



REPORT TO THE CONGRESS

Need For Improvements In The Management System To Assess Performance Of AID-Financed Projects In India

B-146749

Agency for International Development
Department of State

*BY THE COMPTROLLER GENERAL
OF THE UNITED STATES*

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COMPTROLLER GENERAL OF THE UNITED STATES
WASHINGTON D C 20548

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To the President of the Senate and the
Speaker of the House of Representatives

This is our report on the need for improvements in the management system to assess performance of Agency for International Development-financed projects in India. 57

Our review was made pursuant to the Budget and Accounting Act, 1921 (31 U.S.C. 53), and the Accounting and Auditing Act of 1950 (31 U.S.C. 67).

Copies of this report are being sent to the Director, Office of Management and Budget, the Secretary of State, and the Administrator, Agency for International Development.

A handwritten signature in cursive script that reads "James B. Stacks".

Comptroller General
of the United States

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ABBREVIATIONS

AID	Agency for International Development
GAO	General Accounting Office

D I G E S T

WHY THE REVIEW WAS MADE

From 1951 through 1970 the Agency for International Development (AID) made dollar loans totaling \$712.3 million and local currency loans equivalent to \$394.9 million for capital projects in India.

This assistance was concentrated in the areas of electric power, manufacturing, and railways. The General Accounting Office (GAO) believes that the Congress is interested in the success of these projects, the achievement of project goals, and AID's actions when goals and objectives are not met.

This review included all capital projects involving AID assistance of \$5 million or more which had been completed at least 1 year but not more than 10 years (except for loans to assist India's automotive industry). There were 19 such projects to which loans had been made totaling \$687.4 million--\$418.1 million and the equivalent of \$269.3 million in local currency.

FINDINGS AND CONCLUSIONS

AID has only recently established a management system for obtaining production and other data necessary to ascertain whether anticipated levels of production and utilization are being achieved and to identify and analyze reasons for shortfalls. This system is directed only to projects to be completed in the future.

GAO believes, therefore, that AID has been limited in its ability to identify output problems quickly and assess the effectiveness of its assistance and has lacked information on which to propose and to negotiate corrective action with appropriate Indian agencies. (See p. 32.)

Information obtained and conclusions reached in analyzing output problems on completed AID-financed projects in India could serve a useful purpose in reviewing proposals for future projects. Such efforts are in GAO's opinion called for under the provisions of section 611(e) of the Foreign Assistance Act of 1961, as amended.

This section provides that no assistance be furnished for a capital project estimated to cost \$1 million or more until the head of the agency has assured himself that the country involved is capable of maintaining and using

the project, after taking into consideration the maintenance and use of projects previously financed by the United States (See pp 6 and 32)

Expected power production on most power projects financed by AID and reviewed by GAO generally is not being achieved. Nine AID-financed thermal power plants are operating at an overall average of 71 percent of anticipated project production. One AID-financed hydroelectric power plant was meeting its anticipated production goal and a second plant was meeting 75 percent of its goal (See pp 9 to 11)

Reasons for not achieving power-output goals included (1) lack of transmission lines, (2) inadequate coal production in a mine supplying one particular power plant, (3) maintenance and breakdown problems, (4) difficulty in obtaining replacement parts, (5) labor difficulties, and (6) insufficient customer demand (See p 15)

AID has not established or adopted definite standards for utilization of diesel-electric locomotives. Informal standards that AID officials have given GAO, compared with available usage data, indicate that the locomotives financed by AID are not being fully used (See pp 28 to 30)

GAO's review of other capital projects showed that production at an AID-financed fertilizer plant was substantially less than had been anticipated but that goals were being met for an iron-ore-processing facility, a tire cord plant, and several rupee-financed projects under section 104(e) of Public Law 480 (See pp 24, 27, and 31)

Failure to meet established goals does not mean that the U S -financed projects are not making important contributions to the economic development of India. On the contrary, the projects clearly have made substantial contributions to the Indian economy and AID-financed power plants account for about one third of India's electric generating capacity. The principal point is that greater effectiveness could be achieved, in many instances, where a management system would assist in identifying weaknesses and problem areas.

RECOMMENDATIONS OR SUGGESTIONS

GAO is making no recommendations at this time, primarily because of the revised and more definitive monitoring requirements adopted by AID in March and August 1971 and because of the highly unsettled role that future U S assistance will play as a result of recent events on the troubled Asian subcontinent.

AGENCY ACTIONS AND UNRESOLVED ISSUES

AID's comments, dated February 17, 1972, on a draft of this report are included as appendix I. GAO's views on these comments are included as appendix II. There are no specific unresolved matters involving any one of the projects reviewed that require immediate remedial action.

In March 1971 (after the start of the GAO review), AID established a requirement for a loan completion review report. The review report is to be made after the loan's final disbursement and is to contain recommendations for future monitoring. AID's manual order, revised in August 1971, requires that recommended monitoring be limited to the original objectives of the loan and be focused on only those objectives not met when the loan completion report is made. (See pp 6, 7, and 33)

GAO recognizes that enough time has not elapsed for full implementation of the recently revised manual order. Therefore an evaluation of the effectiveness of these monitoring provisions is not practicable at this time. The revised order, however, does not apply to previously completed projects discussed in this report. For projects to be completed in the future, monitoring apparently will cease when basic project objectives have been met, even though future production problems may occur.

MATTERS FOR CONSIDERATION BY THE CONGRESS

The Congress has expressed considerable interest in U S economic assistance, particularly in the large amount allocated to India, which is a principal recipient of U S aid, and in the results being achieved, as discussed in this report.

CHAPTER 1

INTRODUCTION

To help India maintain its independence under democratic institutions and to achieve economic growth, the United States has provided development aid on a massive scale. U.S. economic assistance helps India mobilize its skills and resources for more rapid development. The United States encourages economic development by financing imports of agricultural and industrial goods and equipment and by financing selected capital projects.

Agency for International Development loans for capital project assistance in India from 1951 through 1970 have amounted to about \$712.3 million and the equivalent of about \$394.9 million in U.S.-owned rupees. This assistance has been concentrated in the public sector with emphasis on electric power, manufacturing plants, and the railway system. These projects undoubtedly have contributed greatly to India's developing economy.

India's power-generating capacity has increased from about 2 million kilowatts in 1951 to its present level of about 16 million kilowatts. Although India and other countries provided most of the investment in power facilities that made this increase possible, the United States was the largest external contributor. U.S. assistance financed the generators that provide about one third of India's present power-generating capacity. Other foreign countries and international contributors that helped India develop its electric power industry include Canada, the Union of Soviet Socialist Republics, Japan, Poland, and the World Bank.

AID has helped finance, in addition to power projects, the foreign exchange and local currency costs of nearly 100 manufacturing plants, including automotive, fertilizer, chemical, aluminum, and iron-ore production facilities.

AID also has made seven loans to India to help develop and improve the efficiency of India's railway system. The first of these loans was used to purchase steel to construct railway cars, locomotives, and railway bridges. The other

loans were used to purchase locomotives, spare parts, and a traffic-control system.

Section 611(e) of the Foreign Assistance Act of 1961, as amended, provides that no assistance be furnished for a capital project estimated to cost \$1 million or more until the head of the agency has assured himself that the country involved is capable of maintaining and utilizing the project, taking into consideration the maintenance and utilization of projects previously financed by the United States.

AID's stated policies appear to provide for the implementation of this section of the act. AID's general practice, however, has been to discontinue monitoring public sector projects in India once they are completed and in operation. To the extent that manpower is available, private sector projects are given monitoring priority until the loans are repaid. The rationale for this approach is based on such factors as the limited availability of Mission technical personnel in India, the costs of sending consultants from the United States, and the guaranteed repayment of public sector AID loans by the Government of India.

AID manual orders, since the 1960's, called for Mission reports on completed projects, bearing on the effectiveness and efficiency of the projects and their operations. Monitoring requirements described in these and succeeding manual orders and circulars focused mainly on feasibility coverage, final plans, construction, and contractor reimbursement.

As of March 1971, and after the start of our review, a manual order revision requires a loan completion review report, after the loan's terminal disbursement date, in which recommendations for future monitoring are to be made. In the most recent revision of this manual order, on August 25, 1971, AID specifies that recommended monitoring be limited to the original objectives of the loan and be focused on only those objectives not met when the loan completion review report is made. The manual order requires also that a date be established or conditions of achievement be described after which monitoring by AID will no longer be necessary.

As the current manual order recognizes, the importance of determining that original objectives are achieved at some point in time cannot be overemphasized. AID determinations that projects or activities continue to meet their intended objectives are equally important, in our view, particularly when the United States continues to provide assistance.

We recognize that enough time has not elapsed to allow for full implementation of AID's recently revised manual order incorporating specific monitoring requirements. For this reason any evaluation of the effectiveness of these monitoring provisions is not practicable at this time.

The capital projects included in our review, their locations, and AID input for the projects are listed in the following table.

