Mitigation Action Plan for the Alaska Industrial Development and Export Authority Healy Clean Coal Project

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1. INTRODUCTION

1.1 HISTORY AND BACKGROUND

In response to a Program Opportunity Notice issued in May 1989 by the Department of Energy (DOE) for the third solicitation of the Clean Coal Technology (CCT) Program, the Alaska Industrial Development and Export Authority (AIDEA) conceived, designed, and proposed the Healy Clean Coal Project (HCCP). The HCCP, a coal-fired power generating facility, would provide the necessary data for evaluating the commercial readiness of two promising technologies for decreasing emissions of sulfur dioxide (SO_2), oxides of nitrogen (NO_x), and particulate matter (PM). The two technologies to be demonstrated are the TRW Applied Technologies Division entrained combustion system and the Joy Technologies, Inc./Niro Atomizer spray dryer absorber. These technologies have been designed to achieve reduction in emissions of SO_2, NO_x, and PM while being energy efficient and capable of use in new facilities or as retrofits to existing units. The technologies would be dependent on each other as part of an integrated system.

The nominal 50-Megawatt (MW) HCCP will be located on the southern edge of the Interior Basin of Alaska, about 80 miles southwest of Fairbanks and 250 miles north of Anchorage. The facility will be built adjacent to the existing 25-MW Healy Unit No. 1, a conventional pulverized-coal unit owned and operated by Golden Valley Electric Association, Inc. (GVEA) in a rural setting along the east bank of the Nenana River, about 2.5 miles east-southeast of Healy. The 65-acre site is located about 4 miles north of the nearest border of the Denali National Park and Preserve (DNPP) and 8 miles north of the entrance to the DNPP. Coal will be supplied for the HCCP by the Usibelli Coal Mine, Inc. (UCM), from its open-pit Poker Flats Mine and other reserves, located about 4 miles north of the proposed site. AIDEA has entered into a power sales agreement with GVEA for the purchase and distribution of the electricity that would be generated by the HCCP. AIDEA has assembled a team composed of GVEA, UCM Stone & Webster Engineering Corporation, Foster Wheeler Energy Corporation, TRW, and Joy to design, build, and operate the power plant.

DOE's role in the HCCP is limited to providing cost-shared funding support for AIDEA's project. This proposed Federal action is subject to the requirements of the National Environmental Policy Act (NEPA), in partial fulfillment of which DOE prepared an Environmental Impact Statement (EIS) to analyze and describe the potential environmental effects of the proposed project including consideration of reasonable alternatives. DOE published the Draft EIS for the HCCP in November 1992, and issued the Final EIS (FEIS) in December 1993.

During the preparation of the EIS, the National Park Service (NPS) of the U.S. Department of the Interior (DOI) expressed concerns that increased emissions from the combined operation of the HCCP and the existing Healy Unit No. 1 would adversely affect the nearby DNPP. To address these concerns, DOE facilitated negotiations between the project participants and DOI which resulted in a Memorandum of Agreement (MOA) signed by DOL DOE, AIDEA, and GVEA on November 9, 1993. The MOA provides specific mitigating measures to ameliorate potential impacts on DNPP. Additionally under the MOA, DOI supported the issuance of the final EIS and withdrew its request for an adjudicatory hearing to reconsider the air quality permit issued to AIDEA for the HCCP by the Alaska Department of Environmental Conservation (ADEC).

1.2 PURPOSE

Section 1021.331(a) of the DOE regulations implementing NEPA (10 CFR Part 1021) provides that:

1. Following completion of each EIS and its associated Record of Decision (ROD), DOE shall prepare a Mitigation Action Plan that addresses mitigation commitments expressed in the ROD. The Mitigation Action Plan shall explain how the corresponding mitigation measures, designed to mitigate adverse environmental -impacts associated with the course of action directed by the ROD, will be planned and implemented. The Mitigation Action Plan shall be prepared before DOE takes any action directed by the ROD that is the subject of a mitigation commitment.

2. Each Mitigation Action Plan shall be as complete as possible, commensurate with the information available regarding the course of action ... directed by the ROD ... DOE may revise the Plan as more specific and detailed information becomes available.
3. DOE shall make copies of the Mitigation Action Plans available for inspection in the appropriate DOE public reading room(s) or other appropriate location(s) for a reasonable time. Copies of the Mitigation Action Plans shall also be available upon written request.

