



City and Borough of Sitka

• ELECTRIC DEPARTMENT •

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November 3, 2003

RECEIVED
NOV 07 2003

AIDEA/AEA

~~Lizanna Pierce
Department of Energy
Golden Field Office
1617 Cole Boulevard
Golden, Colorado 80401-3393~~

Dear Lizanna:

RE: DE-FG 36-991d13826

Please find enclosed the interim final technical report, the property inventory certificate, and the final quarterly report Rebecca Garrett requested on August 14, 2003.

These reports cover the No. 4 Diesel project grant number 21950666 Amendment 1 only. Amendment 2 (Sheldon Jackson College utilities) is not included in this report. There were no patents required for this project, and I am unable to find a copy of DOE Form 2050.11 to certify that this is so.

Please contact me at 907-747-6633 should you need additional information.

Sincerely,

Dean Orbison
Engineering Manager

~~1cc:~~ Rebecca Garrett
AIDEA/AEA
813 West Northern Lights Boulevard
Anchorage, Alaska 99502

STI PRODUCT DESCRIPTION, J. Description/Abstract

The purpose of the Sitka Diesel Generator Project is to provide improvements to the City and Borough electrical system. The improvements include specific sub project, they are:

Jarvis St. Substation

The construction of a 10 MW substation at the Jarvis St. facility provides power to the south end of town.

Jarvis St. SCADA

A SCADA system was installed at the Jarvis St. facility. This system enables the Blue Lake Control Center to monitor and control the operation of all Jarvis St. substation breakers.

Marine St. SCADA

A SCADA system was installed at the Marine St. substation. This system enables the Blue Lake Control Center to monitor and control the operation of all Marine St. substation breakers.

No. 4 Diesel

A 4.4 MW diesel generator was installed at the Jarvis St. facility which is SCADA controlled from the Blue Lake Control Center. The generator is intended for stand-by emergency power, and as loads increase the unit will be used for system stability and peaking. The unit will eventually be used for base loading.

To: Charlie Walls
From: Dean Orbison
Date: 11/03/03
Subject: Diesel Plant Construction Final Report November 2003

Following is a brief description of the progress of construction and the percentage of construction complete of the four diesel plant capital construction projects.

Jarvis Street Substation

The Jarvis St. Substation is complete. Operator training is completed, Switching procedures are completed. The substation is in service.

Percent construction complete: 100%

Jarvis Street SCADA

The SCADA system at Jarvis Street is complete and in service.

Percent construction complete: 100%

No. 4 Diesel

Percent construction complete: 100%

Marine Street SCADA

Marine Street SCADA has been completed and put into service. All feeder controls and indications have been completed and tested.

Percent construction complete: 100%

The city's portion of the D-4 Addition Project has reached completion. We have applied for the final payment of grant DE-FG07-99ID13826, 2195066.

FUNDED GRANTEE: City and Borough of Sitka

PROJECT NAME: Sitka Diesel Generator Project

GRANT #: DE-FG07-99ID13826
2195066

PERIOD OF REPORT: November 2003

Recent Project Activities Completed: See Attached

Schedule Update:

A. Status of Schedule
An original completion date of August 30 2001 was defined in the grant application

B. Variance from Original Schedule
A variance was requested April 2, 2001. A new completion date of March 30, 2002 was requested.

C. Reasons for Schedule Variance
The variance was requested so that the quality of the project would not be compromised for speed.

D. Proposed Schedule Changes None

Budget Update:

A. Status of Budget

The original budget was \$4,660,500. This amount was amended to cover minor scope changes. The current Budget is \$4,892,131.

SUB PROJECT	\$BUDGET	\$CURRENT
Jarvis Street Substation	\$920,000	\$920,280
Jarvis Street SCADA	\$140,000	\$154,615
Marine Street SCADA	\$142,281	\$158,542
D-4 Addition	\$3,689,850	\$3,514,727
Total	\$4,892,131	\$4,748,164

B. Variance from Original Budget

The total project cost of \$4,748,164 is \$143,967 below the original budget amount of \$4,892,131.

C. Reasons for Budget Variance

Total Project is finished under budget.

