TECHNICAL PROGRESS REPORT
HEALY CLEAN COAL PROJECT

DOE COOPERATIVE AGREEMENT
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ALASKA INDUSTRIAL DEVELOPMENT AND EXPORT AUTHORITY

Prepared by

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SECTION 1 - SUMMARY

Please refer to Quarterly Technical Progress Report No. 1, January to June 1991 for the project background and objectives.

This report covers October to December 1991 Phase IA activities. The Prevention of Significant Deterioration (PSD) permit and Air Quality control Permit to Operate are in progress. The draft Best Available Control Technology analysis and report was prepared and issued for project participant review. Visibility monitoring using manual picture taking has commenced.

Engineering and design continued on the boiler, combustion, and flue gas desulfurization (FGD) systems. The turbine/generator design, supply and erection contract was awarded and engineering has commenced for this system. Other equipment procurement specifications continue to be prepared.

Joy testing of the flash calcined material (FCM) generated by TRW at Cleveland was completed in NIRO's Copenhagen test facility.

Project management activities including contracting, financing, and DOE reporting continued. The project engineering and design schedule has been prepared. The construction schedule continues to be prepared.

SECTION 2 - INTRODUCTION

Please refer to quarterly Technical Progress Report No. 1, January to June, 1991.

SECTION 3 - PROJECT STATUS

The following status is for Phase I work from October to December, 1991.

Project Management

The HCCP team participants and their primary roles include:

- Alaska Industrial Development and Export Authority (AIDEA) - Ownership, overall project management and financing.
- Golden Valley Electric Association, Inc. (GVEA) - Design input and review, operator and purchaser of the HCCP electrical output.
- Usibelli Coal Mine, Inc. (UCM) - Design input and review, coal supplier and ash disposal.
- TRW, Inc. (TRW) - Entrained combustion system technology supplier.
- Joy Technologies, Inc. (Joy) - Spray dryer, fabric filter and ash recycle system technology supplier.
- Stone & Webster Engineering Corporation (SWEC) - Architect/Engineer.

In addition Foster Wheeler Energy Corporation (FWEC) has been contracted for design, supply and erection of the boiler.

AIDEA's board of directors met during this reporting period. The AIDEA/GVEA Power Sales Agreement (PSA) and the Budget Period 1 spending cap through April 20, 1992 has been approved. GVEA refiled a complete application to the Alaska Public Utilities Commission (APUC) in December for PSA approval.

The required monthly reporting under the terms of the Cooperative Agreement, Article XV, reporting requirements were fulfilled during this reporting period. Preparation of the project cost plan and the engineering and design schedule have been completed. The construction schedule continues to evolve.

Permitting/NEPA Compliance

- Visibility Review Panel

  As stated in the previous Quarterly Progress Report, Stone & Webster contacted a number of nationally recognized experts in the field of visibility to serve on a panel to provide guidance on the best approach for visibility modeling for the HCCP. After independent review of the data and previous modeling, the visibility review panel met in Palo Alto, California on October 22, 1991. The purpose of the meeting was to present preliminary reviews and critiques of a draft visibility modeling study. The meeting facilitated information exchange among the participants, and identified topics where additional analyses were to be conducted.

  The Panel stated that the approach taken in the draft report was reasonable, but the results contained large uncertainties resulting from limitations in meteorological data, dispersion models, and human perception and optics calculations. Additional areas of concern that were identified (and not addressed in the draft report) included the effects of elevated layered plumes, the importance of ice fog, and the potential conversion of SO_2 to sulfate aerosols in the moist plume.

  Reports were received from each member of the visibility review panel, and a Visibility Modeling Study Plan developed for presentation to the National Park Service (NPS) and ADEC. The Study Plan recommended that visibility modeling be conducted using a Valley Box Model rather than the regulatory PLUVUE model.

- Visibility Modeling

  A conference was held with the National Park Service (NPS) and ADEC on December 19, 1991 to discuss the Visibility Modeling Study Plan for the HCCP. The purpose of the meeting was to solicit comments and request concurrence from the NPS and ADEC on the proposed Visibility Monitoring Program. A description of the modeling study plan was sent to NPS and ADEC on December 17, 1991 for the review prior to the meeting. A description of the proposed monitoring program was sent to NPS and ADEC by AIDEA on November 22, 1991.

