

PROJECT EVALUATION SUMMARY

AID/W

4970204 (5)

PO-AAA-773-E1

1. Mission or AID/W Office Name Jakarta			2. Project Number 497-0204		
3. Project Title Semarang Steam Power Plant <span style="float: right;">9p.</span>					
4. Key project dates (fiscal years) a. Project 11/3/71 Agreement Signed			b. Final 11/3/71 Obligation		c. Final 9/30/79 input delivered
6. Evaluation number as listed in Eval. Schedule 78-11			7. Period covered by this Eval. From: 11/71 To: 3/78		5. Total U.S. funding - life of project \$19.7 million
			8. Date of this Evaluation Review 3/22/78		8. Date of this Evaluation Review 3/22/78
9. Action Decisions Reached at Eval. Review, including items needing further study (Note--This list does <u>not</u> constitute an action request to AID/W. Use telegrams, airgrams, SPARS, etc., for action)  Explore with PLN the desirability and feasibility of conducting a base line survey that will enable a post project evaluation of impact on development of new industry and employment generated thereby.			10. Officer or Unit responsible for follow-up  Jack A. Wright		10. Date action to be completed  To be determined after consultation with PLN.

12. Signatures:		Project Officer		Mission or AID/W Office Director	
Signature	<i>Jack A. Wright</i>	Signature	<i>Thomas C. Niblock</i>		
Type Name	Jack A. Wright	Typed Name	Thomas C. Niblock		
Date	4/25/1978	Date	4/27/78		
Evaluation Officer: RF Zimmerman <i>RFZ</i>					

13. **SUMMARY** - Summarize in about 200 words the current project situation, mentioning progress in relation to design, prospects of achieving purpose, major problems encountered, etc.

The total project is 92% complete as of March 1, 1978. General Construction is 98% complete. The submarine pipe line to bring oil to the plant fuel tanks is only 15% complete, which is the reason for the difference between total project completion and general construction. Start-up for 50MW unit No. 1 is now scheduled for May 1, 1978, and No. 2 for two weeks later. Commercial operation is estimated by the Contractor to be within one week of initial start-up, but the Engineer believes a month after start-up will be a more realistic time for commercial operation of each unit. Judgment of the AID office is that it will be July before the plant is actually in commercial operation, and September before the project will be physically complete. With the project nearing completion, the problems have dwindled to (a) a smattering of parts missing or damaged; (b) a reported inadequacy of the construction contractor's personnel and equipment, (c) the usual customs difficulties, and (d) the construction of the fuel submarine pipe line.

14. **EVALUATION METHODOLOGY** - Describe the methods used for this evaluation, i.e. was it a regular or special evaluation? was it in accordance with the Evaluation Plan in the PP with respect to timing, study design, scope, methodology and issues? What kinds of data were used and how were they collected and analyzed? Identify agencies and key individuals participating and contributing.

Site inspection trips have been made periodically; however the review depends mainly on information from files and discussions with Beneficiary (PLN), Engineer (BVI), and Contractor (MWK-B). From start of project to present, there has been a turn-over of 5 AID electrical engineers connected with the project; so contact and personal relationships between AID engineers and implementers have not had continuity.

15. Documents to be revised to reflect decisions noted page 1 (other side:)

- Project Paper (PP)    Logical Framework    CPI Network  
 Financial Plan    PIO/T    PIO/C    PIO/P    Project Agreement  
 Other  
 This evaluation brought out ideas for a new project --  
    • Project Identification Document (PID) will follow.

