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Report No. 12642

PROJECT COMPLETION REPORT

INDIA

FOURTH TROMBAY THERMAL POWER PROJECT (LOAN 2452-IN)

DECEMBER 19, 1993

Energy Operations Division Country Department II (India) South Asia Regional Office

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COUNTRY EXCHANGE RATES AND ABBREVIATIONS

Currency Unit = Rupee (Rs.) Rs. 1 = Paise 100

RUPEE (Rs.) / US \$ EXCHANGE RATES and CPI (Yearly Averages)

Fiscal Year	Rupees/US\$	Consumer Price Index FY80/81=100
May 31 1984 (SAR)	10.80	-
FY84/85	12.37	133.3
FY85/86	12.61	141.2
FY86/87	12.96	148.0
FY87/88	13.92	163.2
FY88/89	16.23	176.3
FY89/90	17.50	190.6
FY90/91	22.74	216.3
FY91/92	26.20	237.0 (estimate)

Government of India and Tata Electric Companies Fiscal Year: April 1-March 31

Measures and Equivalents

1	Ton (t)		=	1 metric ton=1,000 Kg.=2,200 lbs.
1	Kilovolt (kV)		Ξ	1,000 volts (V)
1	Kilovolt ampere	(kVA)	=	1,000 volt-amperes (VA)
1	Kilowatt-hour	(kVh)	=	1,000 watt-hours
1	Megawatt-hour	(MWh)	=	1,000 kilowatt-hours
1	Gigawatt-hour	(GWh)	=	1,000,000 kilowatt-hours

ABBREVIATIONS AND ACRONYMS

The	Act:	Electricity (Supply) Act of 1948, as amended
BEST	:	Bombay Electric Supply and Transport Undertaking
BSES	:	Bombay Suburban Electric Supply Ltd.
CEA	:	Central Electricity Authority
CPI	:	Consumer Price Index
GOI	:	Government of India
GOM	:	Government of Maharashtra
IBRD	:	International Bank for Reconstruction and Development
ICB	:	International Competitive Bidding
IFC	:	International Finance Corporation
LSHS	:	Low Sulphur Heavy Stock
MSEB	:	Maharashtra State Electricity Board
NTPC	:	National Thermal Power Corporation
PLF	:	Plant Load Factor
QA	:	Quality Assurance
SEB	:	State Electricity Board
TCE	:	Tata Consulting Engineers
TEC	:	Tata Electric Companies

THE WORLD BANK Washington, D.C. 20433 U.S.A.

Office of Director-General Operations Evaluation

December 29, 1993

MEMORANDUM TO THE EXECUTIVE DIRECTORS AND THE PRESIDENT

SUBJECT: Project Completion Report on India Fourth Trombay Thermal Power Project (Loan 2452-IN)

Attached is the "Project Completion Report on India - Fourth Trombay Thermal Power Project (Loan 2452-IN)" prepared by the South Asia Region. Part II was prepared by the Borrower.

This was the fourth Bank loan to the private Tata Electric Companies (TEC) in Bombay, India. The US\$135.4 million loan was approved in 1984. Less than US\$1 million was canceled.

The project was to reduce power shortages in the Western Region by providing additional least-cost, efficient and environmentally benign thermal capacity. After an initial delay by Government in selecting the appropriate technology, project implementation was uneventful. The expost economic rate of return was as forecasted at appraisal (13%). The PCR concluded that besides sector regulations conducive to private sector initiatives, project success hinged on the previous experience and management quality of TEC. The PCR cautioned that environment issues should be handled prior to project launch to avoid possible interferences by local environmental groups.

The PCR gives a thorough account of project implementation. Overall, the project outcome is rated as satisfactory; its sustainability is deemed likely in spite of recent interruptions in the supply of gas to the plant. Because of its limited institutional objectives, the project institutional impact is considered as negligible.

No audit is planned.

