary of Comments and DEQ Response, June 18-19, 2009 EQC Meeting.

costs for SCR, as discussed in paragraph d above, are believed to be superior to escalation of older base-year initial assumptions from either EPA program.

b. *The Department understands the need to account for unique costs and considerations associated with installation and operation of the SCR system (and other options) located in the Alaska environment. The site-specific capital cost evaluation and related information provided by GVEA, based on the May 2009 Fuel Tech study, has been considered herein (see additional related discussions below).*

c. The department and its contractor, acknowledges that the SCR cost information contained in the CUECost manual is most applicable to units with capacities greater than Healy 1. In fact, Section 1.7 of the CUECost manual states "CUECost is designed to produce ROM estimates for a wide range of plant sizes and coal types. However, appropriate ranges of plant size and operating conditions have been established based on the limits to the database used to construct the cost-versus-capacity algorithms. Range limits are provided in the spreadsheet for each input supplied by the user. The major criteria limitation for CUECost is the plant size range. Equipment algorithms are based on the assumption that they will be installed at a facility ranging from 100 to 2000 MW in net capacity." As a point of comparison, the Cost Control Manual, Section 4.2, states "This section presents design specifications and a costing methodology for SNCR and SCR applications for large industrial boilers (greater than 250 MMBtu/hr)". However, Section 4.2, Chapter 2.4 further specifies "The capital and annual cost equations were developed for coal-fired wall and tangential utility and industrial boilers with heat input rates ranging from 250 MMBtu/hr to 6,000 MMBtu/hr (25 MW to 600 MW)". While it is not immediately clear how many (or which) 25 MW coal-fired boilers were included in the Cost Control Manual SCR costing information, it generally seems from the EPA discussion that most (or all) of the information was prepared for units whose capacities exceed that of the 25 MW Healy 1 unit.

Based on the above, the Department acknowledges the potential inaccuracies associated with the escalation of average costs for an emission unit that is outside the bounds of empirically established cost information. This situation is obviated by the use of the refined site-specific capital costs developed by Fuel Tech. GVEA has included a revised economic analysis for SCR with their June 15 and June 19, 2009 comment letters using the Fuel Tech information.

d. The Department and its contractor do not agree that the economic evaluation should have been considered as a "BART screening analysis". 40 CFR 51, Appendix Y, Section IV.D,4.a.5 specifies "the cost analysis should also take into account any site-specific design or other conditions identified above that affect the cost of a particular BART technology option." As such, given GVEA's own determination on the viability of SCR as a retrofit option at Healy 1; the related predicted visibility improvement with this option; the cost effectiveness results; CH2M Hill's knowledge of available NPS BART cost summary data; and the consideration of the entirety of this information in the context of the BART review process, the comment on the "BART screening analysis" is unclear. Further, the Department indicated to GVEA during February 2009 that the draft preliminary Healy 1 BART determination for NOx was SCR. While the Department provided additional time for GVEA to further compile and submit information for consideration under the BART review process, it was not

until June 2009; almost one year after the July 2008 initial BART submittal was received at the Department, a site-specific refinement of SCR costing occurred.

The above notwithstanding, the Department acknowledges the refined site-specific cost estimate provided by GVEA through their SCR engineering consultant, Fuel Tech. GVEA has revised the economic analysis for Healy 1 based on use of the Fuel Tech results (see related response in paragraph e. below).

e. *The commenter specifies "Enviroplan did not take into consideration the fact that the estimated remaining useful life of Unit No. 1 is also 15 years" when considering the likely SCR install date of 2016 (i.e., BART install date of 5-years after final SIP approval, which is estimated to be 2011 (two years after the 2009 submittal date)). The department and its contractor agree with this statement. It is the responsibility of the applicant to reflect such information in their analyses, and not the responsibility of the Department (or its contractor) to refine such analyses.*

f. *However, it is emphasized that the contractor, Enviroplan, reviewed cost analyses (July 2008, January 2009 and March 2009), provided by GVEA. In all cases, the analyses were based on a 15-year lifetime for an SCR system. The GVEA reports did not attempt to quantify any other (shorter) lifetime periods associated with a reduced Healy 1 remaining lifetime. It is the responsibility of the applicant to reflect such information in their analyses, and not the responsibility of the Department (or its contractor) to refine such analyses.*

The above notwithstanding, 40 CFR 51, Appendix Y, Section IV.D.4.k provides for the amortization of costs based on remaining useful life. This citation also provides for flexibility if an affected source does not want to accept a federally enforceable permit condition establishing a shutdown date (i.e., the case for GVEA as per their comments). In such instances, the regulatory agency <u>may</u> include a permit condition requiring controls, if such were deemed as BART in the absence of the contracted amortization period.

GVEA has stated the expected remaining useful life for Healy 1 is 15 years from current (2009); therefore, The Department agrees that GVEA's use of an 8-year amortization analysis for Healy 1 retrofit control systems is consistent with the BART Guideline. At this time, the Department has made no determination about future permit conditions for Healy 1 based on the conditional flexibility provided in the BART Guideline as specified above, and the fact that Healy 1 will be 57 years old in calendar year 2024 (fifteen years from this 2009 findings review). The department and its contractor have considered the revised economic evaluation prepared by CH2M Hill on behalf of GVEA. The SCR system capital costs and related operating and maintenance costs are based on the May 27, 2009 site-specific evaluation conducted by Fuel Tech. While the revised economic analysis includes both 15-year and 8-year boiler lifetime scenarios, the Department has decided that the 8-year lifetime is acceptable and is consistent with the BART Guideline. The revised SCR (and other retrofit option) cost results are summarized at the end of this document.

The department's technical contractor, Enviroplan, has made several corrections to the GVEA cost analysis for SCR as follows. First, a double-counting of the O&M

costs associated with reagent and catalyst replacement has been eliminated (this correction was acknowledged by GVEA on August 27, 2009). Second, GVEA submitted revised SCR NOx cost information for two baseline emission scenarios, 0.28 lb/MMBtu and 0.25 lb/MMBtu, and they indicated the true baseline to be more reflective of 0.28 lb/MMBtu based on a 5-year analysis of 30-day NOx emission rates for Healy 1. Therefore, the revised NOx retrofit option cost analyses presented at the end of this document reflect the use of the 0.28 lb/MMBtu baseline, which is more conservative than the 0.25 lb/MMBtu baseline in terms of the cost per ton of pollutant removed metric.

It is noted that the revised NOx baseline emission rate does not affect the visibility impact modeling since modeling relies on the peak 24-hour pollutant emission rate, not the 30-day rolling emission rate. Therefore, there is no change in modeled visibility impacts and related dollars per deciview improvement cost metrics, except for the use of the 8-year amortization period. Finally, it is noted that GVEA escalated their costs to reflect calendar year 2016, i.e., the first year of SCR operation. However, Enviroplan did not use these escalated costs since the comparative cost metrics would also need to be escalated to 2016. Instead, Enviroplan relied on current costing (2009 dollars for SCR and 2007 dollars for other control options) as provided by GVEA for the revised cost analysis.

The BART rule does not exempt affected sources from considering retrofit controls based on the contribution from other sources, even natural and/or international contributors. With respect to the stated 3.5 percent ratepayer increase, as indicated in Section 6.3 of the April 2009 Findings Report this percentage is reflective of combined proposed costs of SCR and FGD sorbent injection increase. Since visibility impairing pollutants are individually evaluated under the BART rule, the cost associated with these two systems is not considered on an additive basis.

The above notwithstanding, the cost of SCR has been refined based on the Fuel Tech on-site cost evaluation; and the costs for optimized sorbent injection also have been revised (see related response to Sierra Club comments). The April 2009 Findings Report has been revised to reflect these updated cost analyses (also see the summary at the end of this document). Based on the cost revision, SCR is no longer considered as BART for Healy 1. As such, the ratepayer cost analysis tables of the April 2009 Findings Report (Tables 6-3-1 and 6-3-4) have been updated accordingly, as reflected in the revised Findings Report. The Department recognizes the incremental costs associated with the installation of BART retrofit control systems represent cost increases to the GVEA ratepayers. It is further understood that GVEA serves a relatively small rural community[5] that is not connected to a nationwide or outside electric grid or connected to other utilities; electricity rates would be increased to pay for add on emissions controls; and nonetheless, the revised Findings Report potential ratepayer increase of 0.31% and 0.38% for the ROFA (NO_x) and increased sorbent injection (SO_2) control options are not, in and of themselves, deemed to be cost prohibitive in terms of assessing the viability of these systems.

g. The Department agrees that the Findings Report (Section 6.1, page 17) is ambiguous with respect to the capital cost of the SCR system ($/kW) and available NPS

[5] *Approximately 36,800 residential customers based on information received from GVEA, March 30, 2009.*

information. The statement was made in reference to a January 9, 2009 data summary compiled by the NPS for western U.S. electric generating units (EGUs). The NPS summary reflected BART evaluation and cost data for SCR systems that were prepared by affected electric generating unit (EGU) sources, and reviewed/adjusted by the NPS. As indicated in Section 6.1 of the April 27 April 2009 Findings Report, based on their summary the NPS determined the range of SCR installed capital costs to be $80/kW - $270/kW. As shown in the revised cost analysis at the end of this document, the revised installed capital cost for SCR is $874/kw. The SCR control option is no longer deemed viable as NOx BART for Healy 1.

The above notwithstanding, the following is noted for purposes of clarification. The NPS disseminated updated BART control survey data spreadsheets on May 13, 2009[6]; and again on August 12, 2009[7]. As shown below, the NPS summary information indicated only four western region EGUs (including Healy 1) with SCR proposed for NOx control, with two units using SCR as reasonable progress.

