

TECHNICAL PROGRESS REPORT
HEALY CLEAN COAL PROJECT

DOE COOPERATIVE AGREEMENT
DE-FC-22-91PC90544

QUARTERLY REPORT NO. 3
FOR THE PERIOD
JULY - SEPTEMBER 1991

NOVEMBER 1991

ALASKA INDUSTRIAL DEVELOPMENT AND EXPORT AUTHORITY

Prepared by

STONE & WEBSTER ENGINEERING CORPORATION

LEGAL NOTICE

This report was prepared by Stone & Webster Engineering Corporation (SWEC) pursuant to a Cooperative Agreement between the U.S. Department of Energy and the Alaska Industrial Development and Export Authority (AIDEA). Neither SWEC, AIDEA nor any of their subcontractors nor the U.S. Department of Energy, nor any person acting on their behalf:

(A) Makes any warranty or representation, express or implied, with respect to the accuracy, completeness, or usefulness of the information contained in this report, or that the use of any information, apparatus, method, or process disclosed in this report may not infringe privately-owned rights; or

(B) Assumes any liabilities with respect to the use of, or for damages resulting from the use of, any information, apparatus, method or process disclosed in this report.

Reference herein to any specific commercial product, process or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by SWEC, AIDEA or the U.S. Department of Energy. The views and opinions of authors expressed herein do not necessarily state or reflect those of the U.S. Department of Energy.

SECTION 1 - SUMMARY

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

This report covers July - September 1991 Phase IA activities. Based on the Department of Energy (DOE) presentations in September, the Environmental Impact Statement (EIS) issue date will be delayed until February 1993. Field data collection is largely completed and a revised draft Environmental Information Volume (EIV) has been submitted to the Department of Energy (DOE) to support DOE's preparation of a federal EIS. Preparation and submittal of permitting documents are continuing.

Contract negotiations continued for the Boiler, Combustion Systems, and Flue Gas Desulfurization (FGD) systems. These contracts were awarded to Foster Wheeler (FWEC), TRW and Joy Technologies respectively during this reporting period. The Turbine/Generator procurement bid evaluations continued. Many of the equipment procurement specifications commenced this quarter in support of the project budget capital cost estimate due in the first quarter of 1992.

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

Project management activities including contracting, financing, and DOE reporting continued. The project engineering, design, and construction schedules are being prepared.

TRW has issued the final report for coal tests at the Cleveland Test Facility.

SECTION 2 - INTRODUCTION

Please refer to quarterly Technical Progress Report No. 1, July to September, 1991.

SECTION 3 - PROJECT STATUS

The following status is for Phase I work from July to September, 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) - Operator and purchaser of the HCCP electrical output.
- Usibelli Coal Mine, Inc. (UCM) - 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 boiler supply and erection and for detailed design of the TRW combustion system.

AIDEA's board of directors have met during this reporting period. AIDEA has completed and presented to its board a financial plan for the project. The report, which was completed in July 1991, indicated that the HCCP is financially feasible. The board established a fund, based on the financing plan, that will be a source of funds which, with other sources, will allow completion of the project as it is currently budgeted and scheduled.

AIDEA's contract negotiations with TRW, FWEC, Joy and SWEC are complete, and Notice to Proceed's have been issued. Copies of the contracts will be sent to the parties, including DOE. Contracts with GVEA and UCM are pending.

AIDEA is now finalizing the Power Sales Agreement (PSA) with GVEA. GVEA plans to refile 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 engineering and construction schedule, and cost plan continued.

Permitting/NEPA Compliance

- Agency Meetings

A conference was held with the National Park Service on July 8, 1991 to discuss the proposed visibility monitoring program for the HCCP. A proposal which outlined a strategy to photographically document the visual conditions that exist in the Nenana River Valley as viewed from the Denali National Park and Preserve (DNPP) Visitor Access Center as prepared by Air Resource Specialists, Inc. was discussed. This documentation had been proposed because of the conservative nature of the preliminary plume visibility modeling, which had indicated that in winter months there was a potential for a visible plume within the Nenana River Valley, as viewed from the DNPP Visitor Access Center.

The issue of visibility monitoring will be addressed further in the next quarterly report.

- Visibility Review Panel

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. The Electric Power Research Institute (EPRI) was selected as the moderator of the panel. All experts were chosen from a list of nationally recognized visibility experts as objective and unbiased in their approach to analysis of visibility issues. These people are researchers with expertise and training in the areas of visibility modeling, meteorology, measurements, atmospheric optics, chemistry, data analysis, dispersion characteristics, and wind field analysis. Most of them are involved in some way with on-going visibility research or visibility model development.