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INDIA

FOURTH TROMBAY THERMAL POWER PROJECT (LOAN 2452-IN)

PROJECT COMPLETION REPORT

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FOURTH TROMBAY THERMAL POWER PROJECT (LOAN 2452-IN)

PROJECT COMPLETION REPORT

Preface

This is the Project Completion Report (PCR) for the Fourth Trombay Power Project in India, for which Loan 2452-IN in the amount of US\$135.4 million was approved on June 6, 1984. The loan was made to the Tata Hydro-Electric Power Supply Company Limited, the Andhra Valley Power Supply Company Limited, and the Tata Power Company Limited, referred to collectively as the Tata Electric Companies (TEC). The loan was guaranteed by India, acting by its President. Implementation was delayed due to delays in choice of boiler technology and creation of the security for the loan. The loan was closed on June 30,1992, after two extensions of one year each. The extensions were agreed upon by the Bank to allow TEC to complete payments for minor additions brought to the project during implementation. Total disbursement under the loan was US\$134,409,077.98. The undisbursed balance of US\$990,992.02 was canceled on November 12, 1992, when the final disbursement under the loan was made.

The PCR (Preface, Evaluation Summary, Parts I and III) was prepared by the Energy Operations Divisions, Country Department II (India), South Asia Regional Office.

Preparation of this PCR was started during the Bank's final supervision mission of the project in February 1992, and is based, inter alia, on the Staff Appraisal Report (No. 4536-IN), the Loan and Guarantee Agreements, supervision reports, correspondence between the Bank and Borrower, internal Bank memoranda and the project completion report prepared by TEC for its own internal evaluation and archives.

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FOURTH TROMBAY THERMAL POWER PROJECT (LOAN 2452-IN)

PROJECT COMPLETION REPORT

Evaluation Summary

Objectives

The main objective of the project was to reduce power shortages in the Western Region by providing additional least cost, efficient and environmentally benign thermal capacity. This objective was accomplished with the installation of a 500 MW natural gas/low sulphur fuel oil fired unit (Unit 6) in the Trombay power plant, owned and operated by the Tata Electric Companies. A further objective was to save fuel by eventually replacing old and less-efficient units with a total installed capacity of 187.5 MW. This objective was achieved by replacing base load generation with generation from the more efficient new unit.

Implementation Experience

TEC successfully implemented this project which included the construction of a 500 MW thermal power unit and its associated transmission facilities. The unit was synchronized in March 1990 and reached its full load in June 1990. The implementation period was twelve months shorter than the previous unit of similar size (Unit 5), built under Ln. 1549-IN. However, implementation was delayed by about twelve months with respect to the date estimated at appraisal. This was mainly due to delays in the decision of the Government of India (GOI) whether to adopt a new steam cycle technology and in the creation of the security for the Bank loan.

Results

The project fully achieved its objectives: (i) the installed capacity of the Western Region was increased by 4.3% to 11,542 MW with the installation of a 500 MW natural gas/low sulphur fuel oil fired unit (Unit 6) in TEC's Trombay power plant, in Bombay; and (ii) generation from the new unit began replacing base load generation from the less-efficient and less-reliable older units. The project has also improved the reliability of power supply to consumers in Greater Bombay and intensive load management measures have been reduced.

The actual project cost was Rs. 4,595.4 million (US\$335.9 million at the average exchange rate of US\$ = Rs. 13.68). In terms of Rupee the project cost increased 17.7%, while it decreased 7.1% in terms of US\$, essentially due to the devaluation of Rupee with respect to the US dollar (27.8% during the implementation period), reduction in customs duty for power projects (from 65% to 30%) and decrease in international prices of machinery and materials.

Sustainability

The project is clearly sustainable because the demand for its full output exists since power is in short supply, particularly in the Greater Bombay Area, where it has been increasing at about 87 per annum. The present tariff setting procedures allow tariffs adequate to recover capital and operating costs and provide a certain profit margin for TEC, and TEC does not have any accounts receivables problem. In addition, recent initiatives by GOI and the Government of Maharashtra (GOM) to attract further private investments to the power sector provide a sustainable basis for TEC to continue its operations in an improved policy environment (Part I; paras. 34 and 35).