Capital Projects Included in Our Review

<u>Power projects</u>	<u>Dollars</u>	Rupees in U S equivalent (note a)
	(000 omitted)	
Thermal power plants		
Bandel, West Bengal	\$ 37,392	\$ 10,933
Chandrapura, Bihar	39,697	22,133
Durgapur, West Bengal	18,440	4,573
Talcher, Orissa	28,430	24,987
Amarkantak, Madhya Pradesh	7,596	8,893
Dhuvaran, Gujarat	33,125	16,960
Trombay, Maharashtra	17,716	-
Delhi "C," Delhi	13,814	20,067
Satpura, Madhya Pradesh	19,116	21,243
Hydroelectric power plants		
Sharavathi, Mysore	6,902	45,933
Sabarigiri, Kerala	<u>18,040</u>	<u>28,000</u>
	<u>240,268</u>	<u>203,722</u>
 <u>Other projects</u>		
Railway (primarily locomotives)	115,358	-
Trombay Fertilizer, Maharashtra	36,189	17,907
Delhi cloth mills (tire cord), Rajasthan	8,006	-
Orissa iron ore, Orissa	18,315	-
Pub. L. 480, section 104(e) rupee loans (Cooley)		
Synthetic & Chemical, Ltd , Uttar Pradesh	-	11,639
Coromandel Fertilizer, Ltd., Andhra Pradesh	-	22,011
Hindustan Aluminum Corp , Uttar Pradesh	-	5,372
Renusagar Power Co , Ltd., Uttar Pradesh	<u>-</u>	<u>8,611</u>
	<u>177,868</u>	<u>65,540</u>
 Total	<u>\$418,136</u>	<u>\$269,262</u>

^aComputed at the current rate of exchange (Rs7 5 to \$1), except for Cooley loans which are shown at the actual rates in effect at the time the loans were extended. Cooley loans are loans of U S -owned local currency to private enterprises

CHAPTER 2

ANTICIPATED GOALS COMPARED WITH ACTUAL GOALS

Production goals generally are being met for some AID-assisted capital projects. Where capital project assistance has been concentrated, as in power generation, achievements have not been as great as anticipated when the projects were planned. In the railway system, where a large volume of capital assistance was also concentrated, expected goals, for the most part, had not been established when the assistance was being considered, or thereafter, and no meaningful comparison had been made between expected and actual results. Indications are that actual results are not as good as they should be. This chapter discusses, where applicable, the extent to which expected goals have not been met and the reasons therefor.

POWER PLANTS

AID assistance to power projects in India, accounting for about one third of India's generating capacity, has amounted to about \$367 million and the equivalent of about \$236 million in rupees. Our review included nine thermal and two hydroelectric power plants for which AID assistance amounted to about \$240 million and the equivalent of about \$204 million in rupees. Generating equipment installed in these plants is relatively modern and up to date, since most installations have occurred within the past 10 years.

AID justifications for financing power projects generally emphasized that normal load growth and new customer demand for power would probably exceed the power available when the projects were completed. Anticipated energy production was calculated generally on such factors as generating costs, load and demand forecasts, energy losses, and expected energy sales.

The nine thermal power plants had been in operation for a year or more and were operating on an overall average of 71 percent of the energy output anticipated when the projects were planned. One hydroelectric power plant was achieving its anticipated goal, and a second plant was meeting 75 percent of its goal.

Installed capacity of a power plant--the sum of the nameplate ratings of all generating units--often is used to measure overall plant performance. AID planning documents indicated that the energy output of the 11 plants, compared with their installed capacity, should average 61 percent. On this basis energy output averaged only 45 percent. (See p. 12.)

The expected output rate for the two AID-financed hydroelectric plants was about 54 percent of installed capacity compared with 63 percent for the nine thermal power plants. A Mission official, explaining the lower goals established for hydroelectric plants, said that estimates of outputs at these plants included such factors as the (1) size of the reservoir, (2) adequacy of the water source, and (3) height of the reservoir in relation to the generators. The substantial variances in the amount of water resulting from the monsoon seasons in India also affect the plants' capacities to generate power.

A comparison of expected output with actual power generated for the 11 plants included in our review showed that

- three were operating at 90 percent or more of expected power generation,
- six were operating at 60 to 90 percent of expected power generation, and
- two were operating below 60 percent of expected power generation.

Detailed data for each of the plants reviewed follows.

AID-Financed Power Plants

<u>Plant</u>	<u>1-year period ended</u>		<u>Installed capacity in megawatts</u>	<u>AID-expected generation in megawatts (note a)</u>	<u>Actual generation in megawatts (note a)</u>	<u>Actual generation percent of AID-expected generation</u>	<u>Plant factor (note b)</u>
Thermal							
1	Mar	1971	250	180	64	36	26
2 (note c)	Dec	1970	250	140	78	56	31
3	Dec	1970	355	213	147	69	41
4	Dec	1970	60	56	49	88	82
5 (note d)	Dec	1970	285	134	96	72	34
6	Dec	1970	420	280	178	64	42
7	Dec	1970	254	157	150	96	59
8 (note d)	Dec	1970	338	246	213	87	63
9	Dec	1970	<u>224</u>	<u>131</u>	<u>120</u>	<u>92</u>	<u>54</u>
			<u>2,436</u>	<u>1,537</u>	<u>1,095</u>	<u>71</u>	<u>45</u>
Hydroelectric							
10	Dec	1970	713	420	314	75	44
11	Sept	1970	<u>300</u>	<u>130</u>	<u>135</u>	<u>104</u>	<u>45</u>
			<u>1,013</u>	<u>550</u>	<u>449</u>	<u>82</u>	<u>44</u>
Total			<u>3,449</u>	<u>2,087</u>	<u>1,544</u>	<u>74</u>	<u>45</u>

Plant locations

1 Talcher, Orissa	7 Dhuvaran, Gujarat
2 Satpura, Madhya Pradesh	8 Trombay, Maharashtra
3 Bandel, West Bengal	9 Delhi "C", Delhi
4 Amarkantak, Madhya Pradesh	10 Sharavathi, Mysore
5 Durgapur, West Bengal	11 Sabarigiri, Kerala
6 Chandrapura, Bihar	

^aData available is in gross megawatt-hours generated during the 1-year periods. For comparison purposes the data has been divided by 8,760 (hours per year) to obtain an hourly average.

^bActual power generated as a percent of installed capacity.

^cData is for four units. fifth unit not commissioned until 1971.

^dPartially financed by AID.

Plant factor and power economy

Many things influence the operation of a power-generating facility. Among these are quality and availability of water and fuel, availability of spare parts, operation and maintenance proficiency, adequacy of transmission and distribution facilities, station use and transmission losses, and customer demand for power.

One recognized measure of a plant's utilization is the plant factor--the ratio of the average load on a plant over a given period of time to the installed capacity of the plant. The plant factor generally is based on the equipment manufacturer's nameplate ratings, which represent installed capacity.

The ability of a generating unit or a plant to sustain a maximum level of power generation, as demonstrated by actual load or by a test proven under specific conditions, would be a more significant base against which to measure plant utilization. This ability, often expressed in terms of net capability ratings, may be higher or lower than the stated installed capacity. In the absence of such specific ratings, the plant factor based on installed capacity serves as a general indicator of plant utilization.

In the preceding table plant factors range from 26 to 82 percent and average 45 percent. Undoubtedly scheduled and forced outage periods have contributed to this rather low level of utilization.

The Federal Power Commission uses net generation (gross generation less plant use) to compute plant factors for power plants in the United States. The power used within a generating station to operate auxiliary equipment, lighting, etc., is not available to the transmission and distribution system and therefore is not available for sale to customers. Considering power used within the plant, plant factors in the preceding table would be lower and would result in an average factor of 41 percent.

In May 1969 the Government of India established a Power Economy Committee to evaluate all aspects of the power supply industry in India. The principal tasks of the Power

Economy Committee were to analyze the performance of all power facilities and to make recommendations both for improving the operating economy of the existing system and for the expansion required over the next 10 years.

In the autumn of 1969, AID sent five U.S. experts to India to advise and assist in the work of the committee. During the next 15 months, the committee made an extensive, well-documented study of the power situation in India. Before the committee completed its final report, AID sent two U.S. power experts to India to review the draft report and its recommendations and to offer their suggestions. The final report is expected to be one of the major planning documents of the Government of India for at least the next 10 years.

The Power Economy Committee's report, completed in March 1971, recognized that plant performance in India was quite low and that there was much room for improvement. The committee noted that Indian power stations operated below the standards of those in the United States, where higher quality fuel is a prime factor.

India has one of the world's highest annual rates of growth for electric energy production. India also ranks among the top 15 countries in installed generating capacity and total energy production. A comparison of performance standards, however, finds India below most of the world's leading power-producing countries.