Operating Company & Facility	Minnesota Power - Boswell Energy Center Unit #3	Xcel Energy – Allen S. King Generating Plant Unit #1	Golden Valley Electric Association (GVEA) – Healy Unit #1	Pacificorp Naughton Unit #3	Pacificorp Jim Bridger Units 3&4	PGE - Boardman
State	MN	MN	AK	WY	WY	OR
Boiler Type	Tangential	Cyclone sub-bituminous	wall-fired, wet bottom	tangential sub-bituminous	tangential sub-bituminous	wall-fired PRB sub-bituminous
Rating (MW Gross)	375	550	25	330	530 (each)	617
Preliminary BART Control	LNB+OFA+SCR	SCR	SCR	LNB+OFA+SCR	LNB+OFA; SCR as reasonable progress (RP)	LNB+OFA; SCR (RP)
30 Day Rolling NOx Emission Limit	0.07 lb/mmBtu	0.10 lb/mmBtu	0.07 lb/mmBtu	0.07 lb/mmBtu	0.26 lb/mmBtu (BART) 0.07 lb/mmBtu (RP)	0.23 lb/mmBtu (BART) 0.07 lb/mmBtu (RP)

As can be seen from the above, none of the EGUs are comparable in capacity to the 25 MW Healy Unit 1. For those EGUs most comparable to Healy 1 (wall-fired EGUs, with capacity in the range 25-100 MW), review of the NPS data indicates the following proposed retrofit determinations:

Operating Company & Facility	Colorado Springs Utilities – Martin Drake Unit # 5	Colorado Springs Utilities – Martin Drake Unit # 6	Golden Valley Electric Association (GVEA) – Healy Unit #1	Nevada Energy - Tracy Generating Station Unit # 1	Nevada Energy - Tracy Generating Station Unit # 2	Nevada Energy - Tracy Generating Station Unit # 3

[6] *NPS BART Evaluation, http://www.wrapair.org/forums/ssjf/bart.html .*

[7] *Email forwarded Don Shepherd, NPS, to various recipients, entitled "Latest Compilation of BART Determinations and Proposals Attached BART Evaluation", dated August 12, 2009.*

State	CO	CO	AK	NV	NV	NV
Boiler Type	Wall fired	Wall fired	wall-fired, wet bottom	Not stated	Not stated	Not stated
Fuel	bit/sub-bit mix	bit/sub-bit mix	sub-bituminous	Pipeline NG & blended Fuel Oil	Pipeline NG & blended Fuel Oil	Pipeline NG & blended Fuel Oil
Rating (MW Gross)	55	85	25	55	83	83
Preliminary BART Control	addition of OFA to existing LNB	addition of OFA to existing LNB	SCR	LNB+FGR	LNB+FGR	LNB+FGR
30 Day Rolling NOx Emission Limit	0.39 lb/mmBtu	0.39 lb/mmBtu	0.07 lb/mmBtu	0.15 lb/mmBtu (annual)	0.12 lb/mmBtu (annual)	0.19 lb/mmBtu (annual)

Based on the two summary tables shown above, Enviroplan agrees with the commenter that there are no NOx SCR BART determinations (proposed or final) for western EGUs similar in capacity to Healy 1. Enviroplan also agrees that NO_x BART generally reflects low NO_x burners with either over fired air or flue gas recirculation for similarly sized units.

Again, the above information notwithstanding, Enviroplan has revised the Findings Report to reflect the new economic evaluation for SCR based on the Fuel Tech site-specific cost evaluation study. The NOx baseline emission rate of 0.28 lb/MMBtu is reflected in the revised cost analysis results, and an 8-year useful lifetime is assumed for Healy 1 for all control options (including SCR). A summary of the revised cost evaluation is found at the end of this document.

7. Comment (page 8 of the letter, ***Energy and Environmental Impacts***): The commenter indicates that, since the April 27 Findings Report already decided SCR to be appropriate for Healy 1, it gave no serious consideration to the energy and environmental impacts associated with an SCR system. The commenter reiterates the SCR system will consume power otherwise available for dispatch to the co-op system customers; and it will result in increased ammonia emissions (slip) as the catalyst efficiency decreases with time. Further, the commenter reiterates the use of ammonia will result in hazardous risk associated with its transport/storage; and result in a solid waste disposal impact due to ammonia accumulation in the ash, which also negates the salability of the ash.

Response from the Department*: The selection of SCR as preliminary BART for Healy 1 was not pre-determined. The determination was based on information submitted to the Department and evaluated in accordance with state and federal BART rules and the Guideline (40 CFR 51, Appendix Y). Regarding the comment on the energy impact, the comment is unclear since the additional electricity cost for the control system was included in the GVEA cost analysis, in accordance with the BART Guideline (40 CFR 51, Appendix Y, Section IV.D.4.h); the penalty itself has been estimated by GVEA at only 0.44% of potential power output from Healy 1. Regarding ammonia slip, it is agreed that ammonia emissions can have a countervailing impact on visibility versus NOx reduction from the SCR system; however, the comment is qualitative only and cannot be considered further without*

ammonia emissions inclusion in the modeling analysis (which was not done by GVEA).

Regarding the potential hazards associated with ammonia, the BART Guideline (40 CFR 51, Appendix Y, Section IV.D.4.i) indicates "the fact that a control device creates a liquid or solid waste that must be disposed of does not necessarily argue against selection of that technology as BART, particularly if the control device has been applied to other similar facilities elsewhere and the solid or liquid waste is similar to those other applications." While it is recognized that there are presently no facilities the size of Healy 1 utilizing SCR as BART and storage/transport of ammonia around the sensitive Class I area would be required, it is clear that SCR has relatively wide application on combustion sources for NO_x removal and results in similar waste for these other applications. As noted in response 8 to comments from Mr. Frank Abegg, industrial safeguards and procedures have been established, such as those required and prescribed by 40 CFR Part 68, to minimize risk from hazardous material (e.g., ammonia) use. Further, GVEA could have accounted for the lost revenue associated with ammonia accumulation in the otherwise saleable ash product in their cost analysis, but this was not included. Again, the commenter's concerns are understood and acknowledged, but the qualitative/quantitative information provided by GVEA on the SCR energy penalty and ammonia use did not rule-out SCR as a viable option. While there is no specific change to the Findings Report due to this comment, the revised costing for the SCR option (see end of this document) has resulted in SCR being deemed infeasible for Healy 1.

8. Comment (page 8 of the letter, ***Existing Pollution Control Technology***): The commenter indicates that, due to the fact that Healy 1 already has significant emissions reduction technology in place (for NO_x, SO_2 and PM) deemed as BART for substantially larger EGUs, the preliminary BART determination disregards applicable regulations and "violate[s] the spirit of the Memorandum of Agreement among NPS, GVEA, the Alaska Industrial Development and Export Authority, and the U.S. Department of Energy."[8]

   Response from the Department*: The Memorandum of Agreement did not address future requirements. The BART determination is a case-by-case evaluation of retrofit technology. Existing emission reduction technology factors into this evaluation by reducing the number of additional retrofit technologies available and by reducing the cost effectiveness of adding those retrofit technologies. The Department's evaluation included these factors in its evaluation of the available retrofit technologies.*

   There is no change to the Findings Report due to this comment.

9. Comment (page 9 of the letter, ***Remaining Useful Life***): The commenter indicates the useful life of the plant is relevant in the BART program and must be considered, noting Healy 1 will long be retired by the regional haze program natural conditions deadline of 2064.

[8] *Memorandum of Agreement, Healy Clean Coal Project, Healy, AK, among the U.S. Department of Energy, U.S. Department of the Interior/National Parks Service, AIDEA, and GVEA, dated November 9, 1993.*

***Response from the Department**: The Department agrees that the remaining useful life of Healy 1, which has been indicated by GVEA to be until about 2024, should be accounted for in the BART determination process. Also see response 6 above (and related responses elsewhere in this document). The revised cost results are summarized at the end of this document.*

10. Comment (page 9 of the letter, ***Degree of Visibility Improvement***): The commenter notes a series of issues regarding the expected degree of visibility improvement anticipated from the BART determination, as follows:

    a. The commenter indicates the Findings Report fails to consider the purpose of BART which they note as "namely, the protection and improvement of visibility by addressing sources which have an adverse impact on visibility in Class I Federal areas and to restore visibility to natural conditions by 2064." To this end, the commenter indicates the useful life of Healy 1 will expire long before 2064, and Healy 1 causes no perceptible impact on visibility (at DNPP).

    b. The commenter notes that 40 CFR 51.301 (Definitions) makes reference to the "time of visitor use" portion of the *adverse impact on visibility* definition, noting DNPP is generally not visited for about 8 months of the year. The commenter notes the NPS has not specified a concern or complaint regarding the Healy power plant and visibility impacts at DNPP.

    c. The commenter suggests Enviroplan "dismissed" their prior visibility monitoring program (VMP) and related data, and they have cited a Department report[9] which concludes "the monitoring program produced no evidence of a discolored NO_2 plume or regional haze event associated with the operation of Healy Unit #1." The commenter indicates the previous VMP, including modeling by ADEC and NPS, consistently have shown no impact on visibility.

    d. The commenter has provided a visibility trend graphic for 1989 - 2007, based on data from the IMPROVE monitoring station located at the Park visitor's center. The commenter opines that the effects of the 1996 NO_x and 1999 SO_2 control projects at Healy 1 are not manifested in the trend data; therefore, any visibility impairment at DNPP is not attributable to Healy 1.

    e. The commenter reiterates, based on NPS information[10], that a significant contribution to haze at DNPP is from international contaminant transport to DNPP (Arctic Haze); in-park roadway vehicle dust emissions; and smoke from natural wildland fires (locally and internationally); and that reducing emissions from Healy 1 will add relatively minimal theoretical visibility improvement at DNPP given these other significant sources will continue to impact visibility at DNPP.

    f. The commenter notes the Department should make a determination on statewide reasonably further progress to avoid placing an undue burden on a single source being evaluated under the BART rule.

[9] Alaska Department of Environmental Conservation, ***"A BART Case Study -Healy Clean Coal Project"***, as Appendix A to WESTAR Council June 2001 report, "RA BART and RA BART-Like Case Studies", located at http://www.wrapair.org/forums/amc/projects/ra_bart_case/Healy-A.doc .

[10] *NPS, May 8, 2009, from http://www.nps.gov/dena/naturescience/upload/airquality2009.pdf.*

g. The commenter concludes that, based on the above comments, SCR as BART will provide no real visibility benefit while resulting in prohibitive costs that must be borne by the customers (i.e., 40 CFR 51, Appendix Y, Section IV.5.E.3.2).