Accordingly, as a DOE management document, the MAP has three major purposes:

1. to specify the environmental impacts requiring mitigation as indicated in the FEIS and the ROD,
2. to identify responsibility for the mitigating actions, and
3. to help ensure implementation of the required actions by the responsible parties.

DOE has overall responsibility to ensure that the environmental impacts described in the FEIS are mitigated as specified. DOE will meet its responsibilities for ensuring that the mitigative measures are developed and implemented by the parties appropriate to the specific environmental concern and the associated mitigative measure. In this MAP, the specific parties and their responsibilities are identified in a primary responsibility matrix (see Section 2).

In addition to the specific mitigation measures that are identified in the MAP, all responsible parties will comply with all applicable federal, state, and local environmental laws, orders, and regulations. DOE also has responsibility to review the final project design to ensure its consistency with the impacts and mitigation measures presented in the FEIS. For purposes of the MAP, these compliance activities are not considered to be mitigation measures and hence are not addressed in detail in this document. Furthermore, other requirements related to mitigation, such as monitoring during construction and demonstration of the HCCP, are addressed in other documents such as the Prevention of Significant Deterioration (PSD) permit issued by the Alaska Department of Environmental Conservation and DOE's Environmental Monitoring Plan.

1.3 ORGANIZATION AND CONTENT

The MAP subsumes the FEIS and does not repeat or present in-depth technical information. However, the MAP does address the pertinent mitigation measures for which commitments were made in the FEIS and the ROD. Mitigation actions are discussed and organized in a tabular fashion, and a table is also provided to identify responsibilities associated with the mitigation measures. Finally, the MAP concludes with an implementation schedule for the mitigation measures.

The potential environmental impacts projected in the FEIS were based on modeling and environmental analyses. However, *in situ* monitoring is necessary to ascertain the extent and degree of the actual environmental impacts requiring mitigation, as well as to establish the efficacy of the mitigation techniques themselves. Accordingly, the monitoring efforts that are part of the mitigation plan are designed to answer the following:

1. Is the project causing significant negative environmental impacts that were not projected in the FEIS? If so, a mitigation measure will be developed for each additional impact.
2. Is the mitigation measure identified in the FEIS the most appropriate for the potential impact? If not, a revised technique will be developed.
3. Have previously identified and validated mitigation measures been implemented? If not, the reason why will be determined and corrective measures taken.
4. Have implemented mitigation measures produced the desired results? If not, the measures must be revised.

Many actions are yet to be defined with respect to actual implementation and verification monitoring. When the details of specific mitigation actions are developed, the MAP will be revised to reflect the

various administrative, implementation, reporting, and verification steps for those mitigation actions involving federal and state agencies. As part of DOE's NEPA Compliance Program (Order 5440.1E), program offices are required to provide an annual report to DOE's Office of Environment, Safety and Health on the status of mitigation efforts. The schedule for the monitoring reports to the states, federal agencies, and DOE is given in Section 3.

2. MITIGATION ACTIONS

This MAP is comprehensive in scope, addressing the mitigation measures proposed for all levels of potential impacts. This section describes the mitigative actions in greater detail, and identifies the' organizations responsible.

2.1 MITIGATION MEASURES DEVELOPED BY THE PROJECT PARTICIPANT

In addition to the mitigation measures specified in the MOA (see Section 2.2), several mitigation measures, shown in Table 1, have been developed by AIDEA for the HCCP to minimize potential environmental impacts associated with the construction and operation of the facilities. Many of the mitigation measures are related to socioeconomic effects expected during construction of the HCCP. Measures include providing a construction camp, providing trained fire-fighting personnel for the HCCP site and work force in the construction camp, and providing medical services for construction workers. The measures proposed by AIDEA are expected to minimize the project related, short-term, socioeconomic impacts to the Healy area. Subsequently, the Healy area would have time to plan for and integrate most long-term effects into the community.

Another mitigation measure is the installation of a cross-connection between the HCCP and Healy Unit No. 1 circulating-water discharges. This measure would allow part of the HCCP circulating water to discharge to the Unit No. 1 outfall during winter times when Unit No. 1 is shut down, thereby keeping the intake pond free of ice. Allowing the warm HCCP water to discharge to both outfalls will minimize cold shock to fish. In addition, during the summer, the circulating water would discharge to the downstream HCCP outfall alone to ensure that temperatures in the Nenana River do not exceed the state-regulated maximum of 55.4EF at the mixing zone. Other mitigation measures include the use of sprinkler trucks to minimize fugitive dust, the implementation of standard erosion control measures to minimize sediment transport, and the installation of a silencer for the intake of the forced-draft fan to reduce noise levels.