The objective of the visibility modeling review for the HCCP was to provide, through independent review of visibility modeling work conducted to date and the application of independent expertise and experience, a focused approach to predictive modeling to address the visibility issues related to the HCCP. The focused modeling approach was to be reasonable in scope and application, be defensible before reviewing agencies including the National Park Service and Environmental Protection Agency, and reasonable in its assumptions.

A meeting has been scheduled for the week of October 21, 1991 for the panel to meet to discuss the results of each individual's review and to formulate the focused modeling approach.

- **Environmental Information Volume (EIV)**

Water Resources Data collected from the 1-year water study contracted to the USGS were used to update Sections 3.4 and 4.4 of the EIV. Sampling continued through July at three sites in the Nenana River, one site in Healy Creek, and two wells. Data from the USGS laboratory should all be complete by October 1991.

Data collection from the USGS gauging station on the Nenana River near the HCCP site also was continued. Data collection may be continued for an extended period to collect additional sediment data and flow rates.

Atmospheric Resources Collection of air quality data from the HCCP meteorological towers was continued through August. Visibility modeling was completed using PLUVUE and a valley box model approach and the results incorporated into Sections 3.2.2 and 4.2.2 of the EIV.

Endangered Species The second phase of the raptor survey in the vicinity of the HCCP was conducted during July 21 and 22, 1991. This survey was conducted to verify the findings of the first phase of the study and to check for any missed peregrine falcon habitat/nesting areas. The endangered peregrine falcons which the U.S. Fish and Wildlife Service suggested might nest in the vicinity of the proposed HCCP were not sited in the study area during either phase of the study. Other raptors which do use the area were noted in the study. A final report was prepared on September 15, 1991.

Construction Camp Alternatives The area known as the "borrow pit" located within 0.5 mile of the HCCP was chosen as the preferred site for the construction camp. The borrow pit is owned by the Alaska Railroad. However, it was suggested that other parties may be interested in providing land for the camp. The HCCP will determine if there is interest in providing land by other parties.

Second Draft Environmental Information Volume The DOE requested a second draft of the EIV be prepared by Stone & Webster. This request was founded on the fact that there had been several changes in the EIV, resulting from the update in information in the areas of water resources, air quality, and visibility. Further, information on the proposed construction camp was available that was not included in the draft EIV dated January 1991. Updated values for air quality, visibility, endangered species, and the construction camp have been incorporated into the Second Draft Environmental Information Volume which was completed on September 13, 1991.

Also included in the Second Draft Environmental Information Volume was data for the Alternative Location (previously called the North Site). Analysis of the Alternative Location included data on vegetation, wetlands, and fish and wildlife habitat.

- Permitting

The NPDES permit application for plant operation, which included three outfalls (once-through cooling water, plant water, and coal pile runoff water), were submitted for client review August 30, 1991, with the final to be submitted to EPA in October. Two other NPDES application were prepared for client review. They were for effluent from the construction camp and from the batch plant.

Stone & Webster proceeded with the proposed Best Available Control Technology (BACT) approach which maintains that the HCCP is BACT. Retrofit options will be addressed in the event the HCCP technologies cannot meet New Source Performance Standards (NSPS) emissions limits of 0.5 lb/MMBTU for NO_x, 70 percent removal efficiency for SO₂, and 0.03 lb/MMBTU for particulate matter.

The preliminary BACT analysis will be sent to the Alaska Department of Environmental Conservation (ADEC) to determine if ADEC considers it a reasonable and defensible approach. ADEC has approval rights for the PSD.

Other permits considered to be in the critical path for permitting is the Corps of Engineers (Corps) Section 404 permits. These permits could possibly be linked to the completion of the EIS process. Three CORPS 404 permits are under development and should be completed in October.

Stone & Webster has been actively preparing the following additional permit applications during the third quarter 1991:

Alaska Department of Environmental Conservation

- Wastewater disposal permit applications (corresponds to NPDES applications submitted to EPA).
- Temporary wastewater disposal permit applications
 1. Supply well pump test
 2. Dewatering well pump test

Alaska Department of Natural Resources

- Temporary water appropriation permit applications
 1. Construction camp
 2. Supply well pump test
 3. Dewatering well pump test
- Water appropriation permit applications (Permanent Water Rights)
 1. Once-through cooling
 2. Plant operations/concrete batch plant

Alaska Railroad

- Special Land Use Permit - construction camp

Alaska Department of Fish and Game

- Fish habitat permit applications

Environmental Protection Agency

- Spill Prevention Control & Countermeasures (SPCC) plan

Engineering

TRW conducted a test burn of two Alaska coals last quarter at the TRW coal combustion test facility in Cleveland, Ohio. A 5-ton sample of flash-calcined baghouse catch material (FCM) from the flue gas stream was collected, prepared and shipped to NIRO in Denmark for spray dryer tests. Joy technologies completed this testing in September. The Joy/Niro FCM test report is due next quarter with results.