***Response from the Department**: The following specific responses are provided to commenter paragraphs a. through g. above. Unless otherwise indicated, the responses are provided for purposes of clarification and do not change the conclusions of the April 2009 Findings Report.*

a. The Department understands the purpose of BART and generally agrees with the commenter's interpretation of the purpose of BART, including the useful lifetime of Healy 1 as discussed in response 6 above. However, the Department does not agree that BART is intended to consider "adverse" impacts on visibility. The regional haze rule (40 CFR 51.301) defines "adverse impact on visibility" only in the context of regional haze SIP development for New Source Review (i.e., 40 CFR 51.307). By contrast, 40 CFR 50.308(e) for BART, as well as much of the remainder of the regional haze rule, applies to sources that may "reasonably be anticipated to cause or contribute to any impairment of visibility" in a mandatory Class I Federal area. This is a subtle but important distinction in terms of the applicability of the BART rule.

b. As discussed in the preceding response, the definition of "adverse impact on visibility" is relevant to 40 CFR 51.307 and not to the regional haze BART determination process (i.e., 40 CFR 51.308(e)). As such, the "time of visitor use" portion of said definition is not applicable to the BART determination. While "time of visitor use" is also included in the 40 CFR 51.301 definition of "significant impairment", the exemption from pollution controls provided by 40 CFR 51.303 requires approval from the Administrator and the Federal Land Manager. This exemption is not relevant to the GVEA BART analysis.

c. The BART rule does not exempt an affected source from the BART determination process based on available visibility monitoring; nor does available visibility monitoring account for the full geographic expanse of the Class I area modeling domain. In the technical review, the contractor, Enviroplan acknowledges the cited Department report and the quoted comment from that report. „. Section 7.3 of the Findings Report provides a synopsis of both the VMP and the results, and it acknowledges the VMP findings. However, as indicated in Section 7.3, no known determination has been made by the regulatory authorities concluding that the VMP demonstrated no visibility impacts at DNPP, as caused by GVEA. While the VMP results suggest limited episodes of visible plume transport to DNPP directly attributable to GVEA, such results do not rule-out GVEA as a source reasonably anticipated to cause or contribute to any impairment of visibility. For example, as indicated in Section 7.3 of the April 27 Findings Report, IMPROVE data shows the year-round presence of sulfate and nitrate aerosols. This suggests that local combustion sources, e.g., Healy 1, are contributing to the airborne concentrations of such contaminants, and not just sources associated with international transport and wildfire events.

d. The Department and its contractor generally agrees with the premise that, if the Healy plant were impacting the Park visitor's center IMPROVE monitoring

station, a related improvement in the measured visibility parameters might be manifested at the time when new pollution controls were installed at Healy 1. However, no information on the general frequency or magnitude of station impacts attributable to Healy 1 is provided. Given that the Healy power plant is located in a valley with a northwest-southeast orientation the Department's technical review indicates that a relatively high percentage of the annual hours would reflect plume height flow vectors in this same alignment. This would suggest limited Healy 1 impacts at the IMPROVE monitor; therefore, the 1998 - 2007 trend data may not necessarily reflect implementation of controls at Healy 1. It is emphasized that low frequencies of Healy 1 impacts at the IMPROVE monitor does not mean no instances of plume transport towards DNPP; nor does it mean Healy 1 does not cause or contribute to any impairment of visibility.

e. Section 7.3 of the Findings Report acknowledges the contribution of international transport of aerosols into DNPP (Arctic Haze), as well as wildfire and in-park vehicle traffic. It is understood that these phenomena are potentially contributors to regional haze at DNPP; however, as indicated in the preceding paragraphs, this does not negate the BART rule and BART determination process for Healy 1.

f. The core requirements for a state regional haze SIP are provided at 40 CFR 51. 308(d). These requirements include reasonable progress goals and a long term strategy to attain natural conditions by the year 2064. The Department agrees that these elements of the SIP are collective, i.e., do not account for the actions of any particular source but consider all affected sources and their potential emissions reductions. However, 40 CFR 51.308(e) requires that the SIP contain emission limitations that reflect BART (and schedules for compliance) for each BART eligible source. While the results of the BART-related emission limits will be reflected in the long term strategy to ensure natural visibility compliance by 2064, the regional haze rule does not provide for a final determination on BART for an affected source pending the completion of the long term strategy.

g. As specified throughout this response document, the determination of SCR as preliminary BART has considered all information provided during the review. However, the consideration for the remaining useful lifetime of Healy 1 will affect the cost analysis and possibly the preliminary determination. The revised costing summary is presented at the end of this document; and related changes to the proposed BART determination for Healy 1 are contained in the BART/GVEA Determination Final Report

11. Comment (page 10 of the letter, ***SO_2***): The commenter indicates their agreement that the existing dry sorbent SO_2 control system should be considered as BART; and that increased sorbent injection would add extra procedures and costs without a perceptible benefit to visibility. Likewise, the commenter opines the installation of a new lime spray dryer would result in even higher costs and related environmental impacts.

Response from the Department*: The GVEA cost analyses for the various SO_2 control options, including a new lime spray dryer, have been revised to account for an 8 year remaining useful lifetime for Healy 1. Further, a comment submitted by the*

Sierra Club has resulted in a revision to GVEA's cost analysis for increased sorbent injection at the existing FGD system as an SO_2 control option (see Sierra Club comment response 2). This cost analysis revision also considers related clarifying information provided by GVEA on August 27, 2009. The cost revision summary is presented at the end of this document, and any changes to the proposed SO_2 BART for Healy 1 are discussed in the Final BART/GVEA determination Report

12. Comment (page 10 of the letter, ***PM_{10}***): The commenter indicates their agreement that the existing fabric filter represents BART for this source; but does not believe the corresponding BART permit emission limit should be imposed.

Response from the Department*: GVEA indicated in both a November 11, 2008 response to an information request, and their revised January 2, 2009 report, that the Healy 1 baghouse "is either achieving, or is capable of achieving, the 0.015 lb/MMBtu emission value" presented as BART for this control system. Review of proposed particulate emission limits summarized by the NPS for other BART EGUs using a baghouse[11] suggests the proposed emission limit for Healy 1 to be within the range of proposed and/or issued particulate BART limits for a fabric filter. This notwithstanding, the Findings Report erroneously expressed the PM emission limit as a 30-day rolling average instead of reflecting compliance based on source testing. The Final BART/GVEA determination Report is therefore revised to reflect a proposed preliminary BART particulate limit of 0.015 lb/MMBtu based on compliance source testing.*

13. Comment (page 10 of the letter, ***Conclusion***): The commenter requests the existing configurations for Auxiliary Boiler 1 and Healy Unit 1 be considered as BART, with no further controls and changes to in emission limits for each unit.

Response from the Department*: The commenter's request is acknowledged. The Department agrees with the request for Auxiliary Boiler 1. All information and comments affecting the proposed preliminary BART determination for Healy 1, as contained in the April 27 2009 Findings Report, are documented herein. As discussed above, this includes a revision to the GVEA cost analyses for the NO_x and SO_2 control options in order to account for an 8-year remaining useful lifetime for Healy 1. Related information is summarized at the end of this document.*

[11] *NPS BART Evaluation, http://www.wrapair.org/forums/ssjf/bart.html .*

Comments received by the Department on June 15, 2009 from Sanjay Narayan on behalf of the Sierra Club, Denali Citizens Council, National Parks Council, Northern Alaska Environmental Center and Cook Inletkeeper

The commenter has provided comments in four itemized sections of their letter. The comments and Department responses are presented below consistent with these sections.

A. The Department Should Require Stricter Sulfur Dioxide Controls

1. Comment (3rd paragraph, page 2 of the letter): The commenter indicates the Department has rejected more stringent SO_2 controls on the basis of "brown-cloud" concerns. Based on their review of Section 3.2 of the Findings Report, the commenter suggests that the chemical reaction of NO to NO_2 associated with sorbent injection will occur relatively close to the source; will not represent new emissions; and will not make any difference in visible impacts at DNPP since chemical conversion will occur closer to the source versus during normal atmospheric transport and chemical conversation. The commenter also opines that, due to the lack of modeling by GVEA of this process, it is reasonable to expect that such transformation may accelerate particle deposition and visibility benefit to DNPP.

***Response from the Department**: As indicated in Section 3.2 of the April 2009 Findings Report, the potential does exist for the FGD reagent (sodium bicarbonate) to cause the oxidation of exhaust gas NO to NO_2. Section 3.2 of the April 27 Findings Report further indicates that a brief literature review was conducted on the potential for the formation of a brown-plume from this chemical reaction due to reagent usage. For instance, in a recent paper[12] prepared by Solvay Chemicals (i.e., vendor of dry sorbent (sodium bicarbonate) injection systems), it was shown that incremental increases in SO_2 control through increased sodium bicarbonate injection resulted in concurrent incremental increases in NO_2 formation (i.e., about 5 ppm NO_2 at 40% SO_2 control, up to about 25 ppm at 60% SO_2 control). A separate paper suggested a brown-plume to be visible at NO_2 concentrations of about 30 ppm; while a different paper suggested 90 ppm. The EPA[13] also acknowledges the potential for a brown-plume for this control system and sorbent type.*

Clearly, increasing the plume concentration of NO_2 will result in an increased potential for the appearance of a brown-plume; however, this is not only dependent upon the NO_2 concentration in the plume, but it is also dependent upon meteorological conditions, particularly stable atmospheric conditions which limit plume dispersion and dilution. Given the proximity of the GVEA plant to DNPP (about 8km), The Department does not agree with the commenter that no difference in visible impacts will occur at DNPP due to the sorbent-based chemical conversion. Should a brown-plume occur, and possibly with increased frequency due to increased injection rates, the source proximity to the Park could increase the chances of observing a brown plume impacting DNPP due to insufficient time for plume dilution over a relatively short-travel distance. Such stable atmospheric conditions could also

[12]Yougen Kong and Jim Vysoky, "Comparison of Sodium Bicarbonate and Trona for SO_2 Mitigation at A Coal-Fired Power Plant", Solvay Chemicals Inc., presented at ELECTRIC POWER 2009, Rosemont, Illinois, May 12-14, 2009.
[13]U.S. EPA. "Multipollutant Emission Control Technology Options for Coal-Fired Power Plants, EPA-600/R-05/034, March 2005.

maintain a visible plume for relatively long time periods and distances, possibly resulting in the visible (brown) plume traveling well into DNPP.

The Department agrees that the above described phenomenon is qualitative only and GVEA did not conduct modeling to specifically evaluate potential brown-plume visible impacts at DNPP. The Department is not aware of any dispersion model capable of making such a demonstration. This notwithstanding, the goal of the regional haze program and BART rule is visibility improvement. The potential for such a visible plume occurrence as discussed above cannot be discounted, even if in a qualitative sense.