Status of Financing: Municipal funds and DOE Grants

Issues: None

Activities Targeted for Next Quarter: None

Sheldon Jackson
-----COLLEGE-----
SITKA ALASKA

**Final Technical Report
DOE-Funded Alaska Energy Project**

FUNDED GRANTEE: CITY AND BOROUGH OF SITKA, ALASKA

PROJECT NAME: INDIAN RIVER HYDROELECTRIC PROJECT GRANT –
Sheldon Jackson College Electrical Infrastructure Renovation

GRANT #:
GRANT AGREEMENT NUMBER 2195066/SITKA
DIESEL GENERATOR PROJECT, AMENDMENT 2
USDOE GRANT: DE-FG36ID13826 (FORMERLY: #DE-
FG07-00ID13826) AR 55121-03, CC 21753186
SHELDON JACKSON COLLEGE

PERIOD OF REPORT: Full project scope duration – June 26, 2001 to January 7, 2005

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DIVISION 1 – Executive Summary

This Final Technical Report will provide a concise retrospective and summary of all facets of the Sheldon Jackson College Electrical Infrastructure Renovation portion of the Indian River Hydroelectric Project Grant of the City and Borough of Sitka, Alaska.

The Project Overview will describe the origins of the project, the original conditions that provided the impetus for the grant funding, how the grant amendment was developed, the conceptual design development, and the actual parameters of the final project as it went out to bid. The Project Overview will also describe the “before and after” conditions of the project.

The Objectives division of this Final Technical Report will describe the amendment-funded goals of the project. It will also describe the milestones of project development and implementation, as well as, the rationale behind the milestone array.

The Description of Activities Performed division of this report will provide an in-depth chronological analysis of progressive project implementation. Photographs (in an Attachment) will provide further illustration of particular functional aspects of the renovation project within project parameters.

The Conclusions and Recommendations division of this report will provide a comprehensive retrospective analysis of the project.

DIVISION 2 – Project Overview

The existing Sheldon Jackson College campus electrical system was examined in detail in 1999 by the electrical engineering firm of Haight & McLaughlin (now known as Haight & Associates) of Juneau, Alaska. The majority of the campus was, at that time, served by an outmoded and dangerous 2.4kV system that also contained a recently non-functional hydroelectric component. This system did not conform to the City and Borough of Sitka Electrical Department's standards. The City and Borough of Sitka Electrical Department wanted to integrate the campus system into the overall distribution grid of the city.

Grant Agreement Number 2195066/Sitka Diesel Generator Project, Amendment 2 between AEA and CBS, was entered into 12/15/99. The original scope provided for a new 4MW diesel power plant for CBS. Amendment 3, signed June 26, 2001, included the rehabilitation of the non-working hydro system, including the electrical system, at Sheldon Jackson College. This funding was in the amount of \$1,296,000. This Amendment was developed as an outgrowth of the recognition by the City and Borough of Sitka Electrical Department that renovation of the Sheldon Jackson College electrical infrastructure and the integration of same into the City and Borough of Sitka Electrical Department's grid was necessary based on whole grid analysis for the city.

DIVISION 2 – Project Overview..continued from Page 2

The project as configured, was funded by amendment to the USDOE grant referred to above. The systems to be rehabilitated and replaced existed wholly on the campus of Sheldon Jackson College, Sitka, Alaska. The City and Borough of Sitka is the 'pass-through' agent for the federal funds provided for the work, and will assume responsibility for the systems. Sheldon Jackson College received the grant funds from the City and Borough of Sitka, who acted as the pass-through agent. Sheldon Jackson College did not provide financing for this project.

Project coordination:

1. The Alaska Energy Authority, acting as the USDOE sponsoring office, supervised and administered the sub-grant for the project by way of a pass-through agreement with the City and Borough of Sitka, Alaska. The City and Borough of Sitka, through the mechanism of a Memorandum of Understanding with Sheldon Jackson College, was the pass-through agent for the grant funds to Sheldon Jackson College. Section 5 of the MOU describes the requirement that SJC hire a Project Manager.

The Sheldon Jackson College Project Manager provided liaison between the utility departments of the CBS and the Land and Facilities division of SJC to promote consolidation of effort and promote common understanding of project goals and parameters. In addition, the Project Manager administered the grant agreements, the RFP and bidding processes, and the contracts for construction.

2. A key element to the success of the electric utilities projects was the integration of design and construction with the Environmental Protection Agency Grant design and construction. The EPA Grant was funded for rehabilitation of the Water/Sewer/Storm systems on the Sheldon Jackson College campus.

It was generally agreed by all parties to both projects that an integrated design and implementation phasing would be most efficient and would be the most conservative use of the monies in both grants. The preliminary design plan was to unify design criteria to fully promote efficient relationships and installations of both the electric utilities and the water/sewer/storm utilities. Common corridors, with code separation of the utilities along with unified rights-of-way and easements, yielded efficient planning and design, reduced duplication of excavation efforts, brought about utilities integration within the cooperating departments of the City and Borough of Sitka, Alaska.