Engineering and design is now underway for three of the technology suppliers. Contracts have been finalized and Notice to Proceed's (NTP) were issued September 13, 1991 for the following:

- 1) TRW's entrained combustor with limestone injection.
- 2) Foster Wheeler boiler design.
- 3) Joy Technologies Activated Recycle Spray Absorber System.

The Turbine/Generator procurement contract specification was completed. Three responsive bids were received. The evaluation process is continuing with an award anticipated in October, 1991.

A construction camp site was tentatively selected. The proposed camp location is at approximately one-half mile west of the HCCP site.

Calculations were started for the heat rejection system hydraulic analysis and modelling; electrical systems/specifications. Engineering commenced on the station service study and plant layout study.

The preliminary powerhouse general arrangements and ground floor flue gas handling area arrangement commenced in conjunction with the plant layout study. Preliminary general arrangements will be used for the plant layout study. The legend, symbols, and notes one-line diagram and main one-line diagram commenced this period.

The following preliminary piping and instrumentation diagrams (P&IDs) started during this reporting period: system & equipment code index, combustion air preheating, hot water for glycol heating, slag water heat rejection ash water, extraction steam, miscellaneous lube oil systems, condensate system, auxiliary steam system, feedwater heater vents and drains, sample system, water treatment system, circulating water systems and chemical feed systems. The first four mentioned above have been issued for participant review. The related system descriptions have also been started to support the subsequent specifications.

The following equipment specifications have started during this period: turbine building bridge crane, combustion air preheater, plate and frame heat exchangers, condenser, induced draft fans, feedwater heaters, plant sample system, power transformers, outdoor instrument transformer, power circuit breakers, medium voltage switchgear and plant control system.

The construction plot plan, site plan, and boring plan location drawings started this reporting period. The plant architectural renderings were completed.

A technology supply and engineering review kick-off meeting was held on September 25, 1991 in SWEC's Denver office. The following entities were represented: DOE, AIDEA, GVEA, SWEC, UCM, TRW, FWEC, Joy and Senior Management Consultants (SMC). The overall project schedule status and critical path was reviewed. Schedule impacts of extended major contract negotiations was discussed with a plan of recovery presented. A technical presentation was given on the combustor and auxiliary system design (TRW), Boiler design (FWEC) and Flue Gas Desulfurization design (Joy).

SECTION 4 PLANS FOR NEXT QUARTER (OCTOBER - DECEMBER 1991)

The following highlights activities planned for next quarter:

- Prepare 1992 construction activities recommendations.
- Continue required monthly and quarterly DOE reporting submittals
- Finalize preparation of engineering and design schedule.
- Continue preparation of the construction schedule.
- Continue administration of S&W environmental subcontractor efforts.
- Complete preparation of Corps Section 404 Permit Applications.
- Continue preparation of state and local permit applications.
- Continue support of DOE Environmental Impact statement (EIS) activity.
- Complete BACT analysis and report.
- Submit NPDES Applications.
- Commence preparation of Prevention of Significant Deterioration (PSD) Permit Application.
- Issue final plant layout study report.
- Complete hydraulic analysis and modeling calculations.
- Commence final heat balances.
- Issue preliminary station arrangement, powerhouse and flue gas handling ground floor area general arrangements for participant review.
- Commence preliminary coal handling and dust collection general arrangements.
- Continue preliminary piping and instrumentation diagrams and system descriptions.
- Continue main one-line diagram.
- Issue index, legend and general notes one-line diagram

for participant review.

- Commence medium voltage switchgear one-line diagram.
- Commence electrical feeder breakers combined wiring diagrams.
- Commence preliminary mechanical load and instrument lists.
- Commence the following equipment procurements specifications.
 - deaerator
 - lube oil condition equipment
 - coal handling and dust collection equipment
 - shell and tube heat exchangers
 - limestone handling equipment
 - shop fabricated tanks
 - circulating water, condensate, and feedwater pumps
 - bottom and fly ash handling system
 - field fabricated tanks
 - circulating water piping
 - filtration systems equipment
 - domestic waste treatment
 - makeup demineralizer
 - oil/water separators
 - plant waste water treatment system
 - chemical feed system
 - 480V load centers
 - motor control centers
 - safety and relief valves
 - control and relay boards
 - air operated control valves

The following equipment will be issued for bids:

- turbine building bridge crane
 - combustion air preheater
 - plate and frame heat exchangers
 - condenser
 - power transformers
 - plant control system
- Continue civil drawings.
 - Commence architectural, concrete, and steel drawings.
 - Issue Joy/Niro FCM test report.

- o Continue combustor, boiler, flue gas desulfurization engineering and design.
- Award turbine/generator supply and erect contract.
- Continue participant design reviews as required.