This response is provided for a purpose of clarification and it does not change the conclusions of the April 2009 Findings Report.

2. Comment (5th paragraph, page 2 of the letter): The commenter indicates the Department has rejected more stringent SO_2 controls on the basis of cost. The commenter indicates "The Department's economic analysis, however, fails to support that conclusion." To support this claim, the commenter indicates the following:

   - There are inconsistencies in the GVEA economic analysis between the baseline control efficiency and the increases in control efficiency for alternative control options. For instance, an efficiency increase of 40 percent for the existing FGD system (baseline control efficiency of 40-50 percent) implies an 80 to 90 percent control for the cost analysis, rather than the 70 percent control reported by GVEA.
   - GVEA significantly overestimated the amount of sodium bicarbonate reagent needed to achieve 70% control, citing a 1995 U.S. Department of Energy report at the Arapahoe Station (*Integrated Dry NO_x/SO_2 Emissions Control System Sodium-Based Dry Sorbent Injection Test Report)* that presents the sodium bicarbonate-to-SO_2 titration ratio as a function of SO_2 control rate.
   - Based on the above, GVEA's assertion that an entire new reagent injection system, at a capital cost of $2,000,000, would be needed to achieve 70% SO_2 control appears to be excessive.
   - The commenter opines that efficient reagent utilization at Healy appears to be poor. While the commenter acknowledges that temperature, mixing time, and particle size are key factors in achieving efficient control, they contend that the Department should require an independent assessment of the current dry sorbent injection system to determine the maximum SO_2 emission reduction that is achievable with optimized temperature, mixing, and reagent selection including particle size of the reagent.

Response from the Department: *The commenter appears to have misinterpreted GVEA's estimates of the incremental increases in SO_2 control efficiency relative to the baseline control level. GVEA has expressed these incremental increases as being <u>relative</u> to the baseline and not <u>in addition to</u> the baseline. For example, assuming a baseline control efficiency of 50% for the existing sorbent injection system, an increase in control efficiency of 40% would result in an overall control efficiency of*

70% (i.e., 50% plus 40% of 50%), and not 90% (i.e., 50% plus 40%), as the commenter claims.

Enviroplan reviewed the cited 1995 U.S. Department of Energy report for the Arapahoe Station, which provides information on the stoichiometric ratio of sodium bicarbonate to flue gas sulfur needed for varying levels of flue gas SO_2 control. Based on this review, Enviroplan has determined that about a 50% increase in the sorbent injection rate will be needed to achieve 70% SO_2 control relative to a baseline of 50% control. However, in order to estimate the magnitude of the increase in the sorbent injection rate needed, the coal sulfur variability must also be accounted for, as described by Enviroplan below.

*"GVEA has reported that it currently injects 370 lb/hr of sorbent to achieve 50% SO_2 control for a coal sulfur content of about 0.17% by weight. This information was cited in their January 2009 report; and again reiterated in an August 27, 2009 submittal that responded to an August 17, 2009 Department request for related information. Usibelli coal property data presented by GVEA indicates a coal ash content of 13.65% and a coal heat content of 6,766 Btu/lb. Based on these properties and relevant data found in EPA's AP-42 emission factor document, the 0.17% sulfur content corresponds to an uncontrolled SO_2 emission rate of about 0.43 lb/MMBtu, which is significantly below the uncontrolled emission rate of 0.60 lb/MMBtu that forms the basis for GVEA's economic analysis. The baseline (50% control) sorbent injection rate must, therefore, be normalized to an uncontrolled SO_2 emission rate of 0.60 lb/MMBtu. This results in an adjusted baseline sorbent injection rate of (0.60/0.43)(370 lb/hr) = 512 lb/hr. To achieve a 70% SO_2 control, the sorbent injection rate must be increased to a level about 50% higher than the adjusted baseline injection rate, or 772 lb/hr of sorbent. (As a point of clarification, Enviroplan notes that GVEA's estimate of the sorbent injection rate needed to achieve 70% control was based on the high-end of the range in coal sulfur content, i.e., 40%. When combined with GVEA's estimated 40% increase in the stoichiometric ratio of sorbent to sulfur, this results in a GVEA computed injection rate of (0.40/0.17)(1.4)(370 lb/hr) = 1,219 lb/hr. However, Enviroplan does not believe this estimate to be valid, as it would not be possible for GVEA to meet the required SO_2 emission rate of 0.18 lb/MMBtu at 70% control using a coal with an annual average sulfur content of 0.40% (i.e., based on the above revised analysis, a 0.40% average sulfur content and 70% system control would equate to 0.3035 lb/MMBtu (0.43*0.40/0.17*0.30), rather than 0.18 lb/MMBtu))."*

"Therefore, the increase in sorbent injection rate needed to achieve 70% control relative to the current 50% control, based on a coal supply having an uncontrolled SO_2 emission rate of 0.60 lb/MMBtu, is: 772 lb/hr – 512 lb/hr = 260 lb/hr. For a reported sorbent cost of $335/ton, this results in an annual increase in sorbent costs of (260 lb/hr)(8,760 hrs/yr)($335/ton)/(2000 lb/ton) = $381,498/yr. The average and incremental cost effectiveness, based on controlling an additional 177 tons of SO_2, is $2,155/ton. This variable cost reflects only the cost of additional sorbent."

"In addition to the above, GVEA has indicated the existing Healy Unit 1 sorbent injection system has a maximum design capacity for sorbent injection of 600 lb/hr per

*feeder for two feeders (i.e., 1,200 lb/hr total maximum design capacity). Although it is possible to operate two feeders simultaneously, the system was not designed with the redundancy needed for continuous operation, without interruption, at this maximum design capacity. The design capacity does not account for regularly scheduled maintenance, unexpected system failures, and operating requirements. On this basis, Enviroplan agrees with GVEA's inclusion of the capital cost of a new redundant reagent injection system in its economic analysis, as such is warranted to ensure continuous compliance with the related SO_2 emission limit. Variable and fixed operating and maintenance costs, including administration, maintenance labor, and electricity costs, but excluding the first year reagent cost which was addressed in the preceding paragraphs, will also be incurred beyond those costs existing for the current system. GVEA estimated these costs as approximately $200,000/year in their March 2009 submittal, based on EPA cost information[14]. GVEA did not provide a detailed breakdown of their O&M cost and Enviroplan believes some of these costs are already built into the existing FGD system. Therefore, Enviroplan has revised the GVEA fixed O&M cost estimate to reduce it as a simple economy of scale, and only the GVEA estimate for additional electric usage (taken from Appendix A of the July 2008 GVEA BART report) is used for the variable O&M costs, as follows: (260/512)[($7,821/yr) + ($1.6/kw-yr*25000kw)] = $24,284/yr."*

On the basis of these considerations, the Department and its contractor has revised the cost analysis results for the existing sorbent injection system optimization option. Further, as explained elsewhere in this document, the cost analysis is also revised to reflect an 8-year remaining useful lifetime for Healy 1. The revised results and any changes to the proposed preliminary BART determination for control of SO_2 emissions are provided at the end of this document. Finally, regarding the suggestion that GVEA evaluate the existing FGD system for additional SO_2 reductions, as indicated by GVEA in their January 2009 report (Section 3.2.2.2), since installation of the control system in 1999, three different sorbents have been evaluated for purposes of improved SO_2 reductions. GVEA has indicated this evaluation has resulted in improved SO_2 emissions reduction based on the current use of sodium bicarbonate sorbent (versus calcium carbonate and trona).

B. <u>The Department Should Require Stricter Oxides of Nitrogen (NOx) Emission Limitations</u>

3. Comment (3rd paragraph, page 6 of the letter): The commenter indicates the Department was correct in requiring SCR as BART for NOx control (of Healy 1). However, the preliminary emission limit of 0.07 lb/MMBtu (30-day rolling average) is inconsistent with the combined performance of the current control system (LNB/OFA). The commenter asserts since SCR technology generally achieves 90 percent or better NOx emissions reduction, the combined emission limit should reflect 0.025 lb/MMBtu and not the approximate 70 percent reduction of the 0.07 lb/MMBtu preliminary emission limit.

[14]U.S. EPA. "Multipollutant Emission Control Technology Options for Coal-Fired Power Plants, EPA-600/R-05/034, March 2005.

***Response from the Department**: The determination of percent emissions reduction is referenced from a baseline. For Healy 1 with an existing LNB/OFA system baseline of 0.25 lb/MMBtu, the reduction to a vendor guaranteed emission limit of 0.07 lb/MMBtu results in a computed emissions reduction of 72 percent, as indicated by the commenter. As discussed earlier, the baseline has been revised based on comments provided by GVEA. The baseline, now at 0.28 lb/MMBtu, would result in a 75% emissions reduction versus the existing baseline. This notwithstanding, as addressed elsewhere in this document, the cost evaluation for SCR (and all other retrofit options) has been revised (see end of this document). The preliminary proposed BART for NOx, as SCR, is no longer deemed feasible.*

This response is provided for a purpose of clarification and it does not change the conclusions of the April 2009 Findings Report.

C. The Plant Contributes to Air Pollution in Excess of the National Ambient Air Quality Standards for Fine Particulates

4. Comment (3rd and 4th paragraphs, page 7 of the letter): The commenter indicates that component PM emissions from Healy 1 include $PM_{2.5}$. The commenter additionally indicates that "the record includes no air quality modeling based upon local monitoring." The commenter further references an ambient $PM_{2.5}$ monitor located in the Fairbanks North Star Borough, and notes this to be within a $PM_{2.5}$ nonattainment area. The commenter concludes Healy 1 $PM_{2.5}$ emissions will add to the monitored pollution levels at this site, contributing air pollution in excess of the NAAQS. The commenter concludes by suggesting the proposed preliminary BART emission limits and control equipment within the Title V permit will result in a violation of the NAAQS and that the BART determination should address and eliminate the violation.

***Response from the Department**: The Department agrees that the component PM emissions from Healy 1 include $PM_{2.5}$. However, the Department does not understand the commenter's indication pertaining to the lack of air modeling based on local monitoring. The commenter appears to be concluding that Healy 1 is impacting the Fairbanks ambient monitor and is contributing to the nonattainment conditions of the area. This claim is unsubstantiated and, more importantly, unrelated to the regional haze program and BART rule.*

Therefore, no changes are made to the April 27 Findings Report due to this comment.