In summary the AID-financed power plants appear to be operating at about 26 percent below standards believed attainable and previously suggested by AID. Some of these plants are operating at slightly higher output levels than the average level of all Indian plants. It appears, however, that performance levels shown by these AID-financed plants are fairly representative of all Indian power plants.

To illustrate the magnitude of theoretical savings possible, increasing the average rate of plant use of presently installed capacity by 10 percentage points (raising the average plant factor from the 40- to the 50-percent range) would be equivalent to increasing India's energy production

by about one fourth, without adding to the nation's generating capacity.

It is conceivable that improvements of this nature would result in millions of dollars worth of development benefits to India as well as better utilization of expensive power plant equipment already installed.

Reasons for unutilized capacity

The Power Economy Committee's report showed that the lack of adequate investment in the field of transmission and distribution was chiefly responsible for inadequacy of interconnection systems, high transmission and distribution losses, unsatisfactory voltage conditions, and low reliability of supply in various power systems in the country.

Information we obtained showed that the reasons for not fully achieving power output goals included (1) lack of transmission lines from plant to power-short areas, (2) inadequate coal production in a mine supplying one particular power plant, (3) maintenance and breakdown problems, (4) difficulty in obtaining replacement parts, (5) labor difficulties, and (6) insufficient customer demand in some areas

AID does not obtain production data from these power plants on a regular systematic basis that would currently allow AID to analyze reasons for low output. Consequently opportunities to negotiate or encourage appropriate Indian Government agencies to take remedial action and to assist in resolving problems may be lost. We believe that such information, obtained on a regularly scheduled and timely basis, would serve a useful purpose in administering approved projects and in reviewing future proposals for power projects

A few of the problems experienced and the actions taken to increase production at certain plants are discussed below.

Talcher thermal plant

During the year ended March 31, 1971, this plant operated at only 36 percent of its expected output and at only 26 percent of its installed capacity. Project officials stated that the primary reason for Talcher's unused generating capacity was the lack of sufficient customer demand. They stated also that the demand for power had been much less than originally planned, due to a slower than anticipated industrial growth within the State of Orissa. For example, it was decided to build a self-contained fertilizer plant in place of the several chemical plants

originally planned. Although the fertilizer plant when completed in about 1974 will use more power than would have been needed for the smaller chemical plants, the change in plans has caused considerable delay in utilizing Talcher's generating capacity.

Another factor limiting Talcher's power output is the seasonal use of the plant's generating capacity. Essentially Talcher is used as a backup for a non-AID-financed hydroelectric power plant in northern Orissa. This hydroelectric plant is used extensively to meet Orissa's power demands because hydropower is much cheaper than thermal power. As a result the hydroelectric plant generally operates at full capacity during the monsoon season while Talcher's thermal generation is curtailed. Conversely during dry seasons more of Talcher's capacity is used to conserve the hydroelectric plant's limited water supply. Even during periods of higher consumption, Talcher's maximum generation in any single month, during the year ended March 31, 1971, never exceeded 52 percent of the anticipated output.

A second hydroelectric plant, which is being built in southern Orissa, is scheduled for completion in mid-1972. This plant, having a firm capacity of about 120 megawatts, will be given preference over Talcher for the reasons stated above. Nevertheless, project officials believe that (1) the added power demand expected from the fertilizer plant, (2) new consumer areas being reached by transmission lines now under construction, and (3) normal growth in power requirements by Talcher's existing customers, should lead to achieving Talcher's established power goals by 1974.



GAO photo

Talcher thermal power plant

Satpura thermal plant

Power plant officials stated that a coal shortage had prevented the plant from operating at its expected output. During 1970 the plant operated at only 56 percent of its expected output and at only 31 percent of its installed capacity. The project's primary source of fuel has been a coal mine located about 2 miles from the plant. When the Satpura project was being planned, mine officials assured the Madhya Pradesh State Electricity Board that there would be an adequate supply of coal to run the plant. Actual deliveries, however, have not permitted full plant utilization.

The plant is buying some more expensive coal from another mine located about 70 miles away. Coal from all sources permits operation of only three of the plant's five power-generating units. A plant official commented that, because of the higher cost of coal from the more distant point--56 rupees a ton versus 33 rupees a ton from the power plant's regular source--it was uneconomical for the plant to use coal from this distant source. Procurements of the more expensive coal were being made because government officials in the State of Punjab agreed to reimburse Satpura for the added coal cost, to obtain some of Satpura's power and thereby help reduce the extreme power shortage existing in that area.

The Mission identified inadequate coal deliveries from the mine as a potential problem in February 1968. AID/Washington advised the Mission in May 1968 that, if additional coal were not obtained by the project, about 73 percent of the \$71 million investment in Satpura would remain idle. On the basis of an assumed 10-percent carrying charge, this was calculated to represent an effective loss of over \$5 million a year. Therefore AID/Washington at that time, and again in August 1968, directed the Mission to explore the coal problem with India's National Coal Development Corporation and its Central Water and Power Commission.

Thereafter a Mission electrical engineer wrote to a member of the Central Water and Power Commission expressing the Mission's concern about the coal delivery problem. The letter urged the Commission to make the necessary

arrangements for ensuring delivery of sufficient coal to meet the requirements of all five of Satpura's generating units. Project files indicated that the Commission responded in September 1968, but Mission officials were unable to furnish us with a copy of the response or with information on the corrective action taken or promised.

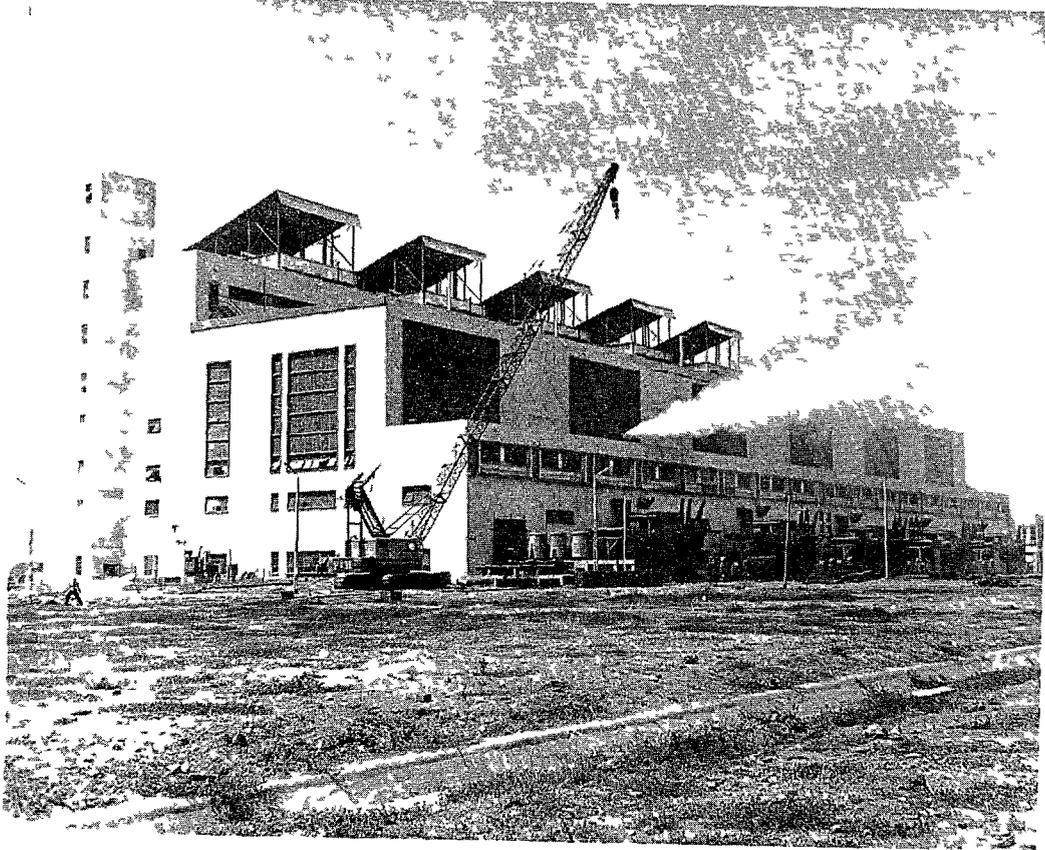
The Mission Director advised AID/Washington in June 1969 that, despite Mission prodding, the problem had not been fully resolved. Also in June 1969 a Mission official corresponded directly with the National Coal Development Corporation and urged it to expand its coal production at the mine. He provided the corporation with a copy of an expert, independent report indicating that the mine's output should be about twice its existing level. During the ensuing 18 months, however, coal deliveries from the mine increased an average of only 15 percent.

Lack of modern mining equipment contributes to the low coal production. Equipment needed to increase production significantly includes shuttle cars, belt conveyors, and loaders. Shuttle cars and loaders are being obtained from U.S. sources. Some new belt conveyors had been ordered and were expected to be installed by July 1971, but some of the equipment was not expected until 1973, according to the project officer. Information was not available at the Mission as to the amount of funds required for procuring the mining equipment.