Table 1, MITIGATION MEASURES TO BE PROVIDED DURING CONSTRUCTION AND OPERATION OF THE HCCP		
HCCP Final EIS		Mitigation Measure
Section	Page	
4.1.2.1, and 4.2.2	4-3, and 4-65	Use sprinkler trucks as needed during construction to spray roads and construction areas to minimize fugitive dust.
4.1.3.1	4-13	Implement standard erosion control measures, such as straw barriers, diversion trenches, and riprap to minimize sediment transport, during construction.
4.1.3.2	4-14	Install a cross-connection between the HCCP and Healy Unit No. 1 circulating-water discharges to allow discharge to both outfalls, which may help to minimize cold shock to fish.
4.1.8	4-40	Provide a construction camp to minimize socioeconomic impacts associated with construction workers.
4.1.8.5	4-51	Provide trained fire-fighting personnel during the construction period with adequate equipment and supplies to protect the HCCP site and the work force in the construction camp.
4.1.8.5	4-51	Provide medical services for workers during the construction of the HCCP. Specifically, a trained emergency medical technician would be on staff during the major construction period. Arrangements for helicopter medivac services (based in Fairbanks) would be made for life-threatening cases.
4.1.9.2	4-59	Install a silencer for the intake of the forced-draft fan to lower noise levels.
5.4.6, and Appendix I	5-27, and I-1	Memorandum of Agreement mitigation measures -Detailed in Table 2.

Table 2, MITIGATION MEASURES PROVIDED BY THE MEMORANDUM OF AGREEMENT (MOA) (HCCP Final EIS, Appendix I)	
Section	Mitigation Measure
I.C	DOE to fund purchase and installation of continuous emission monitoring equipment for SO_2 and NO_x on Healy Unit No. 1.
I.C	DOE to fund purchase and installation of overfire air on Healy Unit No. 1 to reduce NO_x emissions.
III.A.1	GVEA will retrofit Healy Unit No. 1 with low-NO_x burners. Annual NO_x, emissions from Unit No. 1 not to exceed 429 tons/ year by no later than the end of the 1st construction season (1 April - 30 September) after the startup of HCCP (see III.A.12).
III.A.2	GVEA will inject sorbent into Unit No. 1 gas stream/boiler for SO_2 control. Annual SO_2 emissions from Unit No. 1 not to exceed 472 tons/ year by no later than the end of the 2nd construction season (1 April - 30 September) after the startup of HCCP (see III.A.12).
III.A.3	GVEA agrees to emissions limitations in the ADEC air quality permit, for Unit No. 1 and HCCP combined, 1. of 1439 tons/year of NO_x, effective after the 1st construction season (1 April - 30 September) after the startup of HCCP, and 2. of 721 tons/year of SO_2, effective no later than the end of the 2nd construction season following the startup of HCCP (see III.A.12). During the period between HCCP startup and the installation of NO_x and SO_2 control technologies, for Unit No. 1 and HCCP combined, GVEA agrees not to exceed emissions of 1858 tons/year of NO_x, and 878 tons/year of SO_2.
III.A.4	If HCCP demonstration technology successfully reduces emissions as expected, GVEA will ask ADEC to revise the $SO_2$and NO_x emissions limitations in the air quality permit to reflect the achieved emissions levels. Similarly, in applications for renewed air quality permits to operate, GVEA will continue to seek lower emission's limitations representative of achieved emissions levels.
III.A.5, and Addendum No. 1	Beginning with startup of HCCP (see M.A. 12), GVEA agrees that, if advised by the National Park Service (NPS) of a pollutant plume or haze visible within Denali National Park and Preserve, reasonably attributable to the operation of HCCP and/or Unit No. 1, or if ordered by ADEC, immediately reduce total emissions to the levels of present Addendum No. 1 emissions from the existing Unit No. 1 (i.e., about 200 pounds/hour of NO_x and about 150 pounds/hour of SO_2), for a duration of 12 hours; this length of time may be extended by additional 12-hour periods.

