

PROJECT ASSISTANCE COMPLETION REPORT

Project Title: Cumberland Hydroelectric
 Project Number: 538-0091
 Funding Period: 06/27/84 - 03/31/89
 LOP Funding: ESF Grant \$500,000; ESF Loan \$7,500,000
 Implementing Agency: St. Vincent Electricity Services Ltd. (VINLEC)
 PACD: Original 09/30/88; Revised 03/31/89

1. Project Purpose

To meet current and future energy demands of the industrial, tourism, and domestic sectors in St. Vincent and assure that these needs continue to be met on a self-sustaining basis by co-financing a program of activities which will expand energy production and which will contribute to the long-term financial viability of the electric utility.

2. Summary of Inputs

The scope of the overall project was the construction of electrical generation capacity in the Cumberland Valley, including all associated hydraulic facilities, transmission of the electrical energy to the Kingstown area and inter-connection of the new transmission with the existing electrical system to allow for the distribution of the energy.

AID's input into the overall scope of project work consisted of:

- (a) The primary civil works associated with the generation facilities. These civil works included:
 - construction of four gravity weirs and intake structures including sedimentation tanks;
 - preparation of approximately 7 km. of pipeline route, including earthworks and bedding for woodstave pipe and concrete supports and anchor blocks for steel pipe;
 - construction of three powerhouse structures including imbedment of generation equipment (Cumberland 1, 2 and 3);
 - provision and maintenance of project infrastructure including housing, offices, communications and vehicles for the Engineer, and project access roads.
- (b) Supply and installation of overhead hoists in the powerhouses.
- (c) Supply and installation of manual and motorised gates for the various intake and pipeline inlet structures.
- (d) Construction of five houses for use during the project and accommodation for operating staff.

- (e) Construction of measuring weirs and rain gauge and staff gauge stations and supply of hydrometric measuring equipment.
- (f) Construction of laundry facilities and bath-houses for the Cumberland Valley communities to replace the use of the river.
- (g) Supply of miscellaneous electrical equipment for inter-connections to the existing electrical system.
- (h) Rehabilitation of the existing road up the Cumberland Valley.
- (i) Provision of soil conservation measures in the Cumberland Valley and preparation of legislation to prevent exploitation of this land.

Inputs by other co-financiers were:

- IDA - Funding of the A&E consultants and the project manager. Funding for the Hydroelectric Studies.
- CIDA - Funding for the supply and installation of the pipeline and electrical and mechanical equipment.
- EIB - Funding for the supply and installation of the turbines and generators.

A summary of the projected final AID project expenditures is given below:

	<u>Budget</u> (\$000)		<u>Projected Expenditure</u> (\$000)	
	<u>Loan</u>	<u>Grant</u>	<u>Loan</u>	<u>Grant</u>
Watershed Mgmt.	0	\$470	-	398
Civil Works	6,500	-	5,808	-
Contingencies	1,000	30	615	30
	<u>7,500</u>	<u>500</u>	<u>6,423</u>	<u>428</u>

3. Project Implementation and Project Status

The main civil works contract was awarded to CLK Contracting Company on July 4, 1985 for a contract price of \$4,599,737. This was about \$2.0 million lower than the estimate and the next lowest bid. The completion certificate for the whole of the works with a number of outstanding deficiencies and clean-up works was issued on February 14, 1988, which was the original contractual completion date. The Contractor completed all deficiencies by end of April, 1988. The final cost at completion is \$5,312,000. The increase in contract cost is attributed mainly to the following factors:

- higher than anticipated quotations for provisional sum work items covering the provision of housing and laboratory equipment;
- increased requirement for structural fill due to existing foundation conditions under the Convent storage tank;

- increased quantities of higher strength concrete required by final design of hydraulic structures;
- increased quantities of structural and miscellaneous steel required by final design loading specifications;
- increased quantities and volumes of concrete pipe supports and anchor blocks resulting from revisions in split between woodstave and steel pipe lengths.