D. Modeling of Impacts

5. Comment (5th paragraph, page 7 of the letter which carries onto page 8): The commenter indicates the WRAP – RMC website spreadsheet of visibility monitoring parameters for the Healy Power Plant (i.e., ak_emi_01172007.xls) omitted HCCP from the visibility SIP inventory and the inventory should be corrected to include such.

***Response from the Department**: As indicated in Section 1.1 of the Findings Report, 40 CFR 51, Appendix Y, Section II defines a BART-eligible source as one that was in*

existence on August 7, 1977 and began operation after August 7, 1962. The HCCP project was approved for installation in 1994 and began operation during 1998. Therefore, HCCP does not qualify as a BART-eligible source.

There is no change to the Healy Power Plant BART inventory or Findings Report due to this comment.

6. Comment (pages 8 and 9): The commenter indicates the WRAP – RMC website spreadsheet of visibility monitoring parameters for the Healy Power Plant (i.e., ak_emi_01172007.xls) contains erroneous SO_2 emission rates. The commenter also indicates the BART modeling parameters provided by the Department, also found on the WRAP – RMC website (i.e., Alaska_bart_stack_parameters_09_12_06.xls), to replicate the error shown in the WRAP spreadsheet.

***Response from the Department**: The Department agrees with the commenter that the WRAP spreadsheet listed SO_2 emission rate of 0.0163 g/s (0.1291 lb/hr and 3.0973 lb/day equivalents) is erroneous. The erroneous emission rate was acknowledged by the Department during Enviroplan's findings review. As such, Section 7.1 of the final Findings Report does indicate that the Healy 1 peak 24-hour SO_2 emission rate utilized in the visibility impact modeling is 182.2 lb/hour (4372.8 lb/day), reflective of a CEM-based peak 24-hour emission rate of 0.54 lb/MMBtu. This correct SO_2 emission rate was used in the GVEA visibility modeling analysis, as indicated in Section 7.1 of the Findings Report (and reflected in the dispersion modeling files); therefore, no changes are required to the report due to this comment.*

Comments received by the Department on June 15, 2009 from Don Shepard of the National Park Service (NPS)

The NPS comments were comprised of a comments document, and five accompanying appendices (Appendix A- E).

1. Comment (page 1 of comments document, **BART Analysis for NOx, STEPS 1-3**): The commenter indicates GVEA evaluated a reasonable spectrum of NO_x control options. However, the commenter indicates that EPA's Clean Air Markets (CAM) data and vendor guarantees, such as that indicated by Minnesota Power in their Taconite Harbor BART analysis, show that SCR can typically meet 0.05 lb/MMBtu (or lower) on an annual average basis. The commenter indicates GVEA has not provided documentation or justification for the 0.07 lb/MMBtu in their analysis. The commenter suggests, based on their review of CAM operating data for the 2006 ozone season for a similar boiler type (i.e., wall-fired dry-bottom), a NO_x limit of 0.06 lb/MMBtu for a 30-day rolling average; 0.07 lb/MMBtu for a 24-hour limit and visibility modeling; and 0.05 lb/MMBtu (or lower) for an annual average limit and cost estimation purposes.

   ***Response from the Department**: GVEA indicated in both the July 2008 and January 2009 BART reports that the SCR information provided by their consultant, CH2M Hill, was based on the compilation of similar proprietary control project information. During a February 27, 2009 teleconference, CH2M Hill reiterated the emission limit was based on their proprietary compiled vendor data.*

   The above notwithstanding, The Department recognizes the actual operating data provided by the NPS (Appendix B to their comments, as taken from the EPA's CAM database). The data indicate 30-day rolling NO_x emission rates of 0.06 lb/MMBtu (and lower) on an actual operating basis. Enviroplan's technical review raised several concerns associated with the use of this information for setting a BART emission limit for Healy 1. First, while the NPS summary statistics are recognized, not all listed EGUs are shown to achieve this emission limit at all times. Second, the data sample (2006 ozone season, i.e., May - September) is limited to only one 5-month period, and it is unclear how the actual 30-day rates might vary over a full year or over the full time-span since each retrofit system was brought online. Third, the regulatory basis reflected in the NPS example data are not BART; instead, the data reflects NOx SIP and ozone/$PM_{2.5}$ NAAQS compliance programs primarily (if not exclusively) for the eastern U.S. In that regard, the following additional concerns are noted:

   - *Enviroplan's technical review does not come to the same conclusion as the NPS that the eastern U.S. NO_x SIP program requirements to be equivalent to BART (regional haze) program requirements, even though the same control equipment can be used in response to the requirements of each program. The actual ozone-season emission rates summarized by the NPS are acknowledged; however, the level of control and period of system usage for compliance with the NOx SIP for ozone/$PM_{2.5}$ NAAQS compliance versus visibility improvement under the regional haze program are different. For instance, during the ozone season an affected source can opt to over-control their NO_x emissions for purposes of establishing*

saleable NO_x credits under a related cap-and-trade program. During the "off-season" there is ample time for control system maintenance. There is no distinction within the CAM-based data for such a scenario, and reliance on actual emissions data as a basis for BART would not be appropriate.

- *In relation to the above, it is unclear whether a stoichiometric NH_3/NOx ratio of 1:1 is being maintained to achieve the CAM-based 30-day emission rates or if a ratio greater than 1:1 ratio is being used. While unreacted ammonia emissions (slip) are typically maintained in a range of 2-5 ppm for a 1:1 ratio, a system operated under a high NOx reduction scenario could have a substantially higher atmospheric ammonia emission rate causing offsetting deleterious visibility impacts. It is unclear whether the CAM-based ozone-season emissions data reflects this high NOx reduction/ammonia slip scenario.*
- *The CAM data show that actual 30-day emission rates are generally lower than the 0.07 lb/MMBtu rate proposed for Healy 1; however, actual operating data are different from a vendor guaranteed emission rate which takes into account site-specific operating conditions and maintenance requirements. The guaranteed NOx limit provided by each retrofit system vendor for the CAM-based units is unknown.*
- *Irrespective of the CAM-based data, NPS BART summary data for western EGUs (see Response 6.g to GVEA's comments in this document) indicates only 3 other BART eligible units (excluding Healy 1) have proposed SCR for NOx control (and two additional units as reasonable progress); the minimum capacity of those units is 375 MW (as compared to 25 MW Healy 1); each with a proposed emission rate of 0.07 lb/MMBtu. The BART rule provides for consideration of other similar determinations.*
- *Use of a 0.05 lb/MMBtu NOx limit for Healy 1 for an annual emission rate and cost effectiveness determination, as suggested by the NPS, would not account for the fact that the CAM-based data reflects only a 5-month period of operation, i.e., this data does not reflect full year use of an SCR control system at the NPS recommended emission rate. The department's contractor's review does not support that the continuous operation of a SCR control system at this low emission rate can be compared to limited ozone-season SCR use reflected in the CAM-based data. The recently adopted regional haze plan developed by the Oregon Department of Environmental Quality (DEQ) provides further basis for this assertion, as discussed below.*

  The Oregon regional haze plan was adopted on June 19, 2009. The Oregon SIP includes pollution controls for the Portland General Electric Company (PGE) Boardman plant's 617 MW coal-fired boiler, which is a BART-eligible EGU. The DEQ concluded that SCR would be installed as additional NOx control for reasonable progress under the plan (rather than initial BART control). In deciding the appropriate corresponding NOx emission limit, DEQ noted "In terms of the reductions achievable by SCR, DEQ conducted a more extensive evaluation of the SCR control effectiveness. There are 190 coal-fired electric generating units with SCR controls in the U.S. In 2008, 17 of the 190 units had an annual average emission rate less than 0.07 lb/MMBtu and only three of the

17 were dry bottom wall-fired units. The lowest emission rate for the dry bottom wall fired units was 0.052 lb/MMBtu as an annual average. When evaluated on a 30-day rolling average, the 95% confidence level was 0.068 lb/MMBtu. Based on this data, DEQ believes that the control effectiveness (e.g., 0.07 lb/MMBtu) used in the BART analysis represents the best controlled dry bottom wall-fired unit in the U.S."[15] This recent thorough investigation by the DEQ suggests the 0.07 lb/MMBtu NOx emission limit proposed for Healy 1 to be an appropriate continuous rate for the emission unit. In addition to the above, the DEQ also indicated[16] "Some power plants on the east coast using SCR have achieved NOx reductions as high as 90 percent and are required to meet stricter emission limits. However, these SCR systems were developed to help address seasonal ozone (smog) conditions. Seasonal operation provides substantial opportunity for off-season maintenance and catalyst cleaning, which means they can routinely optimize the SCR's ability to meet lower limits."

Like the Boardman plant, the BART retrofit control system selected for Healy 1 (in this case, SCR as proposed in the April 27 Findings Report) would require year-round operation. The SCR system would operate for long periods of time without catalyst cleaning or system maintenance. As further noted by the DEQ, and as reflected in actual operating data provided by the NPS from the CAM-based data, normal day-to-day emissions typically occur at levels well below the emission limit but do demonstrate variability in response to changes in daily activity (similar variability was demonstrated in 5-year CEM emissions data provided by GVEA during March 2009). Based on the above considerations and the other factors associated with the regional haze program requirements, the DEQ concluded a NOx limit of 0.07 lb/MMBtu to be sufficiently strict and not set unrealistically low such that the unit would not be able to continuously meet the limit in its day-to-day operations.

The Department determined the same concerns specified above to be applicable to Healy 1. The 30-day emission limit of 0.07 lb/MMBtu proposed for Healy 1 remains unchanged.

The NPS also suggested the BART determination for NOx include a 24-hour average (0.07 lb/MMBtu) and annual average (0.05 lb/MMBtu) emission limits. It is understood that visibility modeling and control option costing are component BART analyses, respectively utilizing peak 24-hour and annual average unit emission rates. However, as indicated in Section 9.1 of the April 27 2009 Findings Report, 40 CFR 51, Appendix Y, Section V specifies that an EGU emission limit reflect a 30-day rolling average based on the "boiler operating day" definition of 40 CFR 60, Subpart Da. Therefore, the proposed NOx BART emission limit for Healy 1 is reflective of the 30-day rolling average consistent with the BART Guideline.

