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CLASSIFICATION

PROJECT EVALUATION SUMMARY (PES) — PART I

Report Symbol U-447

1. PROJECT TITLE	2. PROJECT NUMBER	3. MISSION/AID/W OFFICE
Semarang Steam Power Plant	497-0204	Jakarta

4. EVALUATION NUMBER (Enter the number maintained by the reporting unit e.g., Country or AID/W Administrative Code, Fiscal Year, Serial No. beginning with No. 1 each FY) FY79-18

☐ REGULAR EVALUATION ☐ SPECIAL EVALUATION

5. KEY PROJECT IMPLEMENTATION DATES			6. ESTIMATED PROJECT FUNDING	7. PERIOD COVERED BY EVALUATION
A. First PRO-AG or Equivalent FY 11/71	B. Final Obligation Expected FY 11/71	C. Final Input Delivery FY 9/30/79	A. Total $75 million B. U.S. $19.7 million	From (month/yr.) 3/78 To (month/yr.) 4/79 Date of Evaluation Review 4/27/79

6 p.

8. ACTION DECISIONS APPROVED BY MISSION OR AID/W OFFICE DIRECTOR

* A. List decisions and/or unresolved issues; cite those items needing further study. (NOTE: Mission decisions which anticipate AID/W or regional office action should specify type of document, e.g., airgram, SFAR, PIO, which will present detailed request.)	B. NAME OF OFFICER RESPONSIBLE FOR ACTION	C. DATE ACTION TO BE COMPLETED
* Final evaluation of this project will be held in abeyance until resolution of steam leaks. ~~See addendum attached~~.		

Clearances:
PTE:REDavis
PTE:JAWright
PRO:RCohen
PRO:RZimmerman
DMF:RBourquein
DD:WGBollinger

Ir. Moh. Mochtar, Dep. Dir. Thermal Technique PLN Pusat
Ir. B. Irawan Sapardi, Thermal Design, PLN Pusat
Ir. H. Kullit, Constr. Budget, PLN Pusat
Mr. A.M. Razovsky, P.E., PLN Advisor
Mr. J.D. Dyer, Acting Proj. Manager, Black & Veatch, Int.

5-4-79

9. INVENTORY OF DOCUMENTS TO BE REVISED PER ABOVE DECISIONS

☐ Project Paper ☐ Implementation Plan e.g., CPI Network ☐ Other (Specify)
☐ Financial Plan ☐ PIO/T
☐ Logical Framework ☐ PIO/C ☐ Other (Specify)
☐ Project Agreement ☐ PIO/P

10. ALTERNATIVE DECISIONS ON FUTURE OF PROJECT

A. ☐ Continue Project Without Change
B. ☐ Change Project Design and/or ☐ Change Implementation Plan
C. ☐ Discontinue Project

11. PROJECT OFFICER AND HOST COUNTRY OR OTHER RANKING PARTICIPANTS AS APPROPRIATE (Names and Titles)

See above

12. Mission/AID/W Office Director Approval

Signature R. Cohen
Typed Name Thomas C. Niblock
Date 5/26/79

AID 1330-15 (3-78)

SEMARANG STEAM POWER PLANT - PES

13. SUMMARY - This project provides for the installation in Semarang of an oil-fired steam-electric power plant, consisting of 2 X 50 MW turbine-generating units with related equipment, and for the training of personnel in operation and maintenance of the plant.

The total projectis 99.9% complete. A steam leak in turbine No. 2 has delayed acceptance of that unit for commercial operation. But for this, the plant would have been dedicated in December 1978. Unit No. 1 was started for test in October 1978, and has been on line since November. No. 2 was started in December 1978 and has been on line since March 1979. Both units were accepted for operation (not completion) pending satisfactory sealing of the steam leaks, and stabilization of the combustion system.

14. EVALUATION METHODOLOGY - Site inspections have been made regularly; however, monthly reports, files, and discussions with Beneficiary (PLN), Engineer (BVI), and Contractor (MWK-B) have been the major sources of information.