	Detailed procedures for implementing this mitigation measure are provided in the addendum to the MOA (EIS, pages 1-9 through 1-13).
III.A.6	GVEA will install on Unit No. 1 and operate a continuous emission monitoring system for NOx and SO_2.
III.A.7	Beginning immediately, GVEA will provide reasonable technical and administrative support for any related ongoing studies that DOE and DOI agree to undertake.
III.A.8	Beginning immediately, GVEA will provide fly ash and slag ash to NPS upon request, as available, FOB Healy at no charge.
III.A.9	GVEA will make available to NPS $25,000/year for 3 years, beginning one year before HCCP startup (see III.A. 12), to fund NPS-selected air pollution projects in Denali National Park and/or the Healy area.
III.A.10	Beginning in 1994, GVEA will schedule one of its two routine Unit No. 1 maintenance shutdowns, and its major maintenance shutdowns, during the June-July-August time period.
III.A.11	GVEA will immediately apply to ADEC for all necessary permit modifications to make these agreements enforceable as part of the air quality permit to operate.
III.A.12	For the purposes of the MOA, the Astartup of HCCP@ shall mean the date upon which HCCP begins its demonstration phase.

2.2 MEMORANDUM OF AGREEMENT (MOA)

The cornerstone of the MOA signed by DOL DOE, AIDEA, and GVEA (see Section 1.1) is the planned retrofit of Unit No. 1 to reduce emissions of NO_x and SO_2. For NO_x control, the MOA calls for Unit No. 1 to be retrofitted with low-NO, burners with overfire air (if technologically feasible) after the start-up of the HCCP. GVEA has agreed to decrease Unit No. 1 NO_x emissions by approximately 50 percent, from 848 tons per year to 429 tons per year. The MOA also requires that SO_2 emissions from Unit No. 1 be reduced by 25 percent, from 630 tons per year to 472 tons per year, using injection of sorbent. Under the MOA, these emissions limits will be monitored with continuous emission monitoring equipment.

The MOA requires-that the permit to operate issued by the Alaska Department of Environmental Conservation (ADEC) reflect the new reductions in emissions from Unit No. 1. Also, GVEA has agreed to implement administrative controls (i.e., reduce Unit No. 1 output) if DNPP experiences any. visibility impacts attributable to the operation of the HCCP and/or Unit No. 1. In addition, the MOA provides for the opportunity to renegotiate the MOA if visibility impacts occur more than 10 times during any 6-month period. In addition, 2 years after start-up of the HCCP and as otherwise agreed, GVEA and the DNPP superintendent would meet to evaluate these procedures and to discuss additional reasonable measures, if necessary, to protect air quality related values of DNPP (e.g., observed plume impacts). Furthermore, the MOA establishes that if the HCCP successfully attains the low level of emissions expected for the demonstration case, then GVEA would request that ADEC reduce SO_2 and NO_x emission limits in the HCCP's operating permit to match the achieved emissions levels, allowing for reasonable operational variability. The MOA also states that DOI shall withdraw its request to the ADEC to reconsider the issuance of the operating permit, and that the mitigation terms and conditions of the Agreement shall be incorporated into, and become enforceable requirements of, the air quality permit that allows the HCCP and Unit No. 1 to operate.

2.3 RESPONSIBILITY FOR MITIGATION MEASURES

There are three areas of responsibility:

- Mitigation Development -- the design of the mitigation measure, which includes the what, how, when, and where of the mitigation measure to be taken.
- Mitigation Implementation -- the actual implementation of the mitigation measure. The party with primary responsibility here is the one that controls the execution of the mitigation measure.
- Mitigation Verification and Monitoring -- the act of verifying that the mitigation is accomplished in accordance with the plan. It includes the collection of activities that will be undertaken to determine if the mitigation measure is performing as intended (i.e., that it is producing the desired results or level of environmental impact mitigation), and, if not, to assist in determining what alternative measures should be taken.

Responsibilities for developing, implementing, and verifying and monitoring the HCCP mitigations are shown in Table 3. For all mitigation measures, AIDEA has responsibility for mitigation development and implementation, while DOE has responsibility for mitigation verification and monitoring.

3. SCHEDULE

Detailed schedules for monitoring and data reporting to various state and federal agencies have not been determined yet. DOE will participate in initial planning meetings between the project participants and the appropriate agencies for the purpose of developing the specific schedules. Many of the mitigation measures will be incorporated during construction of the HCCP and thus will not require continuous monitoring. The construction camp, fire-fighting equipment, and medical services will be in place by the beginning of construction. Erosion and sediment transport control will be applied as needed throughout construction, and sprinkler trucks to minimize fugitive dust will be operated as specified in GVEAs permit to operate. The monitoring of fugitive dust will be part of the Air Quality Monitoring Plan for the permit. The cross-connection between the HCCP and Unit No. 1 circulating water discharges, and the silencer for the forced draft fan, will be installed as part of the construction activities. The MOA includes time intervals in which to assess the effectiveness of the specified mitigation measures.