Findings and Lessons Learned

Major findings are as follows:

- a) The project was instrumental in enabling TEC to extend its license, thereby preserving an important private element in India's power sector (Part I, para. 5);
- b) GOI and GOM complied with their commitments to TEC and took no action that would interfere with TEC's performance and adversely affect its financial position, providing an excellent example for new private investors interested in entering the power sector (Part I, para. 6);
- c) Use of the experience learned from the previous Unit 5 project, close cooperation and coordination between TEC and its consultants on preparation, supervision and monitoring during implementation, and emphasis on quality assurance (QA) programs permitted TEC to complete the project without delays beyond to those experienced at beginning (Part I, para. 12);
- d) It is estimated by TEC that the cost of indigenous equipment procured under international competitive bidding (ICB) procedures in accordance with Bank guidelines was about 30% lower than would have been if TEC were to procure directly from the Indian domestic market (Part I, para. 16);
- e) The design of the project was modified to take into account of the environmental aspects -- initially proposed to burn coal, gas and LSHS, the unit was approved by GOI only for gas and LSHS, the height of the stack was increased to 275 meters, and a modern electrochlorination plant was installed to reduce impact of liquid effluents (Part I; paras. 23);
- f) In accordance with the clearance granted by GOI, the three oldest units (187.5 MW) of Trombay power station were to be shut down and decommissioned, right after Unit 6 was put under commercial operation. In view of the continuing shortages of power in Greater Bombay, GOI amended its clearance in September 1991, so that these units would be retired in 1994, when a 180 MW combined cycle unit, currently under construction at Trombay (Unit 7) is commissioned: Therefore, the units are currently operated during peak periods (Part I; para. 23);

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- g) The project assisted in the transfer of know-how through modifications brought in the design of the steam turbine, adoption of micro processor based controls for the power plant and the switchyard equipment, installation of an environmentally benign and modern electrochlorination system, and installation of gas insulated switchgear (Part I, para. 25);
- h) If the present unreliability in gas supplies continues the Trombay power station would risk to be operated at lower and non-optimal plant load factors (Part I; para. 28);
- TEC's financial position remained solid, with a long-term debt/equity ratio of 1.6 maximum and a current ratio of 1.2 minimum. Debt service coverage ration was 1.8 average through FY91/92, with a minimum of 1.7 in FY88/89. In FY91/92, however, the debt service coverage ratio decreased to 1.3 due to a substantial increase in debt service obligations on foreign loans. TEC financed about 20% of its investments from self financing (Part I, para. 33);
- j) Successful completion of the unit within 4-1/2 years from the date of award for the main plant equipment, was due to the fact that TEC prepared the project well, spending about 5-1/2 years for preparing the project, negotiating the loans and obtaining all necessary approvals and authorizations from GOI, GOM as well as local authorities (Part I, para. 37);
- k) TEC's strong position in the international and local financial markets as well as its self financing capabilities and existing structural and managerial strengths indicate that the Bank's involvement with the company may be progressively phased out and TEC that should make more use of commercial borrowing (Part I, paras. 38 and 39); and
- The Staff Appraisal Report (SAR) did not explicitly give certain specific dates such as project starting, unit synchronization, commercial operation and overall project completion dates, and this shortcoming has prevented a detailed comparison with the actual implementation and completion dates (Part I, para. 46).

Major lessons learned from this project are summarized below:

- a) The major factor leading to successful completion of the project, without additional delays, was the use of the previous experience and efficiency and active involvement of TEC's management (Part I, para. 12);
- b) Environmental issues should be taken into account right from the beginning, otherwise actions brought by local environmental groups might cause delays and additional costs (Part I; para. 13); and
- c) Appropriately designed, constructed and operated projects such as the one covered under this loan, well established and managed companies such as TEC, and GOM's fair execution of the Electricity (Supply) Act and other related legislation provide an excellent example to incite other private investors into the public power supply sector (Part I, para. 35).

INDIA

FOURTH TROMBAY THERMAL POWER PROJECT (LOAN 2452-IN)

PROJECT COMPLETION REPORT

PART I: PROJECT REVIEW FROM BANK'S PERSPECTIVE

Project Identity

Project Name	:	Fourth Trombay Thermal Power Project
Loan Number	:	Loan 2452-IN
RVP Unit	:	South Asia Region
Country	I	India
Sector	:	Energy
Sub-sector	:	Power