The production of coal might have been increased significantly had AID financed the importation of needed mining equipment. Also this problem might have been alleviated had AID provided technical assistance to expedite the procurement and installation of this equipment.

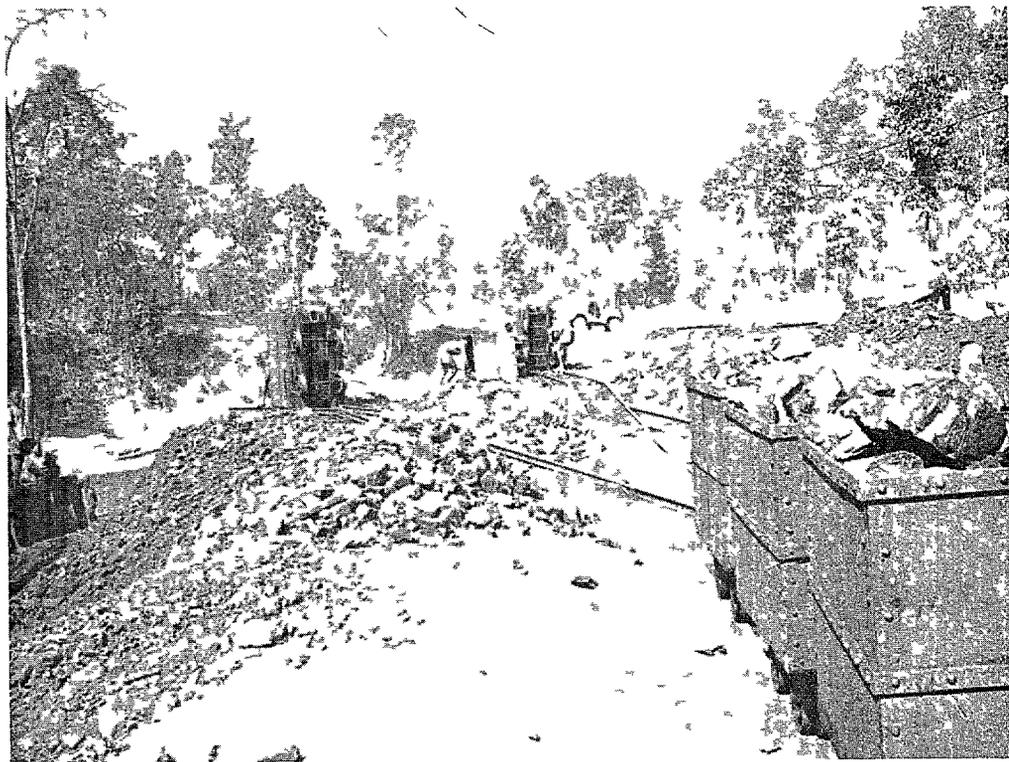
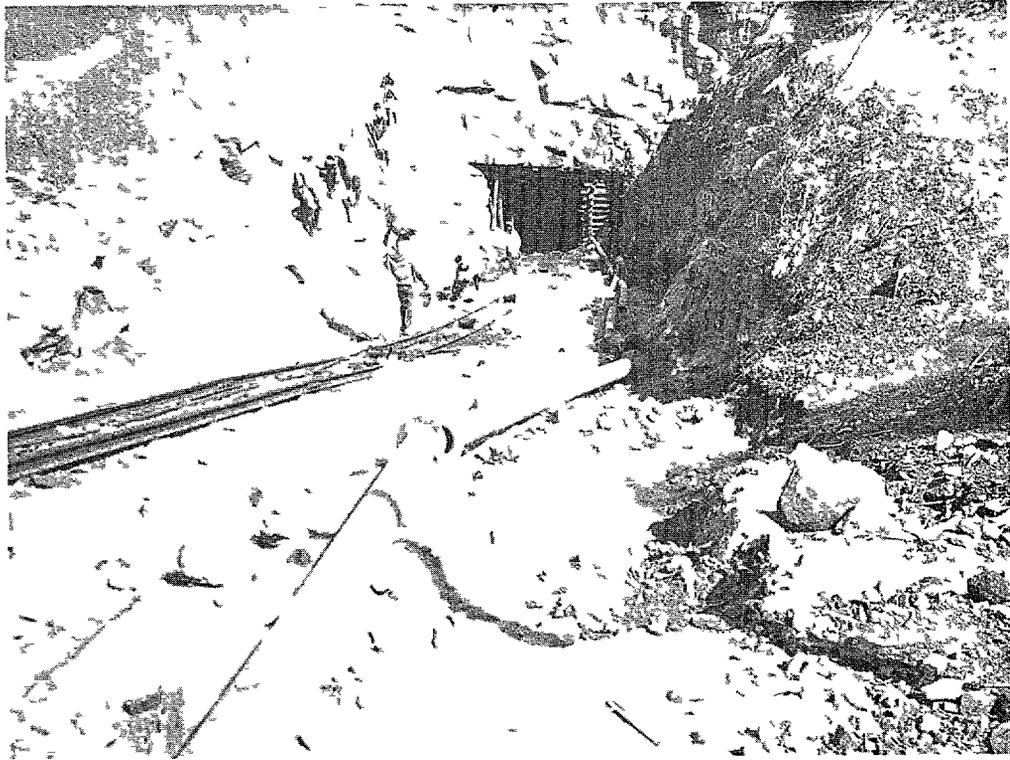
Delhi "C" thermal plant

During calendar year 1969 this plant operated at 75 percent of expected production goals and at an overall utilization rate of 44 percent (plant factor). The plant's operating performance improved considerably in 1970 when expected output was nearly attained. The shortfalls generally were attributable to minor and major breakdowns of the plant's generators.



GAO photo

Satpura thermal power plant



GAO photos

Coal mining operations near
Satpura thermal power plant

The most serious breakdown of a generating unit resulted in power loss from July 1969 until September 1970. This generating unit was shut down following a 4-month period when, on five separate occasions, steam generator temperatures varied substantially from the equipment's designed temperature level. During this time the Mission and AID/Washington were cognizant of the problems but were unsuccessful in attempts to help solve them. The damage was attributable, in part, to the failure of power plant personnel to shut down the generator promptly when trouble developed.

Plant officials, however, denied the existence of faulty operating conditions and were not willing to seek help from an outside source as suggested by AID. The Mission did not attempt to obtain remedial action through discussions at higher levels within the Government of India. In April 1971, the superintending engineer finally agreed to seek expert help in resolving this problem. Apparently this change in attitude resulted from similar failures in two of the plant's other generators. In these instances the trouble was located before extensive damage occurred.

On October 15, 1969, the U S manufacturer advised the Delhi power plant that the repair parts would be sent by air early in December. Due to a strike they were not available until June 1970. The generator was put back in service late in September 1970.

A Mission official had advised plant officials that another U S. manufacturer could furnish the spare parts, and this approach was generally used in times of work stoppages. The Mission requested that AID/Washington make the necessary arrangements on behalf of the Indian Government. This remedial action, though attempted by the Mission, was never finalized.

Sharavathi hydroelectric plant

This plant, located in the southern State of Mysore, is one of two power plants included in our review that use water, rather than coal, as the source for generating electricity. On the basis of his last visit to the plant in June 1969, an AID official reported that little demand existed

for the plant's output and that additional transmission facilities were needed to use the surplus power in deficit areas. Mission officials informed us that, from June 1969, a transmission tie line had been installed between the plant and the Bombay area, which should provide for increased utilization of the plant's capacity.

Information obtained at AID/Washington through the Mission showed that plant utilization, as measured by plant factors, increased from 32 percent in 1968 to 42 percent in 1969 and to 44 percent in 1970. We believe that it is especially important that this plant produce at optimum levels, subject, of course, to water availability. The plant's installed capacity had been increased from 356 megawatts in 1967 to 713 megawatts in 1970, which gave it at least twice the capacity of any other plant covered, except one.

The March 1971 report of the Indian Power Economy Committee showed that significant savings in fuel charges alone could have been made by substituting surplus hydro generation for higher cost thermal generation. Although no definitive estimate was given for Sharavathi, the data presented indicated that the equivalent of millions of dollars in possible savings were involved.

Other power plants

Only limited information was available at the Mission on why other thermal power plants were not achieving anticipated power generation. Mission personnel had not visited most of these plants in over 1-1/2 years.

Low output and unused capacity at Bandel and Chandrapura generally were attributed to breakdown and maintenance problems, spare-parts procurement, insufficient demand, and inadequate transmission and distribution systems.

Breakdowns at three plants partially were due to the use of poor grade coal. These breakdowns became considerably more serious because of the attendant labor problems. Mission officials stated that labor organizations would not allow needed equipment maintenance at these plants during more than one shift a day. This increased the downtime of AID-financed equipment.

OTHER CAPITAL PROJECTS

Fertilizer plant

AID assistance to the Trombay fertilizer plant has amounted to about \$36 million and the equivalent of about \$18 million in rupees. As indicated by the following tabulation, production output has been substantially less than anticipated.