  Regarding the modeling study plan, NPS clearly stated that the HCCP has only two options for modeling methodologies: either to use the standard regulatory approach incorporated in PLUVUE, or to use a more sophisticated and complex non-standard approach. The non-standard approach could involve a large-scale meteorological and air chemistry data collection

effort, detailed wind field modeling, and possible model development (ie., contrast, delta E, and perception models). Such an approach would likely require a significant expenditure of both time and expense.

Subsequent to the meeting, visibility modeling using the PLUVUE model had been initiated and is scheduled for completion during February 1992.

- Visibility Monitoring Program

NPS has requested that AIDEA initiate a visibility monitoring program for the HCCP. The HCCP has maintained that the requested visibility monitoring program is unnecessary and does not provide meaningful data which can be used to document any anticipated visibility impacts of the HCCP on DNPP. In spite of this position, AIDEA has been responsive to the NPS's expressed data needs relative to visibility issues and has, with the concurrence of HCCP Participants and the Department of Energy (DOE), initiated a visibility monitoring program. Air Resources Specialists, Inc. was given a contract to supply the equipment, install the cameras, and analyze the data collected. The cameras were installed during the week of January 16, 1992 with data to be collected for at least 6 months thereafter.

The NPS has stated that the proposed methods and locations of the visibility monitoring cameras are adequate, but had expressed concerns over the proposed duration of the program. NPS feels that a data base of at least 1 year duration, if not longer, is required to define the current visual quality. NPS has also stated that it will request that monitoring data be required as part of the PSD air quality permit application, so this can properly evaluate current and future visual quality at Denali National Park and Preserve (DNPP). NPS may, however, elect to evaluate the permit application before a full year of data is collected if a demonstration can be made that the visibility data presented in the permit application is for the complete time period(s) when PLUVUE predicts adverse visual impacts.

Written concurrence that the visibility monitoring program will satisfy all preconstruction visibility monitoring requirements of ADEC and NPS for the HCCP has been requested. No replies have been received to date.

- Air Quality and Meteorological Monitoring Program

ENSR's Healy Clean Coal Air Quality Monitoring Program Annual Data Report was submitted to Stone & Webster. The document

will be reviewed and ENSR asked to incorporate the comments into the document for submittal to ADEC as the Final Annual Data Report.

- Acoustic Radar Audit Report

  RTP Environmental Associates, Inc. was contracted to prepare the Acoustic Radar Audit Report. A draft report was submitted to Stone & Webster in November, with the final prepared in December for transmittal to ADEC for review and approval.

PERMITTING STATUS

Permit applications which have been submitted to appropriate agencies follows.

Federal Permits

Environmental Protection Agency (EPA)

- NPDES application for discharges from power plant operations

  This NPDES application was submitted to EPA by Golden Valley Electric Association, Inc. (GVEA). GVEA will be the operator of the generating facilities after construction and demonstration of the HCCP is complete. This NPDES application was for a permit to discharge thermal heat from the circulating cooling water system, power plant wastewater, and coal pile runoff water to the Nenana River.

- NPDES application for discharges from the concrete batch plant

  This NPDES application was submitted to the EPA by AIDEA. AIDEA will be the operator for all construction activities including the concrete batch plant. This NPDES was for a permit to discharge wastewater, including concrete cleanup and washdown wastewater from the concrete batch plant, through a settlement basin and borrow ditch to the Nenana River.

- NPDES application for discharge from the construction camp site

  This NPDES application has been reviewed by the HCCP Participants. However, it has not been submitted to EPA because a Special Land Use Permit has not yet been obtained from the Alaska Railroad Corporation. The Alaska Railroad has been contacted by AIDEA and contract negotiations are proceeding. A Special Land Use Permit will be obtained by the early part of 1992.

U.S. Department of the Army Corps of Engineers (Corps)

- Nationwide Section 404 Permit

  The once-through cooling system for the HCCP requires the construction of an intake structure and an outfall structure on the bank of the Nenana River. This activity includes the filling around each structure into the Nenana River and the restructuring of an existing intake pond. These activities must be preceded by a Corps Section 404 Permit. The Corps has indicated that these activities may fall within the requirements of Nationwide Section 404 Permits. Therefore, a Nationwide section 404 Permit application has been submitted to the Corps.