16. **Evaluation findings about EXTERNAL FACTORS - Identify and discuss major changes in project setting which have an impact on the project. Examine continuing validity of assumptions.** - Probably the one external factor which has had the most speculative influence on initial plant operation is the electric distribution load of the Ketenger and Tuntang rehabilitation projects, financed by AID. Anticipated load of these 2 projects was approximately 50,000 KW, scheduled to be served at time of the completion of those projects. Both are complete so far as the AID loans are concerned, but service connections (to be financed by PLN local budget) were held up due to lack of funds; so that only a fraction of the load is going to be available when the Semarang Power Plant is first operated. This, along with reluctance of some heavy self generating industrial consumers to connect to PLN has caused concern as to loading the Semarang Plant for performance tests. Now, it has been foreseen that instead of testing both units simultaneously for coincidental peak load, tests will be run for peak capability of each, separately, and simultaneous tests will be run for loads less than name-plate. Results will give sufficient certification data for full performance guarantees, but had the load of Ketenger and Tuntang been available, there would have been no need to deviate from normal procedures. There will be sufficient load to operate the plant efficiently, using one unit as stand-by or spinning reserve until the delayed loads are realized, which should be within 12 months. (Continued)
17. **Evaluation findings about GOAL/SUBGOAL - For the reader's convenience, quote the approved sector or other goal, (and subgoal, where relevant) to which the project contributes. Then describe status by citing evidence available to date from specified indicators and by mentioning progress of the other projects (whether or not U.S.) which contribute to same goal. Discuss causes--can progress toward goal be attributed to project, why shortfalls?**
- 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, Surabaya, Semarang, and Jakarta interim gas turbine generating plants, some potential hydro, and possibly a nuclear plant in East Java, all to be interconnected thru 150 KV and 500 KV transmission. Semarang Power Plant is one of the major projects essential to the plan. By providing the generating capacity at Semarang for the bulk power to be delivered through the network, This in turn will provide for greater industrial, commercial, rural and urban usage which is a prime requisite for economic development of the area. Prime case in point is the Central Java Rural Electrification Project just authorized by AID. Nearly 200,000 new customers, consisting of some of the poorest farmers in the area will be able to realize for the first time the benefits of electricity at rates they can afford.

CONTINUATION

16. which should be within 12 months. Unfortunately, the connection charges have been extremely high. This was an additional deterrent to transfer. The funds for the actual conversion were not obtained until just recently. (From a Japanese loan). Within two years, a transmission connection will be made at Tegal for the West Java interconnection, at which time power can be dispatched to Cirebon and Bandung. This will absorb the surplus power, but will be too late for the initial performance tests.

**18. Evaluation findings about PURPOSE:**

**(a) Quote the approved project purpose. Cite progress toward each End-of-Project Status (EOPS) condition. When can achievement be expected? Discuss causes of progress or shortfalls.**

The specific project purpose is to provide an increase of 100 MW power supply to (1) Central Java and (2) secondarily to West Java thru interconnection facilities, which will be sufficient to meet the load growth thru 1982, when 200 MW unit # 3 will go on the line. As stated under (13) we expect achievement of this purpose to occur by September 1978, approximately 16 months behind schedule. The main causes for this delay are discussed in section 19 of this report.

**(b) What is current priority of Project with the GOI? Do USAID and GOI share common perception of Project Purpose? How is this priority and common perception manifest in project implementation?**

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, pipe line, 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 concept 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 East Java is envisioned to be built within 10 years and will be the east terminal of the proposed 500 KV EHV line from W. Java to East Java.

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

19. **Evaluation findings about OUTPUTS and INPUTS - Note any particular success or difficulties. Comment on significant management experiences of host contractor and donor organizations. Describe any necessary changes in schedule or in type and quantity of resources or outputs needed to achieve project purpose.**

AID financed \$19,700,000 for foreign exchange for design, engineering, supervision of construction, and most of the procurement, but the French funded the submarine pipeline and the general construction contract was funded from GOI foreign exchange sources. Total cost of the project is \$62 M.

(There seems to be a rather poor working relationship between MWK-Black (Contractor) and BVI (Engineer). The Engineer consistently claimed the Contractor had inadequate equipment, supervision and staff, which accusation was denied by the Contractor. The contract itself was not signed until September, 1975, and mobilization was completed in March, 1976. Target date for commercial operation slipped from May 1977 to May 1978 in these 2 years of construction. It would seem the May 1977 date must have been made when the Engineer assumed a contract could be negotiated within a month of the bid. (February 1975). Considering the late start, a start-up date of January 1978 would have been reasonable with adequate equipment, staff and smooth customs clearance, and with no shortage of material. The slippage between January and May can definitely be attributed to equipment break-down, very poor clearance thru customs, and shortage of parts. This amount of slippage is not unreasonable for this type of project.