As required by DOE Order 5440.1E, the Secretarial Officer (i.e., the Assistant Secretary for Fossil Energy) is required to report to the Assistant Secretary for Environment, Safety and Health (EH-1) on the progress made in implementing the mitigation actions provided in the MAP. The annual report will contain revisions to the MAP as necessary. This requirement is effective until the HCCP demonstration is complete. Tables 4 and 5 provide the monitoring and reporting schedules for the mitigation actions described in Section 2.

Table 3, RESPONSIBILITY MATRIX FOR HCCP MITIGATION MEASURES

Final EIS Section	Mitigation Action	Mitigation Development, Implementation[a] and Monitoring[b]	Mitigation Verification
4.1.2.1 4.2.2	Sprinkler trucks to minimize fugitive dust.	AIDEA	DOE
4.1.3.1	Erosion and sediment transport control		
4.1.3.2	Cross connection between the HCCP and		

	Unit No. 1 circulating-water discharges.		
4.1.8	Construction camp.		
4.1.8.5	Fire-fighting personnel and equipment.		
4.1.8.5	Medical services.		
4.1.9.2	Silencer for the forced-draft fan.		
5.4.6 and Appendix I	Memorandum of Agreement mitigation measures (see Table 2).		

[a] Responsibility for implementing the mitigation may require involvement by federal or state agency personnel. Such determination will be made during development of detailed plans for the mitigation actions.

[b] Federal and state agencies may want to receive monitoring data and status reports on certain mitigation actions.

Table 4, MONITORING AND REPORTING SCHEDULES FOR MITIGATION MEASURES[a,b] TO BE PROVIDED DURING CONSTRUCTION AND OPERATION OF THE HCCP

Final EIS Section	Mitigation Action	Monitoring Frequency	Monitoring Data Reports to Agencies	Report to DOE
4.1.2.1 4.2.2	Sprinkler trucks to minimize fugitive dust.	Ongoing	None	Annual
4.1.3.1	Erosion and sediment transport control.			
4.1.3.2	Cross connection between the HCCP and Unit No. 1 circulating-water discharges	None		
4.1.8	Construction camp.			
4.1.8.5	Fire-fighting personnel and equipment.	Ongoing		
4.1.8.5	Medical services.			
4.1.9.2	Silencer for forced draft-fan.	None		

[a] Monitoring defined as "ongoing" is continuous throughout the project period.

[b] Reporting and monitoring are to be determined after consultation with appropriate agencies.

Table 5, MONITORING AND REPORTING SCHEDULES FOR MITIGATION MEASURES[a,b] TO BE PROVIDED BY THE MEMORANDUM OF AGREEMENT (MOA) (HCCP Final EIS, Appendix I)

Section	Mitigation Measure	Monitoring Frequency	Monitoring Data Reports to Agencies	Report to DOE
I.C.	Continuous emission monitoring equipment on Unit No. 1.	Not Applicable	Notification When Completed	Annual
I.C.	Overfire air on Unit No. 1.			
III.A.1	Retrofit Unit No. 1 with low-NO_x burners.			
III.A.2	Sorbent injection into Unit No. 1.			
III.A.3	Emissions limitations in the ADEC air quality permit.	Not Applicable		
III.A.4	Revise ADEC permit to reflect reduced emissions, if achieved.	Not Applicable		Annual
III.A.5	Reduce emissions if visibility impairment detected in Denali.	Quarterly		
III.A.6	Continuous emission monitoring equipment on Unit No. 1.			
III.A.7	GVEA support for related DOE/DOI studies.	Not Applicable		Annual
III.A.8	Provide fly ash and slag to NPS.			
III.A.9	GVEA funding support for NPS-selected air pollution projects.			
III.A.10	Schedule routine Unit No. 1 maintenance during June, July, and August of each year.	Annual		
III.A.11	GVEA to apply to ADEC to modify permit in accordance with MOA.	As Appropriate		
III.A.12	For purposes of the MOA, "HCCP startup" shall mean beginning date of demonstration phase.	Not Applicable		

[a] Monitoring defined as "ongoing" is continuous throughout the project period.

[b] Reporting and monitoring are to be determined after consultation with appropriate agencies.