Background

1. In India, responsibility for electricity supply is shared constitutionally between the Government of India (GOI) and the states. In addition, India is one of the few developing countries with a vibrant, if small, private sector presence in public power supply. At independence, private utilities and licensed local authorities, located in urban areas, provided about 80% of public electricity supply. GOI opted to embark on an ambitious electrification program, particularly in rural areas, and through the Electricity (Supply) Act of 1948 (the Act) created the state electricity boards (SEBs) and entrusted the state governments and the boards with primary responsibility for public power supply. The Act also made the state governments and SEBs responsible for regulating private utilities. All but few remaining licensees consequently were taken over the expiry of their licenses. No new licenses have been granted since 1956. Only five private utilities remain: Tata Electric Companies (TEC), Bombay Suburban Electric Supply Limited (BSES), Ahmedabad Electricity Company, Surat Electricity Company, and CESC Ltd. (formerly Calcutta Electric Supply Corporation). All but BSES generate at least some of the power they distribute¹; their installed capacity totals about 2,800 MW, and they provide less than 5% of public supplies. In addition, Bombay Electric Supply and Transport Undertaking (BEST), which distributes power in the southern parts of the city of Bombay, is a department of the Municipal Corporation of Greater Bombay. Furthermore, an estimated 6,250 MW of captive generating facilities are operated by industries. The latter has developed in response to poor quality and unreliability of public supplies. The SEBs are grouped into five regional interconnected power systems. The Regional Electricity Boards coordinate plant dispatch and inter-state power exchanges.

2.

The private power utilities are regulated by the Act, as amended

BSES is now in the process of constructing its first generating facilities, a 2x250 MW coal-fired power plant at Dahanu, about 80 km north of Bombay, under a joint Bank/IFC operation (Loan 3344-2IN).

many times since 1948. Under the Act, licensees may set their tariffs to recover their full operating costs, depreciation, interest and a return on equity (para. 30). Their individual franchises are defined in licenses obtained from their respective state government, which cover their geographic area of operation and a term which was until 1991, normally of 20 years. Since 1991, the term was amended by GOI to 30 years. TEC's operations are regulated by the Government of Maharashtra (GOM). The generation and transmission facilities of TEC and the Maharashtra State Electricity Board (MSEB) are operated within the Western Region².

The Borrower

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3.

TEC consists of three companies:

- a) The Tata Hydro-Electric Power Supply Company Limited (Hydro), formed in 1910;
- b) The Andhra Valley Power Supply Company Limited (Andhra), formed in 1916; and
- c) The Tata Power Company Limited (Power), formed in 1919.

4. The companies were formed by the two sons of Jamshetji Tata, who were granted the initial licenses. Today the Tata group's holding company, Tata Sons Inc., holds less than 2.5% of the companies total shares. The Tata family owns less than 10% of Tata Sons. More than 75% of Tata Sons' shares are held by Tata Trust, a charitable institution governed by a board of trustees independent from the Tata family. Other individuals hold about 52.5% of the shares of the companies. The balance (45%) is held by the financial institutions.

In the 1950s, the three companies pooled their facilities and 5. their staff to form a single integrated grid connected to the Western Region. Although, they have not actually merged, they are operated as one company under the same management. They share their assets and liabilities, revenues and costs in the same proportion (20% Hydro; 30% Andhra; 50% Power) and are collectively referred to as the Tata Electric Companies (TEC). The three hydro-electric power stations at Khopoli, Bhivpuri and Bhira are still separately owned by the three companies under the original licenses issued in 1907, 1919 and 1921. The Trombay Thermal Power Station, the receiving stations and the transmission and sub-transmission network are owned jointly. The three companies operate the Trombay Power Station under the jointly owned Trombay Thermal Power Electric License issued in 1953. TEC's licenses were amended three times in 1978, 1985 and 1991 with the implementation of different projects under Bank loans (Part III, Table 1). Under the Act MSEB has the option to acquire, with appropriate compensation, the assets of the undertakings covered by the licenses. This option is exercisable every 10 years, but not before August 15, 2010, the maturity date of the Bank Loan No. 3239-IN approved in June 1990 for the Private Power Utilities (TEC) Project.

The Western Region is formed of the generation and transmission facilities of the State Electricity Boards of Madhya Pradesh, Gujarat, Maharashtra and Goa. TEC's facilities are connected with the system through MSEB's transmission lines. Ahmedabad and Surat Electricity Companies are also connected to this regional system.