Although the final completion certificate was issued on the contractual date, the scheduled completion dates for the various sections of the work were not attained, as indicated below:

<u>Section</u>	<u>Contract Completion Date</u>	<u>Actual Completion Date</u>
Cumberland 1 Works	January 30, 1987	June 12, 1987
Cumberland 2 Works	May 31, 1987	October 12, 1987
Cumberland 3 Works	January 30, 1988	December 15, 1987
Whole of the Works	February 14, 1988	February 14, 1988

The five-month delays in the completion of each of the two first sections led to delays in the work programs and commensurate claims for damages from the other main contractor. The rehabilitation of the Cumberland Valley road was taken out of the main civil works contract when a reasonable cost and schedule for having the work done by the main civil works contractor could not be negotiated.

In April, 1988, the civil works contractor submitted a claim for additional costs of \$2,000,000. The claim is still being reviewed by the A&E consultants.

A contract for the supply of powerhouse hoist equipment was awarded to Essex Exports Inc., on March 6, 1986 for a contract price of \$59,204. The final costs at completion of this contract were \$41,962.76. The decrease was due to the decision not to utilize the on-site services of a manufacturer's representative.

A contract for the supply of gates was awarded to Construction Products International on March 5, 1986 for a contract price of \$70,895. The final costs at completion of this contract were \$72,015.16. The increase was due to ordering of additional equipment, including an additional motorised operator.

Purchase Orders for the supply of miscellaneous electrical equipment were issued through EBASCO (an IQC purchasing agent) to three suppliers in December 1987: Ardry Trading Co. Inc. for \$13,667.94; Ferranti-Packard for \$56,150; and South Wales Switchgear Ltd. of U.K. for \$146,475. Because of delays in defining the technical specifications of the equipment and procedural delays in obtaining waivers, the equipment from

South Wales Switchgear Ltd. could not have been delivered before the original PACD of September 30, 1988. An extension of the PACD to March 31, 1989 was therefore obtained to allow delivery of this equipment.

The construction and furnishing of five staff houses was done through Fixed Amount Reimbursement Agreements with the St. Vincent Electricity Services Ltd. (VINLEC) for a total of \$203,704. These houses were completed by JULY, 1986. The construction of two bath-houses and eight laundry facilities was carried out through a FAR Agreement with VINLEC for \$50,000. These facilities were completed in October, 1987.

On August 5, 1987, approval was given for VINLEC to undertake the construction of measuring weirs and staff gauge and rainfall gauge stations and the procurement and installation of hydroelectric measuring equipment for a total reimbursed cost of \$106,000. The procurement of the equipment was complete by August 1988, however, at the PACD of March 31, 1989, only 78% of the civil works was completed. This project component will require further AID monitoring to insure successful completion.

The rehabilitation of the Cumberland Valley Road was done through a FAR Agreement with VINLEC for \$350,048. The work was completed in February, 1989.

Soil conservation measures in the Cumberland Valley were completed by the St. Vincent Agriculture Department prior to the PACD. The draft legislation for a national forestry policy which includes legislation for legal protection of the Cumberland watershed was prepared through a PSC and forwarded to the Legal Department for presentation to Cabinet, as stipulated in the Project Agreement. The total cost of these two project components is \$398,000.

4. Major Project Outputs

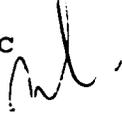
<u>Planned</u>	<u>Actual</u>
a) End of Load Shedding	Accomplished
b) 50% of Electricity Generated thru Hydro	Accomplished
c) Line Losses Reduced to 15%	Reduced to 12%
d) 3.4 MW Generating Capacity Installed	Accomplished
e) 100 Acres of Trees Planted	Accomplished
f) Eight Persons Trained	Accomplished

5. Lessons Learned

- (a) The GOSV took a long time to obtain "Right of Way" for sections of the water intake pipeline. This caused the contractor to circumvent certain areas for various periods of time. The time ranged from two weeks to six months. In the future longer construction lead times should be scheduled.
- (b) All off-shore purchasing of materials took an average of six months before the actual delivery on the island.

- (c) The settlement of encroachment and/or land damage claims took a long time to negotiate a satisfactory payment.
- (d) A&E Consultants should be retained for all work undertaken by Force Account (e.g. FAR Agreements) for supervision and certification of cost and payments. This will insure speedy and efficient completion of the work.

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Clearances:

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