2. Comment (page 1 of comments document, **BART Analysis for NOx, STEP 4**): The commenter indicates that GVEA has overestimated the cost of SCR. The commenter indicates the BART cost analysis should have utilized the OAQPS Control Cost

[15]Memorandum entitled "J-RegionalHaze_includes RTC.pdf", dated May 22, 2009, taken from http://www.deq.state.or.us/aq/haze/pge.htm.
[16] See http://www.deq.state.or.us/aq/haze/pgeQA.htm.

Manual as per the BART Guidelines. The commenter indicates that it is EPA's belief that the Control Cost Manual should be applied instead of the CUECost model, based on the commenter's citing of a November 7, 2007 statement made by EPA to the North Dakota Department of Health. As noted by the commenter, the EPA indicated that the Control Cost methodology should be used instead of the CUECost methodology "in order to maintain and improve consistency" in accordance with the BART guidelines. The commenter further believes the capital and annual costs to be overestimated since GVEA did not provide vendor estimates or bids. The commenter indicates GVEA's equivalent SCR capital cost of $351/kW to be high compared to the commenter's survey data for SCR (i.e., $50 - $267/kW).

***Response from the Department**: The Department acknowledges the commenter's indication on the BART Guideline's recommended use of the Control Cost Manual (40 CFR 51, Appendix Y, Section IV.D.4.a.5) for cost consistency purposes. However, the Guideline does not exclusively require use of this document, indicating that documentation should be provided for cost calculations that might differ from the Control Cost Manual. Since the EPA's CUECost tool has been developed for cost estimation of air pollution control systems installed on coal-fired utility emission units, the Department determined that CUECost to be suitable for the BART cost analysis. This aside, the Department agrees that GVEA's consultant, CH2M Hill, did not divulge the specific vendor(s) upon which the SCR costs (and emission limit) are based. Their costing information was deemed by the Department, pursuant to the request of GVEA, to be proprietary and confidential.*

The above notwithstanding, a SCR application consulting company was contracted by GVEA to conduct a site evaluation and develop a refined cost estimate for a retrofit SCR system for Healy 1. The evaluation occurred on May 27, 2009. The consultant, Fuel Tech, Inc., provided a project report on June 10, 2009 which was included with GVEA's June 15, 2009 comments. Fuel Tech estimated the site-specific capital cost for the SCR retrofit project at $13,300,000. Related costs for project management, engineering, equipment relocation, demolition, new induced draft fan and motor, duct stiffening, and other onsite modifications, and relevant O&M costs, were estimated by GVEA per Fuel Tech recommendations. The Guideline supports the use of site-specific design and other conditions that affect the cost of a particular BART analysis. GVEA has revised their SCR cost evaluation using the Fuel Tech study data as input to their CUECost cost analysis, as discussed in the GVEA comments section of this document. The revised cost analysis is presented at the end of this document.

With respect to the commenter's SCR cost survey data (Appendix C to their comments) two points of clarification are noted. First, Enviroplan utilized the NPS survey information in the BART determination for Healy 1, as discussed in Section 6.1 of the Findings Report. Second, one of the data sources used by the NPS for their cost survey is the recently finalized PGE Boardman Plant BART determination. It is noted that CUECost was the basis of the PGE and Oregon DEQ cost analysis for Boardman.

3. Comment (page 2 of comments document, **BART Analysis for NOx, STEP 4**): The commenter acknowledges that GVEA's cost analysis reflected a *remaining useful life*

of 15 years. However, the commenter notes this period to be less than the assumed 20 years for SCR in the Control Cost Manual. The commenter has qualified their acknowledgement of this period by indicating the 15-year period must become an enforceable permit condition of a final permit should the period be important in the final BART determination. The commenter also notes their estimate of SCR costs based on the Control Cost Manual.

***Response from the Department**: The 20 year value within the Control Cost Manual is only a default value that does not directly account for specific operating conditions in a particular locale. As indicated in Section 6.1 of the Findings Report, other control technology reviews conducted by the Department have reflected SCR lifetimes of 10 years due to the harsh operating environment within the state. As such, the use of a 15 year lifetime for a SCR system utilized in interior Alaska is appropriate, and possibly conservative, for this analysis.*

The above notwithstanding, the Department agrees that the remaining useful life of Healy 1 is a very important input parameter to the cost analysis, both in terms of the capital recovery factor and the determined cost effectiveness of each retrofit option. While the April 2009 Findings Report did reflect a 15-year remaining useful life for Healy 1, GVEA included in their June 15, 2009 comments a revised costing analysis reflective of an 8-year remaining useful life for Healy 1. As explained in the GVEA comments section of this document, this 8-year remaining useful life has been deemed as reasonable for Healy 1; and the revised cost analysis, inclusive of the site-specific cost estimate provided by Fuel Tech, has been accepted. The revised cost analysis is summarized at the end of this document;

In accordance with the cost analysis revision, the Final BART/GVEA Determination report has been revised.

4. Comment (page 3 of comments document, **BART Analysis for NOx, STEP 5**): The commenter indicates there should be a generally linear relationship between CALPUFF visibility modeling results and source emission rates. However, the commenter makes note of GVEA visibility modeling results and the expectation of better predicted visibility improvement than shown by GVEA (i.e., Tables 4-3 and 5-1 of the January 2009 GVEA report) for SCR versus LNB/OFA optimization. The commenter indicates that the GVEA data require further explanation.

***Response from the Department**: The CALPUFF model has a non-linear chemical transformation algorithm (MESOPUFF II) which is used in the visibility modeling. Generally, the algorithm converts source NOx emissions to nitric acid and organic nitrates which, in turn, combine with background ammonia (concentration specified as input to the model) to form ammonium nitrate. Source SO_2 emissions are likewise transformed to sulfates and then ammonium sulfate. However, as indicated in the CALPUFF model user's guide, "unlike sulfate, the ambient concentration of nitrate is limited by the availability of ammonia which is preferentially scavenged by sulfate." As such, due to the preferential chemical reaction between sulfates and ammonia, NOx source emission rate changes may not necessarily manifest a proportional change in visibility improvement as suggested by the commenter.*

Enviroplan has reviewed the CALPUFF modeling files provided by GVEA (created by CH2M Hill). Section 7 of the Findings Report summarized the results of the modeling file review and, unless noted, Enviroplan determined the GVEA modeling to be consistent with the WRAP-RMC protocol. Consequently, it is believed that the non-linear chemical transformation algorithm accounts for the disparate visibility impact results noted by the commenter.

The response noted above is for purposes of clarification and it does not change the conclusions of the April 2009 Findings Report.

5. Comment (page 3 of comments document, **BART Analysis for NOx, STEP 5**): The commenter makes reference to their survey of other BART proposals and associated cost effectiveness values expressed in terms of cost per deciview of improvement. The commenter notes that their survey suggests $10-$20 million/dv represents a "reasonable average cost-effectiveness for improving visibility at the most-impacted Class I area". As such, the commenter agrees that the April 2009 Findings Report cost effectiveness value ($1.6 million/dv of improvement for SCR on Healy 1) to be favorable in terms of SCR installation, but continues to suggest a NO_x limit of 0.06 lb/MMBtu for a 30-day rolling averaging period.

   ***Response from the Department**: With respect to the emission limit comment, see response to comment 1 above. With respect to the cost effectiveness comment, site-specific SCR cost estimates and revised cost effectiveness calculations have been provided by GVEA as part of their comments on the Findings Report (see GVEA comments section of this document).*

   The summary of the revised cost analysis is presented at the end of this document, and related revisions have been made to the April 2009 Findings Report.

6. Comment (page 3 of comments document, **BART Analysis for SO2, STEP 3**): The commenter indicates that GVEA should explain how their uncontrolled emission rate of 0.60 lb/MMBtu was calculated.

   ***Response from the Department**: A request was sent by the Department to GVEA on August 17, 2009 to clarify their uncontrolled SO_2 emission rate of 0.60 lb/MMBtu (Section 3.2.2.3 of their January 20099 report). In a response provided on August 27, 2009, GVEA indicated that the uncontrolled SO_2 emission rate is based on coal analysis data from the Usibelli Mine, taking into account actual variability of the coal quality. This response is provided for purposes of clarification.*

7. Comment (page 4 of comments document, **BART Analysis for SO2, STEPS 1-3**): The commenter indicates that the spectrum of SO_2 control options is reasonable; however, the commenter indicates GVEA underestimated the ability of the lime spray dryer (LSD) flue gas desulfurization system to reduce uncontrolled SO_2 emissions. The commenter notes a May 2005 PSD permit that established a 24-hour average emission rate of 0.065 for a LSD system (93% control), as compared to the GVEA emission rate of 0.15 lb/MMBtu (75% control relative to an uncontrolled baseline emission rate). Similarly, the commenter indicates the wet scrubber emission rate of

0.07 lb/MMBtu (88% control) to be understated, noting a July 2008 PSD permit with a 24-hour average emission rate of 0.06 lb/MMBtu. The commenter has indicated the LSD control option, combined with the existing fabric filter (FF, or LSD-FF), to be the optimum SO_2 control option versus a wet FGD system.

***Response from the Department**: The Department provided the commenter with preliminary review of the draft BART determination for Healy 1 during January and February 2009; and the Department indicated to the commenter on February 12, 2009 the plan to focus the SO_2 retrofit evaluation on optimization of the existing sodium bicarbonate FGD SO_2 control system. This decision, based on a requisite timeline for completion of the State's regional haze SIP, has not been altered.*

The above notwithstanding the Department agrees that the wet FGD option is unfavorable when compared to the LSD-FF for the reasons noted by the commenter (and as indicated in the April 27 2009 Findings Report). For the LSD option, the Department contractor, Enviroplan has reviewed a number of sources of related information, including the EPA Clean Air Markets (CAM) based data (for SO_2 emissions) as referenced in response 1 above; EPA control technology documents, New Source Performance Standards (NSPS), Institute of Clean Air Companies, Department of Energy research documents, the NPS BART analysis summary data for other coal-fired electric generating units, and pollution control technology vendor websites. In general, the technical review agrees that these various information sources do indicate an upper-bound 90 to 95% control efficiency for LSD (versus uncontrolled). However, the information also provides lower bound estimates that include 80% (see footnote [17] for example).