Water, sewer, storm drain renovation, replacement, and new installation funded by the United States Environmental Protection Agency and the Alaska Department of Environmental Conservation electrical (USDOE/AEA) was combined into a single design/construction project to effect maximum coordination of elements, including disposal of old transformers.

DIVISION 2 – Project Overview...continued from Page 3**Conceptual Design Development:**

Conceptual design development was based on a 1999 existing electrical infrastructure assessment and planning document developed for Sheldon Jackson College by Haight & Associates, an electrical engineering firm based in Juneau, Alaska. That document identified the serious problems in the 2.4kV distribution system and componentry, as well as, the need for rehabilitating the hydroelectric facility. In addition, the report emphasized the need for the dangerous and outmoded distribution system to be abandoned and to be replaced by a new system up to code with the City and Borough of Sitka Electrical Department's standards. It also delineated preliminary distribution component replacement. The report emphasized that the system replacement should be complete all the way to and including new meters at the building interfaces.

The Project Design Request for Proposals was developed to specifically address the goals outlined above, and of integrating the overall design criteria for the project and how said criteria interfaces with other work to be done on campus during the same time frame and in the same easements and utility corridors. Based on the foundation provided by the Project Plan, coordination with all principal parties in Sitka, Alaska and those agencies directly involved with the Project was an essential element in the second milestone phase. The Project Design Request for Proposals was developed during the second reporting quarter and was presented in the Appendix of that Report. The Notice of Award to the successful proposing firm was also presented in that Appendix. The correlation of action and information consisted of the following:

- Provide foundation for development of a coherent scope of work for the project design.
- Provide for ongoing coordination and programmatic review with the City and Borough of Sitka Electrical Department to insure that the eventual system owner and operator was going to receive an end product that met their specifications and design goal criteria.
- Ongoing coordination and liaison with the various entities and governmental agencies involved in the funding, monitoring, and execution of the Project (US Department of Energy, Alaska Energy Authority, the City and Borough of Sitka, Sheldon Jackson College, Idaho National Engineering and Environmental Laboratory, Federal Energy Regulatory Commission).

DIVISION 2 – Project Overview...continued from Page 4

Parameters of Final Design at time of Bid:

A portion of the original design criteria for the project and the project objectives were developed during an independent system analysis phase of existing utilities on the Sheldon Jackson College campus during 1999. The electrical engineering design team for the final design DoE/AEA project was the same as for the original study.

The final project design elements were driven by an in-depth assessment of the need for bringing the Sheldon Jackson College electrical distribution grid up to safe, modern standards compatible with the City and Borough of Sitka Electrical Department's requirements. In addition, the rehabilitation of the existing hydroelectric plant and reintegration of that facility into the renovated grid was an essential component driving the final design. Coordination with the EPA-funded water/sewer/storm infrastructure project was a top priority organized to save project dollars on both projects by running all the new utilities in the same utility corridors.

Before and After Project Parameters

The existing electrical distribution infrastructure was incompatible with the grid of the City and Borough of Sitka Electrical Department. The service components of the Sheldon Jackson College system were deteriorated, and in many cases, dangerously non-functional. The hydroelectric plant was in disrepair.

After project completion, the electrical infrastructure met the City's codes because they had such a strong guiding hand in the development of project design parameters, and because they knew they would be the owners and operators of the system upon completion and acceptance. The distribution network component represented by the hydroelectric plant renovation was substituted for by a conventional distribution network component after jurisdictional rulings by FERC, which if implemented, would have delayed implementation of the hydroelectric renovation by up to five years.

DIVISION 3 – Objectives

1. Sage Hall Hydroelectric Turbine - Rehabilitation of the out-of-service hydroelectric system located in the Sheldon Jackson College's Sage Building. The generator was to be connected to a steam boiler located near the steam generation system in order to provide a constant load system.

DIVISION 3 – Objectives...continued from Page 5

2. Campus Electrical Distribution System – This portion of the project was intended to convert the portion of the College's existing distribution system that was 2.4kV to a 12.47kV system, rehabilitate the College's existing 12.47kV system to City and Borough of Sitka design standards, replace secondary feeders, and provide metering at each building on the campus. The College will dedicate utility right-of-way, or easements to the City and borough for the rehabilitated system, and the City and Borough will take over ownership and Maintenance of the distribution system.