- Corps Section 404 Permit for the laydown/storage site

  Construction of the HCCP will require a laydown/storage area to be located south of the Suntrana Spur of the Alaska Railroad at the confluence of the Nenana River and Healy Creek. This activity will include cut and fill of an area which is classified as wetlands and, therefore, a Corps Section 404 Permit is required. An application has been submitted to the Corps for a permit for this laydown/storage area.

- Corps Section 404 Permit for the discharge basin of the temporary wastewater treatment system of the construction camp site

  Construction of a discharge basin for the disposal of primary and secondary treated water from the construction camp site will be a part of the construction camp wastewater treatment system. This basin will be located in an old stream channel of the Nenana River. Although the channel is not in the 100-year floodplain of the river, the channel retains wetlands characteristics. Therefore, a Corps Section 404(b)(1) permit application has been prepared for submittal to the Corps. This application has been reviewed by HCCP Participants. However, it has not been submitted to the Corps because a Special Land Use Permit has not yet been obtained from the Alaska Railroad Corporation for the property in question. The Alaska Railroad has been contacted by AIDEA and contract negotiations are proceeding. A Special Land Use Permit will be obtained in the early part of 1992.

Federal Aviation Administration (FAA)

- Two FAA permit applications have been prepared by Stone & Webster. However, there are additional data that are required in the permit applications. The stack height has not been set yet, as the height will be determined by the requirements to

meet air quality standards. Once air quality data are complete, the FAA permit applications for the HCCP will be submitted to the Participants, followed by submittal to the FAA. The air quality data are required as part of the PSD which is scheduled for completion on March 21, 1992. The FAA application submittal will follow soon thereafter.

The second FAA permit application that must be obtained is for the construction camp site. This site is immediately south of the south end of the Healy Airport, therefore, the FAA must be notified by its activities and a permit obtained.

State of Alaska Permits

Alaska Department of Natural Resources (ADNR)

- Temporary permits to appropriate water

  As suggested by ADNR, three temporary water uses have been incorporated into the permanent permit to appropriate water as secondary uses of the water. These temporary uses are: water which will be pumped from the supply well during a well test for that well, water for concrete production and concrete batch plant operations, and water for dust control. As identified below, the permanent permit to appropriate water for which these temporary uses are a part was submitted to ADNR on January 24, 1992.

- Temporary permits to appropriate water during drawdown tests and dewatering of the shallow aquifer at the intake and discharge structures

  A permit will be obtained for the water extracted from the dewatering wells during their tests. This permit application to appropriate water has been reviewed by HCCP Participants. Submittal of the permit will be delayed until a drilling program is established. At that time the permit application will be submitted to ADNR. It is anticipated that the submittal will occur during the spring months of 1992.

  Another temporary permit to appropriate water will be obtained from ADNR for dewatering the aquifer around the intake and discharge structure during construction of these structures. The amount and quality of water that will be appropriated will be determined by the dewatering well tests.

  A temporary permit to appropriate water for the domestic water supply at the construction camp site has been completed and reviewed by HCCP Participants. As for other construction camp permits, this permit is awaiting the Alaska Railroad Corporation Special Land Use Permit which has not yet been obtained for the construction camp site. The Alaska Railroad

has been contacted by AIDEA and negotiations are proceeding for this lease. Therefore a Special Land Use Permit will probably be obtained in the early part of 1992.

- Permanent permits to appropriate water

  Applications for a permanent permit to appropriate water for the once-through cooling system and for a permanent permit to appropriate water for the supply well were submitted to ADNR on January 24, 1992. As indicated above, the supply well will be used for temporary water uses before being used for plant operations and a potable water supply. If the well tests, included as a temporary water use, determines the well production to be inadequate to supply all needed water, the balance of the need will be taken from the Nenana River through the discharge side of the once-through cooling system for the HCCP.

- Land use leases

  There are two land use leases which must be obtained for the HCCP. They are for air quality monitoring sites and for the use of State of Alaska Lots 7 and 8. Lots 7 and 8 are a GVEA lease that is to be extended to the HCCP.

  The leases for land use have been obtained through the ADNR for air quality monitoring. One of those leases has expired while the other is still maintained for a site to gather air quality data to be used in the PSD and visibility studies.

  The land use lease application for the use of Lots 7 and 8 for the HCCP is presently being prepared. This application will be submitted prior to April 6, 1992.