The performance of the LSD system in terms of SO_2 control is a function of the fuel sulfur content. As indicated in their January 2009 submittal, GVEA has specified that the Usibelli Coal Mine is the source of the Healy 1 coal. The coal has a very low-end sulfur content at 0.17% by weight (0.23% for calendar year 2005, based on a comment by the Sierra Club), and the degree of SO_2 removal by an LSD system for such low sulfur coal is unclear. The commenter's indication of the SO_2 reductions achieved in the referenced PSD permits were based on coal with sulfur contents of 0.45% and 0.82%, respectively. In fact, as was recently noted by the Oregon DEQ during their regional haze SIP development process[18], the EPA established differing criteria in the NSPS for electric generating units (40 CFR 60, Subpart Da) to account for diminished control efficiencies under a lower sulfur condition (i.e., reduce SO_2 emissions by 90% if the emissions are greater than 0.60 lb/MMBtu, and by 70% if the emissions are less than 0.60 lb/MMBtu).

A review of the EPA Clean Air Markets (CAM) data for SO_2 emissions (operating year 2007) indicates, for those EGUs generally comparable to Healy 1 (i.e., wall-fired EGUs) and listed as using dry lime FGD, a range of emission rates from 0.07 lb/MMBtu (361 MW) to 0.17 lb/MMBtu (571 MW). Further, two wall-fired units with capacities between 25-100MW, using dry lime FGD, are shown to have SO_2 emission rates of 0.14 and 0.15 lb/MMBtu (90 MW and 91 MW, respectively). Additionally,

[17]EPA, "Air Control Technology Fact Sheet: Flue Gas Desulfurization (FGD) - Wet, Spray Dry, and Dry Scrubbers", dated July 15, 2003, taken from http://www.epa.gov/ttn/catc/products.html#aptecfacts .
[18]Memorandum entitled "J-RegionalHaze_includes RTC.pdf", dated May 22, 2009, taken from http://www.deq.state.or.us/aq/haze/pge.htm.

review of NPS survey data[19] [20] indicates for those EGUs most comparable to Healy 1 (wall-fired EGUs using a lime spray dryer, irrespective of capacity) shows SO_2 emission rates in the range of 0.12 lb/MMBtu (PGE Boardman) to 0.15 lb/MMBtu (Colorado Springs, Martin Drake), and even higher for Great River Energy. This information generally illustrates the variable nature of the SO_2 emission rate associated with the LSD system.

The above notwithstanding, assuming what is believed to be an unrealistic emission rate of 0.06 lb/MMBtu for Healy 1, would result in an average cost effectiveness of over $5,800/ton of pollutant removed based on the 8-year revised cost analysis. This cost is still almost 3 times the $2,000/ton presumptive limit cost metric established by EPA in the BART rule. Therefore, based on this lower-bound cost estimate and the uncertainty with respect to being able to achieve continuous compliance with 90% control efficiency (or 0.06 lb/MMBtu as suggested by the commenter) for the low sulfur Usibelli Mine coal, the Department concludes the LSD SO_2 emission limit, which is consistent with the emission rates summarized above and the presumptive EGU emission limit established by EPA in the BART Guideline, to be acceptable for the LSD control option for Healy 1.

8. Comment (page 5 of comments document, **BART Analysis for SO2, STEP 4**): The commenter indicates that the SO_2 cost analysis is flawed. The commenter notes that only an incremental cost analysis was reflected in the January 2009 report by GVEA; and the April 2009 Enviroplan Findings Report. The commenter recommends the SO_2 control analysis for LSD and wet FGD be considered replacement controls for the existing dry FGD system, as was reflected in the original July 2008 GVEA report. The commenter provided their own estimate of annual average cost for the LSD system, based on use of the EPA Control Cost Manual and 90% control for the LSD system.

   ***Response from the Department**: With respect to a 90% control efficiency for the LSD system option, please see response 7 above. The Department does not agree with the commenter that only the incremental cost analysis is considered in the BART review. As indicated in the GVEA January 2009 report (Table 3-4) the cost analysis includes both an annual average and incremental cost estimate for each control option. The related cost effectiveness determinations are based on the existing controlled SO_2 baseline emission rate which is consistent with the BART Guideline. The April 27 Findings Report (Table 6-2 and Section 7.4) likewise reflects annual cost estimates for these options. While there is no change to the Findings Report due to this comment, the costing analysis for the LSD and wet FGD options are revised to reflect an 8-year remaining lifetime for Healy (see related discussion under GVEA comments in this document, and the revised cost analysis summary at the end of this document).*

9. Comment (page 5 of comments document, **BART Analysis for SO2, STEP 5**): The commenter indicates the GVEA visibility modeling analysis is flawed for several

[19] NPS BART Evaluation, http://www.wrapair.org/forums/ssjf/bart.html .
[20] Email forwarded by Don Shepherd, NPS, to various recipients, subject title "Latest Compilation of BART Determinations and Proposals Attached BART Evaluation", dated August 12, 2009.

reasons. First, the commenter indicates GVEA should have evaluated all DNPP receptors and not just the most impacted receptor when assessing the effects of a lower plume height on visibility changes at DNPP from LSD and wet FGD (versus the existing dry sorbent injection FGD system). Second, since the commenter believes GVEA to have understated the control efficiency of an LSD system (see comment/response 7 above), they indicate a resultant overestimate of remaining emissions and related impacts have occurred. Third, GVEA did not evaluate the Healy 1 stack to determine the GEP stack height and potential for building downwash. The commenter believes the FF-LSD FGD option may represent SO_2 BART for Healy 1.

***Response from the Department**: With respect to the LSD and wet FGD options, see response 7 above. The Department acknowledges the modeling comment but notes the following. First, 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 percent 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.*

With respect to the potential for aerodynamic building downwash, a GEP stack height analysis was not included in the GVEA visibility modeling analysis. This is consistent with the WRAP modeling protocol which was followed by GVEA to conduct their visibility impact analysis.

10. Comment (page 6 of comments document, **BART Analysis for PM_{10}, STEP 1**): The commenter indicates agreement that the existing reverse-gas fabric filter (baghouse) at GVEA to be BART for filterable PM_{10}; however, the commenter specifies that GVEA must also evaluate controlling condensable PM_{10}. The commenter notes condensable PM_{10} typically equals or exceeds filterable PM_{10} emissions.

***Response from the Department**: The Department provided the commenter with preliminary review of the draft BART determination for Healy 1 during January and February 2009; and the Department indicated to the commenter on February 12, 2009 the plan to focus the retrofit evaluation on the existing baghouse control system. This decision, based on a requisite timeline for completion of the State's regional haze SIP, has not been altered.*

The above notwithstanding, the existing baghouse is used for control of filterable particulate matter. The baghouse also provides complimentary benefit to the SO_2 control system (sorbent injection into the ductwork prior to the baghouse resulting in dry sulfate particles captured at the baghouse). At this time, control efficiencies for

condensable PM are not well understood (e.g., see Federal Register Notice 74 FR 36427, July 23, 2009); and are not required to be accounted for in NSR permitting processes. EPA is aware of the positive bias (overstatement) that exists when determining condensable PM emissions with Method 202, and is presently developing a revision to the test method to accurately account for condensable particulate formation. Regardless, it is anticipated that the degree of control of condensable PM will be similar between a cold-side ESP and a baghouse. In addition, the baghouse is capable of a higher emission reduction for filterable PM. Hence, at this time, the Department sees no benefit of adding an additional PM_{10} control device in place of, or in addition to, the existing baghouse for controlling condensable PM.

This response is provided for a purpose of clarification and it does not change the conclusions of the April 2009 Findings Report.

11. Comment (page 6 of comments document, **BART Analysis for PM_{10}, BART Modeling Analysis**): The commenter indicates their disagreement with GVEA's specification in their January 2009 report (page 4-5) that modeled particulate emissions were not speciated. The commenter notes a statement from the WRAP protocol (page 1-2)[21] that indicates PM_{10} emissions should be broken into specified species. The commenter also inquires on whether building downwash from Healy 1 was applied in the CALPUFF modeling; and they request the UTM coordinates for the Healy 1 stack. Finally, the commenter inquires whether the receptors were obtained from the NSP web site)[22] .

***Response from the Department**: The comment incorrectly implies that GVEA did not follow the WRAP protocol. GVEA actually used the same approach as WRAP, as allowed under 18 AAC 50.260(h)(3)(A).*

While the commenter correctly noted WRAP's statement that PM_{10} emissions "should be" speciated, they overlooked WRAP's following statement: "However, in reality most States provided PM emission estimates for their potential BART eligible sources as total PM_{10} without speciation. In this case [WRAP] will model the PM_{10} as $PM_{2.5}$ and summarize the PM contribution to light extinction for the highest visibility impairment days and it will be up to the States to justify performing the BART exemption screening analysis without speciating the PM emissions (see Section 1.2 for extinction characteristics of the different components of PM)."

Alaska was one of many states that provided PM emissions as total PM_{10} emissions, since this is the emissions format that is readily available from the permit files. WRAP, and later GVEA, therefore modeled the PM emissions as stated in the protocol – i.e., without speciation. This" fall-back" approach was clearly noted in the protocol, and was not challenged by the NPS during the protocol development phase (which included teleconferences with the NPS); the subsequent modeling teleconferences with industry, EPA and the federal land managers; or the eventual adoption of the WRAP protocol in the Department's BART regulations. The

[21]WRAP. *Draft Final Modeling Protocol, CALMET/CALPUFF Protocol for BART Exemption Screening Analysis for Class I Areas in the Western United States.* Air Quality Modeling Forum. Regional Modeling Center. August 15, 2006.
[22]http://www.nature.nps.gov/air/maps/receptors/index.cfm .

Department therefore considers the NPS objection to this established modeling approach as delinquent, especially since the Department is already notably behind the federally-established schedule for developing its Visibility SIP.

With respect to the comments on building downwash and the source of the receptors used in the modeling analysis, see response 9 above. These issues were discussed in Section 7.1 of the Findings Report. With respect to the UTM coordinates of the Healy 1 stack, GVEA used Lambert Conformal Conic (LCC) coordinates in their CALPUFF modeling consistent with the WRAP modeling (stack coordinates of 102.026 (LCC X (km)) and 545.101 (LCC Y (km))). This translates into UTM coordinates of 403.2984 km (easting) and 7081.5927 km (northing).

This response is provided for a purpose of clarification and it does not change the conclusions of the April 2009 Findings Report.