<u>Product</u>	<u>Designed capacity</u>	<u>Anticipated production (note a)</u>	<u>Actual production during 1970</u>	<u>Actual production as percent of anticipated production</u>
	————(metric tons)————			
Ammonia	115,000	97,750	68,342	70
Urea	99,000	84,150	55,883	66
Complex fertilizer	330,000	280,500	113,154	40
Nitric acid	105,600	89,760	53,282	59
Sulphuric acid	66,000	56,100	21,028	37
Methanol	33,000	28,050	21,281	76

^aBased on 85 percent of installed capacity, which Mission officials believe to be appropriate for public sector fertilizer plants, such as Trombay.

Production figures for 1971, using actual output for the first three quarters and estimates for the last quarter, show overall increases, particularly for complex fertilizer, nitric acid, and methanol. None of the individual products, however, has yet achieved the production expected on the basis of the designed capacities of the plant.

The Trombay plant has operated at a comparatively low rate of production for several years. At the request of the Government of India and AID, the Tennessee Valley Authority made a study of Trombay's operation in 1967 and concluded that a major problem was the low level of ammonia production. At the time of the study, the ammonia plant's output was higher than the current output but substantially

less than the level considered by the Tennessee Valley Authority to be appropriate

Low-quality naphtha used by the plant had contributed substantially to reduced ammonia production, according to Tennessee Valley Authority officials. Reduced ammonia production, in turn, limited the output of the plant's other products, such as nitric acid, urea, and complex fertilizer

The Tennessee Valley Authority recommended a second naphtha reformer in 1967, to supplement the one already installed in the project's methanol plant. (Reformers are used to convert naphtha, a raw material, into hydrogen gas which is used to produce ammonia and methanol.) In the Authority's opinion, the additional naphtha reformer would enable the plant to increase its ammonia output to the level originally anticipated and thereby increase the output of other products which use ammonia in their production process

Mission officials visited the plant in July 1969 and agreed with the Tennessee Valley Authority's finding and recommendation. They also found that actions to procure the new reformer had been taken and that installation was expected by July 1971. Because of staffing limitations Mission officials have not visited the Trombay plant since July 1969 to inquire into the status of the reformer procurement and installation program

During our visit in March 1971, Indian project officials informed us that they did not expect the reformer to be installed until the first half of calendar year 1973. A reasonable installation period would have been about 2-1/2 years, according to the project officials. In this case a longer delay has been encountered because of (1) an unusually long design time for an Indian Government organization to draw up plans for erecting the reformer and (2) an Indian Government policy requiring indigenous manufacture of certain reformer equipment. A communication received from the Mission in October 1971 indicated that the new reformer would be available in May 1972

The anticipated output for complex fertilizer was never achieved. Project officials believed that this was due to design defects, and the project's complex plant has

been redesigned. The true capacity of the redesigned plant is not known, but project officials believe that an appropriate standard for measuring output would be about 180,000 metric tons a year, substantially less than the 330,000-ton capacity originally included in AID planning documents.

Problems with complex fertilizer production also account for the plant's low output of sulphuric acid, initially planned as a raw material for the fertilizer. Because of the design changes referred to above, the quantity of sulphuric acid needed to manufacture the type of complex fertilizer now being produced is minimal. As a result the plant's sulphuric acid output has been curtailed substantially, and most of the acid produced has been sold commercially. Project officials stated that they were in the process of constructing a phosphoric acid plant at the project which, when completed in 1973, would require substantial amounts of sulphuric acid. They estimated that the sulphuric acid plant then would be producing at full capacity.

Iron-ore plant

AID has financed the procurement of commodities and services needed for India to export 2 million tons of iron ore yearly to Japan. Total AID assistance for the project amounted to about \$18.4 million and was used as follows:

<u>Item</u>	<u>Amount (millions)</u>
Rails, bridge girders, and construction equipment for a new railway	\$ 5.7
25 diesel locomotives	7.0
Material and equipment to construct a wharf and an ore-handling plant	<u>5.7</u>
Total	<u>\$18.4</u>

Production goals have been exceeded each year from 1967, as shown by the following comparison of anticipated with actual ore exports:

<u>Year</u>	<u>Exports</u>		<u>Percent</u>
	<u>Anticipated</u>	<u>Actual</u>	
	————(metric tons)————		
1967	2,000,000	2,162,000	108
1968	2,000,000	2,820,000	141
1969	2,000,000	4,950,000	247
1970	2,000,000	4,273,260 ^a	214

^aFor 12 months ended March 1970

A mission official stated that the increase in exports in 1969 and 1970 resulted from opening a second iron-ore mine. The anticipated level of 2 million tons was based on ore taken from only one mine. He said that India planned to increase iron ore exports to 8 million tons a year, by enlarging the harbor at Visakhapatnam to accommodate bigger ore transport ships. This is being accomplished through Japanese assistance amounting to an equivalent of about \$7 million.

Locomotives

AID has financed 448 diesel-electric and electric locomotives for India at a cost of about \$111 million.

Mission officials stated that the best standard for measuring use of locomotives was the average ton-kilometers a day, which is the product of the average number of tons transported and the distance the average ton is hauled. The Government of India's Ministry of Railways publishes monthly statistics on locomotive use, including the average ton-kilometer a day performance of locomotives on broad-gauge (66 inches) and meter-gauge (39-3/8 inches) Indian railways. This information is available in Indian publications on an overall basis for each type of locomotive in use. It is not readily available for individual locomotives, including those financed by AID.

AID-financed diesel-electric locomotives include about half the total locomotives of this type used in India. Therefore the published overall usage figures for this type of locomotive in freight service should be meaningful indicators of the use being made of AID-financed locomotives, all of which were designated to haul freight.

AID Mission personnel discussed with us certain standards which had not been used in the past by AID but which were deemed suitable for measuring locomotive utilization in India. They indicated that the average daily use of diesel-electric locomotives on broad-gauge track should be 640,000 ton-kilometers. This was based on a freight-train load of 1,600 tons hauled 400 kilometers. On meter-gauge track, for which no distance standard is available, they indicated that a 1,000-ton daily payload would be a reasonable standard. We discussed also the suitability of these standards with AID officials in Washington, who checked with their personnel in India. AID believes that the former Mission official who provided us with these standards had not made the proper background research on basic evaluative criteria necessary to support such standards. (See AID comments in app I, pp. 41 and 42.)

Indian diesel-locomotive use per day for 1970 was reported to be about 256,000 net ton-kilometers on broad-gauge track and 118,500 net ton-kilometers on meter-gauge track. The actual pay load on meter-gauge track averaged just over 500 tons. It is evident that, of the many factors involved, track gauge alone had a marked effect on use statistics. (See GAO views on AID comments in app. II, p. 48.) In India four different rail gauges exist, with broad-gauge and meter-gauge representing 49 percent and 44 percent, respectively, of the total rail length.

Except for establishing the 400-kilometers-per-day criterion used by AID in two instances in 1968, AID made no comparison or measurement of locomotive performance. For the standards given us at the Mission there seems to be no easy way of ascertaining, without extensive analysis, whether they were reasonable. When actual performance is compared with these particular standards, the daily-use rates of diesel-electric locomotives average less than 50 percent.

Because of the many complex factors involved, we are of the opinion that the task of establishing and applying suitable performance standards for AID-financed locomotives should be given to experienced AID technical personnel who would consult with appropriate Indian railway officials. Measurement standards and systematic comparisons of operating performances are essential for any meaningful evaluation of the effectiveness of U.S. assistance to Indian railways

In conclusion AID has not established or adopted definite standards for the utilization of the 448 AID-financed locomotives provided to India at a cost of about \$111 million. Moreover AID has not obtained the necessary operating information on the use of these locomotives that would enable it to ascertain whether these locomotives are being effectively used.

We have noted that the last AID loan to finance locomotives was made in 1964 and that AID is not planning to make any further loan for this purpose. We believe, however, that good management practice--particularly one aimed at ensuring optimum effectiveness of U.S. assistance--requires that AID remain currently informed on the status of locomotive use. We believe that, by doing so, AID would be

in a much better position to offer constructive assistance and to encourage corrective action wherever and whenever the need for such assistance and action is identified. As a practical matter AID's well-documented experience in monitoring this type of capital project assistance in India could be useful in guiding existing or contemplated railway aid to other countries.

Tire cord plant

AID financed, at a cost of about \$8 million, a plant to produce rayon tire filament yarn and rayon tire cord from part of the plant's yarn production. Project data shows that yarn production goals have been substantially achieved and that the plant's output of rayon tire cord has exceeded the established goals

Anticipated annual production for yarn was 3,600 metric tons and for cord was 1,800 metric tons. Metric tons produced from 1968 to 1970 have been

<u>Year</u>	<u>Yarn</u>	<u>Cord</u>
1968	3,740	1,956
1969	3,347	2,534
1970	3,558	2,714

Project officials informed us that the increased cord production was attributable, in part, to additional equipment installed at the project. In order to better utilize this equipment, project officials have obtained a license to increase production levels to 5,000 tons of yarn and 2,500 tons of cord a year.