Alaska Department of Fish and Game (ADF&G)

- Fish habitat permit

  A Fish Habitat Permit application will be submitted to ADF&G on February 10, 1992. It includes a discussion of all activities, temporary and permanent, that could have an impact on the fish or fish habitat in the Nenana River and its tributaries. The primary area of potential impact is in the mixing zone of the warm water discharged from the once-through cooling system during the winter months. The potential of an impact will be reduced by discharging part of the GVEA Healy Unit No. 1 outfall and the HCCP through the same discharge structure. Therefore, if one unit is required to shut down, the temperature change in the mixing zone will be minimized by the continued discharge from the other unit. Further, if both units were to discontinue operations at the same time (which is highly unlikely during winter peak load months), it has

been calculated that the zone of warm water will move downstream as a warm zone and that the fish in the warm zone will move with the water becoming acclimated as the water cools off.

Alaska Department of Conservation (ADEC)

- PSD-BACT

  A Draft Best Available Control Technology (BACT) for the HCCP has been completed. That document has been through extensive review and is considered complete with the exception of the input of final SO_2 control levels and particulate emissions (particularly fugitive dust); these numbers are to be input into the BACT pending completion of the final air quality modeling. A meeting with ADEC to discuss the BACT was scheduled and took place in Juneau, Alaska on January 23, 1992. The BACT will be included as an appendix to the PSD scheduled to be complete on March 21, 1992.

  Items which must be finalized before the PSD can be completed are completion of the air quality modeling, visibility modeling, and evaluation of available camera visibility monitoring.

- Wastewater disposal permit

  Wastewater disposal permit applications generally correspond to NPDES applications submitted to EPA. For each NPDES submitted there has been a wastewater disposal permit application submitted to ADEC. For the permits submitted see the preceding NPDES permit applications listed. All corresponding wastewater disposal permits have been submitted to ADEC.

A few of the required permits which have not been completed are discussed under the agency for which they are to be submitted. These are the permits which have been prepared and are awaiting other actions before submittal. Other required permits which have not been completed, the projected time of submittal, and the scheduled date receipt of the final permit are listed below.

PERMIT	APPLICATION DATE	SCHEDULED PERMIT DATE
Spill Prevention, Control and Countermeasures Plan for Oil Storage Facilities (SPCC)	Sept95	Jan96
Stormwater Runoff Permit	Sept95	Jan96
Certificate of Assurance Permit	June92	Feb93
Construction Camp Sewage Plant Review	15Aug92	Feb93
Plan Review for Sewage Wastewater Systems	15Aug92	Feb93
Solid Waste Disposal Permit	20July92	Feb93
Fuel Storage, Transfer and Handling	20July92	Feb93
Hazardous Waste	20July92	Feb93

Engineering

The 5-ton sample of sample of flash-calcined baghouse catch material (FCM) test report was completed and received in December.

Engineering and design continued for three of the technology suppliers: 1) TRW's entrained combustor with limestone injection system, 2) FWEC's boiler system and, 3) Joy Technologies' activated recycle spray dryer absorber system design continued.

FWEC completed construction of boiler models for the flow model study. Development of the test plan for the flow model study continues. Review of the critical furnace design information (CFDI) for its effect on the boiler design and control also continued.

TRW continued development of the coal supply plan (coal supply, grinding, transport and delivery requirements to the Capistrano Test Site (CTS) test facility), and test planning for the Design Verification Tests (DVT). The procurement of the DVT precombustor pressure parts was evaluated and awarded.

AIDEA, GVEA, TRW, Jenike and Johanson (a material handling consulting firm), and SWEC attended the coal feed system design review meeting held in the offices of SWEC. Attributes of the proposed semi-direct coal feed from the pulverizer outlets to the combustor and the attributes of the indirect system proposed by TRW at that time were discussed. The meeting ended with action items of FWEC to provide review and comments on the TRW proposed indirect coal feed system. FWEC was also requested to inform AIDEA if it is willing to supply and guarantee a non-storage system which would meet TRW's requirements.

Joy continued work on the absorber system, dry recycle system, reagent slurry system, electrical and instrumentation design, and engineering administration.

The Turbine/Generator procurement contract evaluation process was completed with a contract awarded to Sumitomo Corporation of America (SCA). SCA commenced engineering and design efforts on the embedded material, turbine, turbine auxiliary and piping, generator, electrical equipment and instrumentation.