12. Comment (page 7 of comments document, **BART Analysis for PM_{10}, Just Noticeable Differences in Atmospheric Haze**): The commenter disagrees with the GVEA assessment in their January 2009 report on what constitutes a perceptible change by the human eye of delta-deciview. GVEA indicates in their report that a deciview change of 1.5 to 2.0 dV to be perceptible; while the commenter notes competing studies as the basis for much lower perceptible changes. The commenter notes the use by EPA/RPO of 0.5 deciview and 1.0 deciview as the basis for determining whether a BART-eligible source is "reasonably anticipated to cause or contribute to visibility impairment"; however, the commenter specifies their belief that any improvement in visibility, no matter how small, should be considered when determining BART for an affected source.

***Response from the Department**: The Findings Report presented the visibility improvement modeling results associated with the baseline and each retrofit option evaluated for Healy. The related results summaries were not limited to visibility improvements exceeding any minimum threshold. The Department has adopted the BART Guidance threshold of 0.5 deciviews (18 AAC 50.260(q)(4)) as the basis for determining whether a source is "reasonably anticipated to cause or contribute to visibility impairment".*

This response is provided for a purpose of clarification and it does not change the conclusions of the April 2009 Findings Report.

13. Comment (page 7 of comments document, **BART Analysis for PM_{10}, Economic Impacts – Rate Payer Analysis**): The commenter cites specific phrases from citations within the BART Guideline that were referenced in the Findings Report. Most specifically, the commenter references 40 CFR 51, Appendix Y, Section IV.E.3 (i.e., *In selecting a "best" alternative, should I consider the affordability of controls?*); and highlights phrases within the citation that focus on the impact of a proposed control option on a plant, including affordability, profitability and competitiveness. The commenter believes GVEA did not make a showing that the proposed control options would jeopardize its ability to operate; and the commenter indicates that GVEA is not in a competitive market. Further, the commenter does not believe potential control costs should consider the localized impact on GVEA

customers since DNPP is a national park; and, given the source's contribution to visibility impairment at DNPP, the commenter indicates there is no allowance in the rule for consideration upon rate payers when assessing the five factors used to determine BART.

***Response from the Department**: The Department does not agree with the commenter's assertion that the BART Guideline does not provide for consideration of the impact on GVEA rate payers. As indicated in the Findings Report, and as acknowledged by the commenter, the cited BART Guideline section provides for the consideration where, even if deemed cost effective, installation of controls would affect the viability of continued plant operations.*

GVEA is a not-for-profit locally owned cooperative providing electric service to Interior Alaska. The Healy power station is part of the GVEA cooperative. GVEA serves a relatively small rural community that is not connected to a nationwide or outside electric grid; or connected to other utilities through a regional transmission organization for ample, readily dispatched electricity. Related electricity rates increased to pay for any add-on emissions controls would be directly borne by the relatively small rate payer community. Additionally, the stationary source is located in a remote area and not easily accessible year round for supply of fuel and ancillary operating/maintenance supplies. The Department therefore believes these conditions are unique to GVEA and are considered as "unusual circumstances" pursuant to the cited section of the BART Guideline.

There is no change to consideration of rate payer costs in the GVEA BART determination process due to this comment; however, as indicated in response 6 to the GVEA comments, the rate payer cost information is revised. The revision accounts for the consideration of the useful life of Healy 1, as discussed in the GVEA comments section for Healy 1.

14. Comment (page 9 of comments document, **Mercury Emissions**): The commenter notes the installation of SCR would likely promote oxidation of elemental mercury making it more readily removable using a downstream FGD system. The commenter requests consideration of this added environmental benefit to SCR plus FGD.

***Response from the Department**: Mercury is not a pollutant of concern under the BART Guidelines. Therefore, the Department cannot consider the potential benefits of controlling mercury as part of the BART control technology analysis process. However, the Department does acknowledge that during combustion, mercury is volatilized and converted to elemental mercury. As the flue gas is cooled, elemental mercury is converted to mercury compounds and ionic mercury (process known as mercury speciation). However, the oxidation reactions are kinetically limited. Mercury enters the flue gas control system as a mixture of elemental mercury, mercury compounds and ionic mercury. Mercury compounds and ionic mercury can be captured via existing baghouse and FGD control system. Based on studies conducted by EPA[23], it was shown that there will not be a significant increase in*

[23] http://www.epa.gov/ttnatw01/utility/hgwhitepaperfinal.pdf

mercury capture between a FGD only control system and a FGD + SCR control system.
This response is provided for a purpose of clarification and it does not change the conclusions of the April 2009 Findings Report.

Preliminary BART Determination Revisions Proposed by the Department

In response to GVEA comments, the Department has agreed that an 8-year remaining useful lifetime for Healy 1 is appropriate for use in the BART cost analyses. The final determination report is revised for the remaining SO_2 and NO_x control options to reflect an 8-year remaining useful lifetime for Healy 1. Several points are noted with respect to the revisions:

- Except for the site-specific SCR evaluation by Fuel Tech which reflects 2009 dollars, the revised analysis reflects 2007 dollars from the GVEA CUECost analysis (July 2008 report, January 2009 report revision, and March 2009 submittal).
- GVEA (CH2M Hill) escalated the 2009 dollar amounts for the SCR system to 2016 dollar amounts (using a 3% escalation factor); however, Enviroplan used only current (non-escalated) cost information. Although the SCR system components would be purchased in and around the 2016 time-frame, the costs were not adjusted to that calendar year since cost comparison metrics would also have to be adjusted to 2016; therefore, both the system and metric costs were retained in current unadjusted dollars.
- Only capital costs are affected by the reduction from a 15-year to an 8-year useful lifetime amortization period. A linear adjustment has been made to the capital cost for each option using the ratio of 8-year to 15-year capital recovery factors (CRFs). Previously provided GVEA control option O&M costs are unchanged unless otherwise noted.
- The 15-year cost analysis results for each option are shown for comparative purposes, but only the 8-year analysis results are reflected in the revised Findings Report.
- The revised 30-day average NO_x baseline emission rate of 0.28 lb/MMBtu is used in the revised cost analysis, per the comment made by GVEA. The Findings Report is revised to reflect the cost analysis results associated with this revised baseline emission rate.

Summary of Enviroplan Revised SO_2 Cost-Effectiveness Calculations Based on an 8-Year Remaining Lifetime for Healy Unit 1

Remaining Useful Life	Cost Item	Optimization of Dry Sorbent Injection System	Semi-Dry FGD (Lime Spray Dryer)	Wet Limestone FGD
15 Years[5]	Total Installed Capital Cost	$2,000,000 ($80/kw)	$8,357,143 ($334/kw)	$15,042,857 ($602/kw)
	Capital Recovery	$233,660[1]	$976,361[1]	$1,757,450[1]
	Fixed and Variable O&M Costs	$405,782[2]	$631,511	$901,654
	Total Annualized Cost	$639,442	$1,607,872	$2,659,104
	Tons SO_2 Removed	179	223	343
	Average Cost Effectiveness ($/ton)	$3,578[3]	$7,198[3]	$7,763[3]
	Incremental Cost Effectiveness ($/ton)	$3,578[3]	$21,677	$8,824
8 Years	Total Installed Capital Cost	$2,000,000 ($80/kw)	$8,357,143 ($334/kw)	$15,042,857 ($602/kw)
	Capital Recovery	$348,020[4]	$1,454,227[4]	$2,617,608[4]
	Fixed and Variable O&M Costs	$405,782[2]	$631,511	$901,654
	Total Annualized Cost	$753,802	$2,085,738	$3,519,262
	Tons SO_2 Removed	179	223	343
	Average Cost Effectiveness ($/ton)	$4,218[3]	$9,337[3]	$10,275
	Incremental Cost Effectiveness ($/ton)	$4,218[3]	$29,813	$12,033

Notes:

(1) Based on a capital recovery factor of 0.11683 for 15 years at 8%.

(2) Fixed and variable O&M costs based on Enviroplan's estimates of the additional reagent and other related costs required to achieve 70% control (relative to the existing 50% control baseline), using a coal having an uncontrolled SO_2 emission rate of 0.60 lb/MMBtu (see response 2 to Sierra Club comments).

(3) Annual and incremental costs for the dry sorbent injection optimization control scenario (70% control) were calculated relative to the existing (baseline) dry sorbent control scenario (50% control). Average costs for other options calculated relative to the existing controlled baseline.

(4) Based on a capital recovery factor of 0.17401 for 8 years at 8%.

(5) Results presented for informational purposes only, and reflects an update of the April 2009 Findings Report, i.e., no constraint on remaining life expectancy for Healy 1 and each add-on control option is assumed to have a useable lifetime of 15 years.

Summary of NO_x Cost-Effectiveness Calculations Based on an 8-Year Remaining Lifetime for Healy Unit 1

Remaining Useful Life	Cost Item	Optimize Existing LNB w/OFA	SNCR	ROFA	ROFA/ Rotamix	SCR[1]
15 Years[4]	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 Recovery	$2,337[2]	$296,620[2]	$534,147[2]	$807,529[2]	$2,554,007[2]
	Fixed and Variable O&M Costs	$0	$122,191	$138,852	$287,309	$1,125,172
	Total Annualized Cost	$2,337	$418,811	$672,997	$1,094,838	$3,679,179
	Tons NO_x Removed	74	134	194	253	313
	Average Cost Effectiveness ($/ton)	$31	$3,125	$3,476	$4,325	$11,765
	Incremental Cost Effectiveness ($/ton)	$31	$6,992	$4,267	$7,082	$43,385
8 Years	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 Recovery	$3,480[3]	$441,794[3]	$795,574[3]	$1,202,757[3]	$3,804,013[3]
	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	$4,929,185
	Tons NO_x Removed	74	134	194	253	313
	Average Cost Effectiveness ($/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) Costs and tons of NO_x removed based on GVEA's estimates for the 0.28 lb/MMBtu scenario as presented in its June 15, 2009 letter to ADEC from Kristen DuBois of GVEA.
(2) Based on a capital recovery factor of 0.11683 for 15 years at 8%.
(3) Based on a capital recovery factor of 0.17401 for 8 years at 8%.
(4) Results presented for informational purposes only, and reflects an update of the April 2009 Findings Report, i.e., no constraint on remaining life expectancy for Healy 1 and each add-on control option is assumed to have a useable lifetime of 15 years.