Cooley loan projects

Under section 104(e) of Public Law 480, AID has made local-currency Cooley loans equivalent to about \$141 million as of December 31, 1970. We compared output with production goals for four plants that received loans equivalent to \$47.6 million. These plants were producing chemicals, fertilizers, aluminum, and power.

Production data shows that three of the projects were operating at 100 percent or more of the anticipated output level and that one project was operating at about 80 percent.

CONCLUSIONS

At the time of our review, AID had not established a management system to (1) systematically obtain production and utilization data to ascertain whether anticipated levels of production and utilization of capital development projects

were being achieved and (2) identify and analyze reasons for shortfalls. Consequently for some of the power plants, a fertilizer plant, and the locomotives, AID has been limited in its ability to identify output problems quickly and assess the effectiveness of its assistance and has lacked information on which to propose and to negotiate corrective action with appropriate Indian Government agencies.

In our opinion information obtained and conclusions reached by analyzing output problems would be useful in reviewing proposals for future projects in India and in other countries. We believe that such efforts are intended by section 611(e) of the Foreign Assistance Act (See p. 6.)

We recognize that in some cases AID assisted troubled projects. This assistance, however, had not always been at AID's initiative and generally had not resulted from the timely and systematic analyses of production and utilization data that could be expected under formal monitoring arrangements.

AID's large contributions to help finance power and manufacturing plants, locomotives, and other projects in developing countries, substantiate the AID's need to obtain, on a systematic basis, information on whether output goals are being achieved. The recipient country should be agreeable to furnishing AID periodically with appropriate output data and with explanations for shortfalls in anticipated output. Obtaining this type of information should not involve a substantial commitment of manpower and would place needed emphasis on an important aspect of AID-financed projects--the results being achieved.

Some commitment of manpower may be involved when the production data and reasons for low output suggest the need for follow-up reviews by AID specialists and/or consultants. Such reviews would enable AID to identify necessary self-help measures to be taken by the host country to accomplish production goals. Information obtained through these reviews should provide a good basis for AID's management to negotiate necessary remedial actions with the host country.

We are making no recommendations at this time, primarily because of the revised and more definitive monitoring requirements adopted by AID in March and August 1971 and because of the highly unsettled role that future U S assistance will play as a result of recent events on the troubled Asian subcontinent

In commenting on these matters, AID has stated that performance standards are set, as appropriate, for the projects which AID helps to finance, that AID requests the borrower to provide production data for completed projects in the sectors of the economy that AID expects to assist in the future, and that AID provides the services of specialists, when needed, to advise responsible Indian institutions on production problems. AID has expressed the belief that these actions should be taken on a carefully selected case-by-case basis, stating that its recently established management system provides for a reasonable cutoff of AID monitoring and assistance after a loan has been fully disbursed, the project completed, and AID's development objectives met

The actions planned by AID under its recently established management system represent a forward step in strengthening its ability to obtain greater benefits from the economic assistance provided to developing countries. However, as we understand AID's plan to implement the new system, it does not propose to apply performance standards for previously financed projects in which there is considerable investment and a need for assuring that maximum effectiveness is obtained from these projects.

Establishing a cutoff date or determining that conditions of achievement have been met at a particular point in time would not assure that projects or activities continued to meet their intended objectives. Such assurance, in our view, is important, particularly when the United States continues to provide substantial assistance in the same sector of the economy.

CHAPTER 3

SCOPE OF REVIEW

Our work was directed toward reviewing the AID follow-up on the status of completed AID-financed capital projects to ascertain whether output goals were being achieved. In instances of substantially unused capacity, we reviewed AID's efforts to analyze why output goals were not being achieved and to seek, when appropriate, remedial action by the Government of India.

We included all capital projects involving AID assistance of \$5 million or more which had been completed at least 1 year but not more than 10 years, except for loans to assist India's automotive industry that were under a separate audit review at the time.

The Office of the AID Area Auditor General (South Asia) gives sufficient attention to the borrower's compliance with the terms and conditions of the loan agreements and of letters of implementation, therefore, we excluded these matters from our review.

We examined mission project files, interviewed Indian Government officials at project locations that we visited, reviewed information obtained from these officials and held discussions with appropriate AID Mission officials.

The overseas fieldwork was completed in July 1971, and some additional work was subsequently performed in Washington, D.C.

DEPARTMENT OF STATE
AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON D C 20523

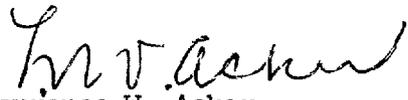
FEB 17 1972

Mr. Oye V. Stovall
Director
International Division
U.S. General Accounting Office
Washington, D. C. 20548

Dear Mr Stovall

I am forwarding herewith a memorandum dated February 15, 1972 from Mr. Donald G. MacDonald, Assistant Administrator for Near East and South Asia, which constitutes the comments of AID on the U.S. General Accounting Office's draft report titled, "Need for Management System to Assess Performance of AID-Financed Projects in India "

Sincerely yours,


Laurence W. Acker
Auditor General (Acting)

Enclosure a/s

GAO note GAO requested agency comments on a draft of this report on December 30, 1971. In view of these comments, changes were made to the draft and were incorporated in this report

GAO views on these comments are included as appendix II. The letters in the margins on the following pages of appendix I correspond to the related GAO views expressed in appendix II

APPENDIX I

DEPARTMENT OF STATE
AGENCY FOR INTERNATIONAL DEVELOPMENT
WASHINGTON D C 20523

ASSISTANT
ADMINISTRATOR

FEB 15 1972

MEMORANDUM FOR Mr. Laurence W. Acker
Auditor General (Acting)

SUBJECT GAO Draft Report on Need for Management
System to Assess Performance of AID-Financed
Projects in India

We are glad to have had an opportunity to review the draft report prepared by the GAO titled "Need for Management System to Assess Performance of AID-Financed Projects in India." The GAO examined 19 completed projects which AID helped to finance. On the basis of its review of those projects the GAO suggested that the AID Administrator consider the development of a management system which would provide meaningful information on completed projects and a basis for management action. It also suggested three steps which the AID Mission to India should take to implement such a system.

(A) Management System

AID recently established a management system, effective March 3, 1971, to accomplish the objective stated above. As the draft report points out, AID now requires that the offices responsible for development loans prepare a loan completion review report within 90 days after the termination of disbursement under each loan. At that time AID decides what further reports will be required from the borrower and what further monitoring should be done by AID.

AID monitoring of completed loans is focused on the basic objectives of each loan. When AID has determined that the basic objectives have been accomplished or that for good and sufficient reasons they cannot be met, AID monitoring will normally cease. In addition, the Agency and its overseas Missions will continue to seek the kind of information about completed projects which they can put to effective use. AID will evaluate the performance of similar completed projects when it undertakes an intensive review of an application for AID financing of a proposed new project of the same kind. The evaluation of such completed projects will be done on a selective basis to determine whether AID financing of similar new projects is warranted. The nature, extent and duration of reporting requirements and monitoring of the performance of completed projects will be determined by AID's need for information about them. The need will depend in large measure on what AID intends and is able to do with the information it obtains.

Implementation of Management System

We have the following comments with respect to the three steps which the GAO suggested that the AID Mission to India take to implement the proposed management system.

1. "-- establish suitable performance standards or production goals, where they do not exist, and use them to measure project performance "--
- (B) Performance standards or production goals are inherent in the project review and appraisal conducted by AID before a project is approved. To be meaningful, the nature of the performance standards for individual projects must be tailored to project objectives. For example, in the case of the AID-financed diesel-electric locomotives cited in the draft report, the aim was to assist the Indian Railways to meet the expected increase in freight traffic in future years. The utilization of the locomotives depends on the volume and pattern of freight movement which vary in different sections of the railway system and with the performance of the country's economy. It was not and is not practicable to set a country-wide utilization standard in terms of ton-kilometers per day for each locomotive in India.
- The performance standards established by AID can be used to measure project performance, however, it should be borne in mind that these standards are derived from estimates and projections made before the AID loan was authorized. After loan authorization several years elapse before the project is completed. Although the estimates of plant production and projections of demand for the product or services were based on the best information and judgment available at the time, developments which could not then be foreseen sometimes result in different levels of production and demand after the plant is completed.
2. "-- make arrangements with the Government of India to furnish AID, on a systematic basis, production data for significant AID-financed projects to show whether anticipated production goals are being met and the reasons for shortfalls."--
- (C) AID regularly receives production data on Indian fertilizer plants and on AID-financed power plants. The Indian Railways publish detailed and comprehensive operating data on an annual basis. These are available and can be supplemented, if needed. AID will request the GOI to furnish production data on other completed projects in those sectors of the economy which it plans to assist.