SWEC issued the second revision of the plant general arrangements. The preparation of preliminary piping and instrumentation diagrams (P&ID's) continued in conjunction with the corresponding system descriptions. Approximately 33 percent of the preliminary P&ID's have been issued. One-line diagrams and logic diagrams are also continuing to be prepared. SWEC presented the results of the preliminary station service study to GVEA.

SWEC continues the development of the site plan and civil drawings. The administrative/control building architectural drawings continue to evolve. The concrete and steel drawings continue on the administrative/control building and turbine building.

The following specifications have been issued for bid: condenser, combustion air preheater, turbine building bridge crane.

SWEC has received the following equipment procurement specifications back from participant review and is preparing for bid issues: travelling screen, power transformers, plant control system.

The following specifications have been issued for participant review: trash rake, car & hoist, trash rack, steel stop logs, lube oil conditioning equipment, induced draft fan, plant sample system.

The following specifications continue to be prepared for participant review: expansion joints, large butterfly valves and operators, deaerator, circulating water, condensate and boiler feedwater pumps, eliminate per February 3, 1992 meeting feedwater heaters, limestone handling equipment, air compressors, coal handling and dust collection equipment, fly ash handling system, circulating water piping, shop fabricated tanks, makeup demineralizer, oil/water separators, plant waste water treatment system, chemical feed system, outdoor instrument transformers, power circuit breakers, safety and relief valves, air operated control valves, control and relay boards.

SWEC continued preparation of the Unit 1 coal handling study. The proposal for modifying the Unit 1 fly ash system from Joy Technologies was received and evaluation commenced.

SECTION 4 PLANS FOR NEXT QUARTER (JANUARY - MARCH 1992)

The following highlights activities planned for next quarter:

- Continue required DOE reporting submittals.
- Continue preparation of the construction schedule.
- Prepare total project budget capital cost estimate.
- Finalize project procedures manual.
- Finalize design criteria.
- Continue administration of SWEC environmental subcontractor efforts.
- Complete final air quality modeling.
- Complete the visibility modeling report.
- Submit the PSD permit application to DOE/ORNL.
- Continue visibility monitoring
- Submit corps Section 404 permit application for agency review.
- Submit permits to appropriate water applications for agency review.
- Submit Fish Habitat Permit Application for agency review.
- Issue final station service study.
- Continue updating final heat balances.
- Continue updating general arrangements as information becomes available.
- Continue preliminary P & ID's and system descriptions.
- Continue preparation of one-line diagrams and logic diagrams.
- Commence preparation of mechanical, valve, line, motor and instrument lists.
- Continue preparing the following equipment procurement specifications for bid:

  Circulating water, condensate and boiler feedwater pumps

Field fabricated tanks
Limestone handling equipment

Coal handling and dust collection equipment
Fly ash handling equipment
Bottom ash handling equipment
Shell & tube heat exchanges
Circulating water piping
Shop fabricated tanks
Horizontal centrifugal pumps
Miscellaneous small pumps
Fire pump
Fuel oil pumps
Miscellaneous hoists and monorails
Makeup demineralizer
Oil/water separators
Plant waste water treatment system
Chemical feed system
Outdoor instrument transformers
480 V load centers
Motor control centers
Medium voltage switchgear
Safety and relief valves
Venturi flow nozzle and orifices
Positive displacement flow meters
Special service control valves
Control and relay boards

- The following equipment procurement specifications are scheduled to be issued for bids:

  Traveling screen
  Trash rake, car and hoist
  Trash rack
  Steel stop logs
  Expansion Joint
  Large butterfly valves and operators
  Lube oil conditioning equipment
  Induced draft fan
  Deaerator
  Feedwater heaters
  Plant sample system
  Power transformers
  Power circuit breakers (138kV)
  Power circuit breakers (generator circuit breaker)
  Plant control system

- The following bids are scheduled back for SWEC and participant evaluation and award.

  Traveling screen
  Trash rake, car and hoist

Trash rack
Steel stop logs
Condenser
combustion air preheater
Turbine building bridge crane
Lube oil conditioning equipment

- Continue civil, architectural, concrete and steel drawings.
- Continue combustor, boiler, flue gas desulfurization engineering and design.
- Continue turbine/generator engineering and design.
- Continue participant reviews as required.