15. EXTERNAL FACTORS - As reported in the last PES (April 1978) the major factor, external to this project, which caused concern for test-loading the plant was the lack of electric distribution load in the Ketenger and Tuntang areas of Central Java. After completion of the rehabilitation projects of those two areas, which were financed by AID, (and also by KFW, West Germany), PLN was faced with insufficient funds to connect the customers to the new system. The 50,000 KW load anticipated consequently is not yet available; although PLN has recently received a Japanese loan and is now in the process of transferring all customers to the new system. As a result of not having this load available, plans were altered, and by carefully planned switching the start-up crews were able to run tests for maximum loads, separately, and less-than-nameplate loads for the two units operating in synchronism, instead of testing both for coincidental peak loads simultaneously. There is sufficient load to operate the plant efficiently with one unit on stand-by until the delayed loads are realized.

16. INPUTS - AID is financing $19,700,000 for the foreign exchange component of the project for design, engineering, supervision of construction and procurement of major equipment. Construction

contracts were funded from other GOI foreign exchange sources. The submarine oil pipeline was financed by a French firm, backed by the Govt. of France. Total cost of the project is now estimated to be approximately $75,000,000.

Although Engineer and Construction Contractor have not had the best of working relationships, the friction has smoothed out considerably, and cooperation has been noticeably improved since June, 1978.

17. OUTPUTS - Slippage from a tentaive "start-up" date of May 1978 to October, 1978 was due to failure of the condenser intake tunnel under test, just prior to "start-up". Unit No. 1 was accepted for commercial operation in November, but Unit No. 2 developed steam leaks from the turbine and had to be shut down for a thorough inspection. GE experts were called in for advice and corrective action. After inspection, various adjustment were made to permit satisfactory operation, but a very slight leak remained. On the recommendations of GE and BVI, PLN agreed to operate the unit until the first scheduled major overhaul (September or October, 1979), at which time proper equipment for machining the surfaces involved would be brought to Semarang by GE under an extended warranty, and GE would be responsible for the unit meeting contract specifications. A week prior to this evaluation review, a steam leak was observed on Unit No. 1. Pressure is now being brought to bear on GE to bring in equipment and personnel to seal the leaks immediately.

18. PURPOSE - The specific purpose of the project is to increase by 100 MW the power supply, primarily to Central Java, and secondarily to West Java thru interconnection facilities. This additional capacity will be sufficient to provide power to meet the load growth thru 1982, when 200 MW Unit No. 3 is scheduled to go on line.

The Semarang Power Plant has the same priority with GOI and PLN as the power plant under construction in Jakarta. Both have top priority. When it was determined that the loan would not cover the construction contract, pipeline, and other items, GOI approved financing from other sources for those items, and for overruns. USAID, PLN, and the GOI are of the same accord in their concepts of the Project Purpose, which is to establish a firm source of power in the fast-growing Central Java area. This project is one of the major plants to make up the various sources of power supply as determined in the 5-year and 10-year plan of PLN. Besides the Semarang and Jakarta steam plants, a nuclear plant in Central Java is envisioned to be built within

20 years. The east terminal of the proposed 500 KV EHV line from West Java to East Java will be the 1600 MW oil-burning Gresik steam plant near Surabaya. The west terminal will be the 3100 MW coal-burning Suralaya steam power plant.

Revenue from power produced by the plant will provide for reinvestment in additional generation facilities, maintenance, operation and depreciation.

19. GOAL/SUBGOAL - The sector goal of PLN and GOI is to establish sufficient generation capability, together with transmission and distribution facilities, to give all of Java a reliable, interconnected system to serve every existing and potential electric customer at a reasonable rate.

PLN has made complete long-range plans for accomplishing this goal. Plans included Semarang Steam Plant, Jakarta Muara Karang Steam Plant, Gresik Steam Plant, Suralaya Steam Plant, Surabaya, Semarang, and Jakarta interim gas turbine generating plants, some potential hydro, and possibly the aforementioned nuclear plant in East Java, all to be interconnected thru 150KV & 500 KV transmission.

Semarang Power Plant is one of the major projects essential to the plan. Provision of the generating capacity at Semarang for the bulk power to be delivered through the network will, in turn, provide for greater industrial, commercial, rural and urban usage which is a requisite for economic development of the area. Prime case in point is the Central Java Rural Electrification Project being financed by AID. Nearly 200,000 new customers, consisting of some of the poorest farmers in the area will be able to realize the benefits of electricity at rates they can afford.