One of the principal purposes of the AID program in India and elsewhere is to assist in developing the capability of the local institutions

APPENDIX I

which are responsible for the management, operation and maintenance of project facilities. In cases where project performance is consistently less than anticipated, the responsible institution should determine the reasons for the shortfall and take corrective action if feasible. Part of the task of economic development is to teach these institutions to rely on their own resources and to wean them from continued dependence on advice and assistance provided or financed by AID or other donors. To accomplish this objective AID's monitoring of completed projects should be on a selective basis and limited in both scope and duration.

3. "-- provide appropriate specialists to follow up on production problems in instances where the data and reasons for lost production suggest that it may be advantageous for AID to seek specific remedial action by the recipient country, and consider ways, if appropriate, to assist in the resolution of the problem."-

- (D) AID has provided specialists to advise and assist the GOI to resolve problems affecting the performance of various AID-assisted projects.

In 1967 it arranged with the Tennessee Valley Authority for the services of a team of TVA specialists to study the operation of the AID-financed fertilizer plant at Trombay and determine what should be done to overcome production limitations. In 1970 AID obtained the services of another TVA team to study the maintenance problems of public sector fertilizer plants in India, including Trombay.

AID provided the services of six U.S. specialists in 1969 to help plan and organize the work of the Power Economy Committee which the Indian Government had established to analyze the performance of all electric power facilities in India, to recommend improvements in the operation of the existing systems and to examine the expansion of these systems needed over the next ten years. In 1971 AID provided technical assistance for the Northern Region Control Center which is designed to provide maximum operating economy and security for the electric power system in northern India. One of the functions of the Center will be to coordinate load dispatching throughout the region and thereby provide for more effective utilization of the individual power plants in the system. AID expects to continue to provide technical assistance for the Northern Region Control Center and for similar centers in other parts of the country when requested by the Government of India.

AID can and will provide the services of specialists to assist in improving the performance of particular industries or sectors of the Indian economy but this should be done only when AID determines that it is needed, the GOI concurs, and the assistance is related to AID's ongoing program and objectives in India.

We consider that after a loan has been fully disbursed and the project is completed and in beneficial operation, it is up to the borrower (whether the Indian Government or a private Indian company) or the implementing agency, e.g., an Indian State Electric Board, to provide for the management, operation and maintenance of the facility. In the interests of good management there must be a reasonable cutoff of AID monitoring and assistance after project completion. The cutoff would not exclude further assistance by AID in an emergency situation such as the breakdown or shutdown of an AID-financed plant, or in other special situations such as those described above, but such assistance should be provided only in carefully selected cases. Neither the interests of AID nor those of the aid recipient would be well served by the maintenance ad infinitum of an umbilical cord connecting aid donor and aid recipient.

GAO Review of Completed Projects

In the course of its review of 19 AID-assisted projects in India, the GAO made a finding that nine thermal power plants were operating at an overall average of about 71 percent of anticipated project production, one hydroelectric power plant was meeting 75 percent of its production goal, the output of a government-owned fertilizer plant was substantially less than anticipated, and the diesel-electric locomotives financed by AID for the Indian Railways were under-utilized.

(E) Power

The power stations which AID helped to finance were planned to provide sufficient generating capacity to meet projected system demand in areas where there was a good potential for economic development. India has been plagued by power shortages with consequent load-shedding¹¹ which has had an adverse effect on industrial production and on investment in industry. The AID-financed power stations have helped to relieve some of these shortages.

The test of the economic benefit of these stations is not merely their individual output but whether the demand on the system of which they form a part could be met without them. It is incorrect to assert that a plant operating at less than the anticipated average level of production is not being properly utilized. The load on each plant depends on the condition, interconnection and utilization of all the operating plants in the system, the location of the load, and the load on the system as a whole. It would be gratifying if projections of required plant production were matched or exceeded by actual utilization, the fact that they are not does not equate to failure of the project. This is not to denigrate the importance of realizing the full potential

¹¹GAO note Load shedding describes a condition that occurs when the output of a unit or power plant is disconnected when the demand is greater than the available capacity to supply it.

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of unutilized capacity as soon as possible and thus reap the full benefit of capital investment already made. However, the key factor to bear in mind in a developing country is the extent to which sufficient firm power in an area improves the performance of its factories, mills and mines and of electrically driven pumps for the supply of water to irrigate farmland, and whether the availability of firm power attracted investment both in new industries and in the expansion of existing factories and farms.

The flavor of the draft report is that the performance of most of the AID-assisted power plants examined by the GAO was unsatisfactory. Although we do not wish to argue numbers with the GAO we think it would be informative to compare the performance of AID-assisted power plants in India with the performance of power plants in typical sections of the United States. As pointed out on page 11 of the draft report, a measure of plant utilization is the attained "plant factor". Other measures, such as the "load factor",^{1/} are also in widespread use. The utilization attained in the AID-assisted plants in India, using both factors, compares favorably with that attained in at least one large area of the United States. The East Central Region is heavily industrialized containing, as it does, the states of Ohio, West Virginia, Indiana and Michigan, together with portions of adjoining states. The West Central Region, including and extending from Minnesota to the Dakotas and Nebraska is essentially agricultural in overall character. The utilization attained in India is almost identical with that in the latter region, as shown in the following table

	Plant Factor ^{1/} <u>1965</u>	Load Factor ^{2/} <u>1965</u> <u>1970</u>	
U.S. East Central	53.8	66.2	65.9
U.S. West Central	45.1	59.6	58.4
AID-assisted plants in India ^{3/}	45	N.A.	58

^{1/} "Hydroelectric Power Evaluation," Federal Power Commission, 1968
(Data given is for thermal plants.) Data is not available for 1970,
but load factor statistics indicate that changes would have been minor.

^{2/} From Parts II and III, 1970 National Power Survey, Federal Power Commission.

^{3/} Data for 1970, as plants were not in full service in 1965.

Fertilizer

The fertilizer plants financed by AID provide for the domestic manufacture of one of the principal inputs required for the rapid growth in food

^[1] GAO note. Load factor can be defined as the ratio of the average load supplied over a designated period to the peak or maximum load occurring in that same period.

grain production in India which has occurred during the last few years. Domestic production of fertilizer is contributing to the "green revolution" and to achievement of the Indian Government's goal of self-sufficiency in food grains. Also, as domestic fertilizer production increases, it will gradually relieve the burden of foreign exchange payments for fertilizer imports.

The AID-financed fertilizer plant at Trombay is not yet producing as much fertilizer as it should, owing mainly to design defects, despite the input of a reputable U.S. firm whose business is the engineering, design and construction of chemical processing plants. Most of these production problems are likely to be resolved in the course of a plant expansion to be financed by the World Bank. AID obtained and paid for the services of a technical team from the Tennessee Valley Authority to study production problems at Trombay. The TVA team made a number of specific recommendations to improve the operation of the various units. The Indian Ministry of Petroleum and Chemicals and the Fertilizer Corporation of India, the institution responsible for operation of the Trombay plant, accepted the TVA recommendations and undertook the necessary remedial action.

(F) Railways

During the period 1958-65 AID made seven loans totalling \$184 million to the Government of India for the Indian railways. The planning document for the seventh and last of these loans, which was authorized in February, 1965, concluded that the Indian railways were more effective than highway trucks in meeting the transport demands most essential to basic economic development, i.e., long distance hauling of bulk loads such as coal, iron ore, industrial raw materials, food grains, fertilizer and the like. The AID loans were based on projections of railway freight traffic which was expected to increase steadily in the future. In fact, the revenue-earning freight traffic of the Indian railways rose from 72,333 million net ton-kilometers in 1960-61 to 111,826 million net ton-kilometers in 1969-70, an increase of 54.6 percent over the ten-year period. We consider that the operating performance of the railways under the conditions prevailing in India has been and continues to be reasonably good.

One infers from the draft report that because the utilization of diesel-electric locomotives in India is less than 640,000 ton-kilometers per day, the Indian Railways are performing badly. We do not think that this is the case and believe that a comparison of railway performance in India and the United States would lead to a better understanding of the situation. The draft report refers, on page 26, to a standard for

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average daily utilization of diesel-electric locomotives on broad-gauge track in India of 640,000 ton-kilometers. On the next page, the draft report notes that "1970 locomotive utilization in the United States was in the neighborhood of 200,000 net ton-kilometers per locomotive unit per day." We question the applicability of a locomotive utilization standard for India which would be more than three times the average unit pay load utilization of locomotives in the United States. The suggested standard for India may be attributable either to a misunderstanding resulting from verbal discussion or to consultation with a source in the USAID Mission not fully conversant with railway operating practices and performance. It should be corrected. The draft report states, on page 27, that "Indian diesel locomotive utilization per day for 1970, was reported to be about 256,000 net ton-kilometers on broad gauge track..." This rate of utilization compares favorably with the corresponding rate in the United States cited in the draft report, it indicates that the performance of the Indian Railways is not far from the norm by U.S. standards.