3. Sheldon Jackson College Work and Payment Schedule:

<u>Milestone</u>	<u>Payment</u>
Project Plan	\$ 320,000
Contract award for project design	\$ 65,000
Complete project design	\$ 65,000
Bid award for electrical infrastructure project	\$ 400,000
Bid award for hydroelectric project	\$ 100,000
Project completion electrical infrastructure project	\$ 256,000
Project completion hydroelectric project	\$ 80,000
Final project report	\$ <u>10,000</u>
TOTAL	\$1,296,000

The Milestones were developed in coordination with the City and Borough of Sitka Electric Department, and other departments of the City and Borough of Sitka, the DOE and its representatives, the AEA, and Sheldon Jackson College. The rationale supporting the amounts and the sequencing of the milestones and the attendant payouts was based on industry-recognized analysis dictating proportional weighted encumbrances by project progress.

It was acknowledged that front-end development of the highly complex project design, along with the necessary design coordination with the concurrent water/sewer/storm project using the same corridors, would necessitate early milestone support of project design fees, and design mobilization.

DIVISION 3 – Objectives...continued from Page 6

3. Sheldon Jackson College Work and Payment Schedule...continued from Page 6:

Likewise, it was acknowledged that project fund loading would be necessary at the beginning of the actual construction phase of the project to provide for adequate funding for kicking off the construction with its high mobilization and subcontractor involvement. Similarly, adequate funding weighting was anticipated for the end of the project, as timely payments helps insure project objectives are reached in a timely manner by the contractor.

DIVISION 4 – Description of Activities Performed

a. Pre-Construction Timeline

On November 16, 2001, the College issued a Request for Proposals for professional engineering services (civil and electrical) for design of water, sewer, storm water and electrical distribution system improvements.

An environmental assessment was prepared to EPA standards and NEPA Categorical Exclusion was received from EPA.

A conceptual design was prepared during the NEPA process that identified the new piping system sizes and routing configuration. The design included about 2,400 feet of water main, 2,800 feet of sanitary sewer main, 1,800 feet of storm drain (and minor outfall construction), 440 feet of water services, and 1,600 feet of sewer services.

The electrical element of the project was designed to convert a portion of the College's existing distribution that was 2.4 KV to a 12.47 KV system, and to rehabilitate the College's then-existing 12.47 KV system to City & Borough of Sitka standards, replace secondary feeders, and provide metering at each campus building.

A project startup meeting was held on February 14, 2002, with the selected design firm, HDR Alaska, Inc., and representatives of SJC and City & Borough of Sitka. A reconnaissance of building utility services was then completed. Finished floor elevations of buildings were surveyed on March 1, 2002.

The geo-technical investigation for soil and archeological monitoring using a combination of backhoe pits and probing with an air-track drill was completed on March 30, 2002.

DIVISION 4 – Description of Activities Performed...continued from Page 7**a. Pre-Construction Timeline...continued from Page 7**

The 50% design was delivered July 10, 2002 and design analysis meetings, with resultant design refinements, were held in July and August 2002. Participants included HDR, Inc., the City and Borough of Sitka Electric, Water, Wastewater, and Public Works Departments, and Sheldon Jackson College.

The Archeological monitoring plan was repeatedly addressed and refined, reaching completion, through coordination with the Alaska Department of Natural Resources State Historical Preservation Office in January of 2003.

The final design documents were received March 15, 2003 with all agencies and parties subsequently reviewing and approving and/or concurring and said documents.

The RFP for Construction was developed with the Bid Due date of May 17, 2003. The bids were reviewed by jurisdictional parties during the last half of May 2003. Bid Award was made on May 28, 2003. The Notice to Proceed was issued, after project negotiations with the contractor, on June 23, 2003.

b. Schedule

Schedule for Design - actual:

2/28/02	Design study report submitted	U.S. Corps of Engineers - Section 404 Permit
4/15/02	Results of geo-technical exploration received	Alaska Division of Governmental Coordination (DGC) - Coastal Management Consistency Determination
7/10/02	50% design delivered	Alaska Department of Environmental Conservation (ADEC)
1/13/03	Archeological monitoring final revised plan completed	U.S. Environmental Protection Agency (USEPA)
3/15/03	100% design documents delivered	U.S. Department of Energy (USDoE)
3/31/03	Agency review complete:	Alaska Energy Authority (AEA)