20. **Evaluation findings about UNPLANNED EFFECTS - Has project had any unexpected results or impact, such as changes in social structure, environment, health technical or economic situation? Are these effects advantageous or not? Do they require any change in plans?**

A side result, which may or 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 PLN. 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.

21. Does this project have any impact on the five development criteria outlined in Section 102(d) of the FAA (i.e.: a. increasing agricultural productivity through small farm labor intensive agriculture; b. reduce infant mortality; c. control population growth; d. promote greater equality in income distribution; and e. reduce rates of unemployment and underemployment). Explain.

The project employed several hundred Indonesians during construction, and therefore temporarily reduced to some extent unemployment, and when in operation, a force of approximately 100 employees will be added to PLN's payroll in Semarang. As for the increase of agriculture production, reduction in infant mortality, and control of population growth, the benefits would be of a very small incremental nature, and only indirectly. At this time it is impossible to predict the impact on employment that new industries might have but we expect that it will be considerable. Perhaps arrangements should be made with PLN to have a post project evaluation 2 years after completions that foresees specifically employment from generation of electric power.

22. Who are the direct and indirect beneficiaries of this project? (Identify, describe nature of benefits and number of those benefiting). Finally, do the benefits justify the costs?

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 to be served from the proposed rural electrification project consist of the poorer population in the rural sections throughout Central Java. These people will benefit directly from the Semarang Power Plant which will make available to them electric energy at a price they can afford. The laternative would be installation of isolated diesel generators for each of the six areas included in that project, which would have been more expensive and would require higher rates. 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%.

23. **CHANGES IN DESIGN OR EXECUTION** - Explain the rationale for any proposed modification in project design or execution which now appear advisable as a result of the preceding findings (items 16 to 20 above) and which were reflected in one or more of the action decisions listed on page 1 or noted in Item 15 on page 2

No major changes in design were necessary, but for the on-coming 200 MW addition modifications will be required to match deck elevations. Although the Engineer anticipated an extension of the plant at the time the plans were drawn, another 50 MW unit was considered to be the size which would be added. The 200 MW unit was proven in on a revised load growth forecast. (World Bank is funding this third unit).

24. **LESSONS LEARNED** - What advice can you give a colleague about development strategy -- e.g., how to tackle a similar development problem or to manage a similar project in another country? What can be suggested for follow-on in this country? Similarly, do you have any suggestions about evaluation methodology?

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 inadequacies mentioned in the reports should have been 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. This was requested in December, 1973 (by AID) and finished in February 1974. AID gave permission to resume negotiations on the equipment tenders, April 1974. This was the time when full effect of the energy crisis erupted, with the result not only a 5-month delay, but a jump in cost. Although not an actual part of the power plant project, there is a lesson to remember in that "external factor" Ketenger/Tuntang Distribution. Had the AID portion included the connection/conversion phase as well as the construction, that \$40,000,000 investment would now have the load that will take another year or two to connect. Also, 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 try to get some workable arrangement to expedite clearance.

25. (a) **SPECIAL COMMENTS or REMARKS (For AID/W projects, assess likelihood that results of project will be utilized in LDC's)**

With the exception of Egypt, Syria, and Jordan, unless AID's direction mandate is altered, power plant projects of this type will be funded 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 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 due to 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.

(b) Overall assessment of project performance.

Unsatisfactory		Satisfactory			Outstanding	
1	2	3	4	5	6	7
				X		

**Narrative statement explaining ranking:**

The problems have, for the most part, been overcome. The delays at the start of the project were results of many unusual circumstances, not the least of which was the unparalleled 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 than AID. The workmanship is satisfactory. The project on the whole compares favorably with similar projects in other countries and is in our judgement above average; though not outstanding. Fortunately, the start-up earlier than May would not have given PLN any great advantage, for reasons given in 16.