- (G) To sum up, AID does set performance standards as appropriate for the projects which it helps to finance, it requests the borrower to provide production data for completed projects in sectors of the economy which AID expects to assist in the future, and it provides the services of specialists when needed to advise the responsible Indian institution on production problems. But we believe that these actions should be taken on a carefully selected case-by-case basis. The management system recently established by AID provides for a reasonable cutoff of AID monitoring and assistance after a loan has been fully disbursed, the project completed and AID's development objectives met. When this system has been fully implemented, there will be an opportunity to evaluate its effectiveness.



D.G. MacDonald
Bureau for Asia

GENERAL ACCOUNTING OFFICE VIEWS
ON AGENCY FOR INTERNATIONAL
DEVELOPMENT COMMENTS

On December 30, 1971, GAO requested the AID Administrator to review and comment on a draft of this report. The AID response, dated February 17, 1972, is included as appendix I. Changes were made to the draft and were incorporated in this report.

The following comments are alphabetically keyed to the agency's letter in appendix I.

(A) Management system

AID's manual order regarding project monitoring was revised in March 1971 and again in August 1971. It calls for a loan completion review report after final disbursement has been made. Recommended future monitoring is to be limited to the original objectives not met at the time the report is made. The manual order requires also that a date be established or conditions of achievement be described after which monitoring by AID will no longer be necessary.

The manual order, which AID describes as a management system, does not provide for the systematic monitoring of the maintenance and utilization of previously financed projects.

We agree that monitoring should focus on whether basic objectives have been accomplished. We also agree that the performance of similar completed projects should be evaluated when an application for AID financing of a proposed new project of the same kind is being reviewed. We believe, however, that good management practice calls for some form of systematic monitoring which would provide a continuing and current check on utilization and performance of completed projects. Information obtained would help to insure that officials at the highest practical level within the government of the assisted country would be made aware of conditions requiring corrective action.

Moreover, AID and the Missions would be in a knowledgeable position to recommend corrective actions to the recipient government and to render timely technical assistance. Waiting for a proposed new project of the same kind to come along before evaluating similar completed ones could prejudice the chances for approval of the new project, particularly if detrimental conditions were found that might have been corrected if discovered earlier.

(B) Performance standards

Performance standards and production goals are not always spelled out clearly in the appraisals conducted by AID before projects are approved. In such instances few, if any, measuring guidelines are provided for those who later are expected to evaluate performance and to report on project utilization.

More importantly it seems unlikely to us that AID can realistically make a decision to finance a capital project unless it knows clearly, and with some precision, the expected production to be achieved by the project.

For the utilization of AID-financed diesel-electric locomotives, the volume and pattern of freight movements have been considered in a few instances and specific standards of expected locomotive performance have been indicated. No formal evaluation or measurement of utilization by these standards had been made, however, according to information we obtained and records we examined.

Our main concern is not that a strict utilization standard be established for each locomotive in India but rather that some form of regional or general performance standards be developed--on the basis of expert evaluations, determinations, and expectations--to allow a continuing performance analysis using the actual performance data currently available from Indian Government sources. No general or specific standards or set of criteria have been applied to measure the effectiveness of U.S.-provided assistance to the Indian railways. We have no such standards, nor are we in a position to develop them.

We recognize that specific performance comparisons with the railway systems of other countries may not be feasible or warranted because of many differing factors and conditions. Our point is that appropriate criteria should be identified and incorporated into suitable standards from which meaningful evaluations can be made of the effectiveness of U.S. assistance provided to India for the purchase of diesel-electric locomotives.

With respect to when performance standards are established, we see nothing to preclude the revision or updating of expected performance standards originally established to reflect subsequent developments and current conditions, provided that such changes are properly justified and documented. Such changes, upward or downward, could reasonably be expected to provide a more useful standard for measuring project performance.

(C) AID monitoring of production

Although production data is generally available upon request, AID does not obtain production data from the power plants covered in this report on a regular, systematic basis that would allow it, on a current basis, to analyze reasons for low output. Moreover, AID has not obtained the necessary operating information on the use of AID-financed locomotives to enable it to ascertain whether these locomotives are being efficiently and effectively used.

On several projects found to be performing below expected standards because AID apparently was not aware of the current situation, AID was not in a position to suggest corrective measures or to offer other assistance which might have been translated into swifter correction of conditions causing poor utilization.

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(D) Providing specialists when needed

There is no doubt that AID has provided very valuable technical assistance to the Indian Government in several areas. AID's role in implementing the work of the Indian Government's Power Economy Committee is particularly noteworthy. In providing technical assistance to individual projects, AID almost invariably acted after the fact, i.e., after problems had developed to a point where emergency-type assistance was needed. The systematic gathering and routine appraisal of minimal performance data would help prevent the serious loss of production or substantial underutilization that can occur when problems go unrecognized or unremedied for long periods of time.

AID, if informed in advance of an approaching problem, would be able to suggest steps that the Government of India could take to ameliorate any actual or potential adverse condition. Prompt technical assistance could be made available, or Indian Government officials could be advised to seek expert outside help, possibly financed in part by AID. Such assistance, we believe, should not come only after emergency situations present themselves

We do not suggest that AID maintain a perpetual donor-recipient connection to each completed project. The interests of the United States and the recipient country would be better served, however, by a systematic performance evaluation--by AID or by others for AID--to ensure the maximum utilization of U.S. funds as long as bilateral, concessional assistance continues to be provided to the recipient country.

(E) Power

In responding to the section of the report draft dealing with power plants, AID showed a comparison of plant factors and load factors, using

power plants in selected areas of the United States, and states that utilization attained in India was almost identical. We would like to point out, as AID did, that India has been plagued by power shortages--a condition that rarely exists in the United States because increasing demand is anticipated in such a manner that adequate installed capacity and efficient interconnections are available when needed.

Because continued shortages and concurrent demands for power are the rule, rather than the exception, in India, utilization of equipment, in our view, could be much better than it has been and at least on a par with the expected goals established by AID when proposed power projects were being reviewed and evaluated.

We recognize that there are major factors involved in addition to producing electricity and having it available at the power plants. Important factors, including transmission and distribution facilities, interconnections, equipment operation, and maintenance, are part and parcel of efficient utilization and are all subject to the influence of the planning, management, and monitoring actions of responsible officials.

With reference to AID's comparison with power plants in typical sections of the United States, we would like to point out that our overall estimate of plant factors, for example, was based on gross generation, which placed it on the conservative side. In the United States the Federal Power Commission uses net generation in computing plant factors. On that basis the overall plant factor for the AID-assisted power plants in India averages 41 percent. (See p. 12.)

Including the West South Central States in AID's comparison (AID's 1965 plant factor of 45.1 percent is for U.S. West North Central States

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only), which are agricultural and which compare with India in climate, the figures would show average plant factors of 47.4 percent compared with 41 percent for India--a performance difference of some 15 percent.

(F) Railways

We agree that the locomotive performance standards originally given to us by the AID Mission in India may be open to questions of validity and suitability.

Many factors would be involved in any direct comparison between countries or even within the same country. These factors include, but are not limited to track gauge, types of locomotives used, capacity and number of cars pulled, number of locomotive units used for each train, hours of operation, train speed, terrain traversed, weight capacity of rails, makeup of loads hauled, condition of track, and extent of modern dispatching equipment. Because of these and other complex factors, we have deleted from our report any reference to comparisons between United States and Indian railway performance as being irrelevant to our main concern.

The point we wish to emphasize is that AID has not established or adopted suitable standards for the utilization of AID-financed locomotives. We do not know what an appropriate standard would be, but we believe that experienced AID technical personnel, in consultation with appropriate Indian officials, could establish suitable standards. Meaningful evaluations of the effectiveness of U.S. assistance to Indian railways should include current performance checks on the status of locomotive use (See comment B)

(G) Summary

See comments A and B

PRINCIPAL OFFICIALS RESPONSIBLE
FOR THE ACTIVITIES DISCUSSED IN THIS REPORT

AppointedDEPARTMENT OF STATE

SECRETARY OF STATE:

Dean Rusk	Jan. 1961
William P. Rogers	Jan. 1969

AMBASSADOR TO INDIA:

John Kenneth Galbraith	Mar. 1961
Chester E. Bowles	June 1963
Kenneth B. Keating	June 1969

AGENCY FOR INTERNATIONAL DEVELOPMENT

ADMINISTRATOR.

Fowler Hamilton	Sept. 1961
David Bell	Dec. 1962
Williams S. Gaud	Aug. 1966
John A. Hannah	Mar. 1969

DIRECTOR, MISSION TO INDIA

C. Tyler Wood	Nov. 1959
John P. Lewis	Sept. 1964
Leonard J. Saccio	Oct. 1969
L. Paul Oechsli (acting)	Dec. 1970
Howard E. Houston	May 1971

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