DIVISION 4 – Description of Activities Performed...continued from Page 8

b. Schedule...continued from Page 8

Schedule for Construction - actual:

5/17/03	Bids due
5/17-27/03	Bid review period: review by EPA
5/28/03	Bid Award
6/23/03	Notice to proceed
7/09/03	Ground broken
12/31/03	Electrical system substantially complete
6/15/04	Electrical system operational and provisionally accepted by CBS
9/07/04	Electrical systems punch list being fulfilled
9/30/04	Electrical close-out and finalization period begins with AEA
1/07/05	Final Report

c. Status: Project complete

- Mainline electrical, as well as conduits for telephone, cable, and fiber optics have been installed on John Brady Drive from Jeff Davis St. to College Drive, and from Sweetland Hall to Lincoln Street on College Drive.
- Conduits for telephone, cable, and fiber optics have been installed from Metlakatla Street to the Maintenance area.

DIVISION 5 – Conclusions and Recommendations

1. Design and implementation achieved stated goals.
2. Strict inspection and review criteria successfully insured that the City and Borough of Sitka Electric Department had oversight and input throughout the project. This was a key factor given that City and Borough of Sitka Electric Department is receiving the project as part of their system.
3. Coordination was achieved per design and contract guidelines for coordination of the electrical infrastructure and the water/sewer/storm infrastructure components of the larger Sheldon Jackson College Utilities Infrastructure Project.
4. Strict adherence to requirements for progressive as-builts updating tied to release of progressive Pay Requests disbursement is essential on projects such as this one, with its high degree of interconnection to existing systems, and integration with additional complex new utility systems sharing the same main easements.

The finished product ownership of the main distribution systems is held by the City and Borough of Sitka. The easement documents, as confirmed and based on the progressive as-builts requirement in the contract, clarify the long-term relationship between the City and Borough of Sitka and Sheldon Jackson College, with the confidence gained that the easements accurately relate to installation locations.

5. The Alaska Energy Authority representatives for this grant and project, Rebecca Garrett and Peter Crimp, along with Amy McCollum, were outstanding in their support and assistance during the long course of this grant and project from inception through completion. Without their guidance, professionalism, and advice, the project would not have been a success. In addition, their timely intervention in helping to retain funding for the infrastructure component replacing the planned hydroelectric renovation, was critical to whole project completion.

DIVISION 6 – Lessons Learned

1. The length of time required to coordinate all the jurisdictional agencies exceeded initial expectations. The time necessary for the initial and ongoing coordination effort for future similar projects should be included in the project time-line. Permitting time-lines for each agency based on individual agency pre-commitment for processing and for approval, should be included in the pre-construction project programming.

DIVISION 6 – Lessons Learned...continued from Page 10

2. The refusal of FERC to participate in the hydroelectric portion of the grant and the project, was both costly and distracting. The necessary coordination with FERC could have been anticipated by the grantors, and the necessary relationships could have been established in advance of project initiation. FERC's refusal to relinquish jurisdiction was damaging to project process and progress. The FERC regional office conceded that a long history of non-jurisdiction was incorrectly marred by a declaration of jurisdiction some years ago, yet they failed to overturn said jurisdiction despite ample evidence to do so.
3. The design process was more involved and lengthy than anticipated due to the necessary 'buy-in' and review process of the affected City and Borough of Sitka Electric, Wastewater, and Water Departments in addition to the main grantors, the City and Borough of Sitka, and Sheldon Jackson College.
4. Project funds were inadequate for the project as designed due to an unfavorable bidding climate. Contingency funds were inadequate to address shortfalls in funds for design components, to make up the difference. As a result, the scope of the project was affected through design scope reduction. This required scarce project funds to be utilized for re-scoping, review, and management.

Contingency variables must be increased in similar future rural Alaska projects to address specific variables such as unfavorable bidding environments, local cost increases for materials, materials delivery and labor.
5. There must be an agreed upon financial review and program analysis for both parties in a partnered project such as this. The computer programs, the reports, and the regular dialoguing between financial departments must be standardized.
6. The design principal for the project was distracted from the project by serious personal concerns from the second week of the actual construction project onward. This seriously affected the on-site project manager's ability to coordinate the timely processing of contractor questions, materials questions, RFI, RFP, and Change Order reviews, and changed conditions.

END OF SECTIONS 1-6

Please refer to separate attachment for final project photo set showing finished conditions (Section 7).

Respectfully submitted,

Fred Knowles, Project Manager
Sheldon Jackson College
Sitka, Alaska