20. BENEFICIARIES - This project was justified on the basis of rate-of-return as well as indirect benefits to the poor. Revenue, as stated previously, will go for repayment of the loan, expansion of generation facilities, operation and maintenance. Naturally, the people of Central Java will benefit from an improved economy resulting from this and related planned power projects.

The customers (approximately 200,000) to be served from the proposed rural electrification project consist of the poorer population in the rural sections throughout Central Java. These people will be able to receive electricity supplied from the Semarang Power Plant. Another direct benefit has been that of on-the-job training for over 100 employees, who will be on the permanent PLN payroll.

The estimated internal rates of return at the time the Project Paper was submitted were computed on the basis of four sample tariffs from 1.86 ¢ KWH (average) to 2.72 ¢ KWH. The rate of return varied from 6% at the lower cost to 13.7% at the higher. It is apparent that the rate of return depends on tariff, and assuming PLN maintains rates corresponding to escalation of costs, the rate of return will be in the area of 10 or 12%.

21. UNPLANNED EFFECTS - A side result, which may not have been anticipated, was the use of the PLN port facilities at Semarang which had been completely rebuilt and dredged for the unloading of large ships carrying the heavy power plant equipment. After PLN had the dock, crane, etc. ready (the dock is on PLN plant property) the port officials decided to make use of the PLN dock. This relieves harbor delays,substantially, but so far as can be determined, PLN receives no monetary benefit up to this time for use of their facilities. Probably PLN considers this use of its facilities a necessary good-will gesture for the area.

As to effect on social structure, health, etc., the project is only a part,but a major part, of the overall electrical supply, which gives the entire economy the means for industrial growth and increased productivity and eventually delivery of improved health and education sources to rural areas in Java.

22. LESSONS LEARNED - While much of the delay on this project was caused by contractor management, the responsibility of the Engineer cannot be overlooked. As supervisor over construction, the Engineer should have taken proper action to have the inadequacies mentioned in the reports corrected early in the project and pressure brought to bear on the Contractor to get proper personnel and equipment on the job. Also, the hold-up on the project to make a generation study after beginning of tendering was a mistake. The request was made December, 1973 (by AID). This was the time when full effect of the energy crisis erupted, with the result not only of a 5-month delay, but a jump in cost.

Finally, the chronic problem with clearing material and equipment thru customs is ever-present on all overseas projects of a capital nature. The delays are in some cases extremely critical, and it is highly desirable to endeavor to arrive at a workable arrangement to expedite clearance of material and equipment for future projects.

23. SPECIAL COMMENTS/REMARKS - (a) With the exception of Egypt, Syria, and Jordan, unless AID's direction mandate is altered,

power plant projects of this type will be funded in the future by other financial agencies, so the results do not directly affect future AID projects; however, this is a typical power generation project, which would have the same type design, standards, method of construction, etc. that would be experienced in any LDC, or for that matter in countries that are fairly well-developed. In other words, the make-up of a thermal power plant project has little deviation in overall planning and implementation guidelines. The universal practice is to try to design and construct the most efficient plant under the parameters given in the optimum time, but the country in which the project is located does affect problems of transportation, customs clearing, obtaining competent personnel, and obtaining satisfactory working and living conditions. The problems encountered because of Indonesian customs clearing and untrained workers are not peculiar to Indonesia, and these conditions are generally taken into consideration on all projects of this type in LDC's.

The sad, and very serious, situation which has developed is the apparent unreliability of American know-how on this project.

(b) Overall assessment of project performance.

Unsatisfactory		Satisfactory			Outstanding	
1	2	3	4	5	6	7
			X			

Narrative statement explaining ranking:

The delays at the start of the project were results of many unusual circumstances, not the least of which was the unparalled oil situation that affected the prices of all material and equipment, which in turn resulted in the borrower having to farm out portions of the project to other donors that AID. Delays toward the end of the project were caused by the Engineer's design error of the intake tunnel and later by faulty workmanship or design of the turbine by the supplier. While the units have been tested to 104% of nameplate, the project can only be considered barely satisfactory pending certification that the plant meets performance specifications after the steam leaks are sealed.

PTE:JAWright:jm:6/4/79