The licenses are not exclusive. Other utilities may also be 6. licensed to distribute power in the same area. There are two such distribution utilities in TEC's area (BSES and BEST) who are supplied by TEC and retail power to 9 million consumers through their own distribution networks. In addition, TEC supplies directly about 114 large industrial consumers. About 70 more of these direct consumers located in TEC's area were taken over by MSEB in 1980, because TEC did not have adequate capacity to supply them. At that time TEC was importing about two thirds of its requirements from MSEB, a dependence that has since decreased. TEC is still in a deficit with respect to demand by about 1,600 GWh per annum and 400 MW on average (about 18% of its sales in FY91/92). But the probability that TEC's distribution rights may be truncated again by GOM and MSEB is considered very low. MSEB has neither the financial incentive nor the financial resources to take over more direct customers. In connection with the project, GOI had agreed to cause GOM not to take any actions, including delimiting TEC's area of supply, that would adversely affect TEC's operational performance and financial position. Since then, GOM took no such adverse action.

7. TEC generates, transmits and supplies power to large industrial consumers and two distribution utilities in the Greater Bombay Area. The quality of its power supply (as regards continuity, frequency, voltage) is superior than those supplied by the public utilities. TEC is a well managed corporation with strong financial performance and a good record of efficient operation and maintenance. TEC's staffing is commensurate with the size and scope of its operations. As of December 1992, TEC had a total of 3,960 personnel; out of which 151 were senior managers, 498 senior engineers, 544 assistant engineers, 2,360 skilled and semi-skilled labor and 407 nontechnical and administration staff. TEC provides extensive in-house and external training to its personnel and to that of other utilities in India, primarily for power plant operation. TEC has established an Environmental Cell which follows environmental pollution control issues.

Project Objectives and Description

8. <u>Project Objectives</u>. The main objective of the project was to reduce power shortages in the Region³ by providing additional least cost, efficient and environmentally benign thermal capacity. This objective was accomplished with the installation of a 500 MW natural gas/low sulphur fuel

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At appraisal, intensive load management was practiced in the Greater Bombay Area, to restrict both demand and energy consumption. Consumers were required to stagger their weekly holiday, were allocated quotas of demand and energy and were subject to disconnection if they exceeded their quotas.

oil fired unit (Unit 6) in TEC's Trombay power plant, in Bombay⁴. When commissioned in 1990, the project increased the total capacity of the Western Region by 4.3% to 11,542 MW. A further objective was to save fuel by eventually replacing old and less-efficient units with a total installed capacity of 187.5 MW. This objective was achieved by replacing base load generation with generation from the more efficient new unit (para. 21).

9. <u>Project Description</u>. The project was an integral part of GOM's least-cost program of alleviating power shortages in Maharashtra. It was assigned to TEC because MSEB lacked the financial resources to build another 500 MW unit and the associated transmission system, at a time when MSEB was implementing the 2x500 MW extension of the Chandrapur thermal power plant⁵ and developing its 400 kV transmission system. The project (Unit 6) consisted of:

- a 500 MW single reheat steam turbine-generator set, complete with auxiliaries;
- b) a boiler equipped to burn natural gas and low sulphur heavy stock (LSHS) fuel oil;
- a circulating water system to extract sea water from Bombay harbor, deliver it to the condenser of the turbo generator set, and return it to the harbor;
- d) LSHS storage tanks;

(Ln.1549-IN).

- e) buildings for the turbo generator set and auxiliary plant;
- f) miscellaneous electrical and mechanical equipment;
- g) associated civil works;
- h) extensions to existing switchyards at Trombay power station and Carnac receiving station; and
- the construction of a double circuit 220 kV part overhead/part underground transmission system from Trombay switchyard to Carnac in South Bombay and establishment of a 220/110 kV switching station at Carnac.

The project was similar to and erected beside Unit 5⁶ on reclaimed land, owned by TEC, which was part of the original ash disposal area. There was no resettlement. All the necessary infrastructure facilities were already present and had only to be extended as necessary to accommodate the new unit.

4 Before the construction of this project, TEC's Trombay power station had five units of different sizes either in operation or under construction. Units 1, 2 and 3 $(3 \times 62.5 \text{ MW}) = 187.5 \text{ MW}$ Unit 4 : 150.0 MW Unit 5 : 500.0 MW Total (prior to Unit 6) : 837.5 MW With the commissioning of Unit 6 (500.0 MW) the total installed capacity of the station reached 1,337.5 MW. 5 This 2x500 MW coal-fired power plant is being implemented under the Bank Loan 2544-IN. Built under the Bank's Third Trombay Thermal Power Project

Project Design and Organization

The feasibility report of the project was prepared jointly by TEC 10. and its consultants. Tata Consulting Engineers (TCE - paras. 41 and 42). The project was initially proposed as triple-fired unit (coal, LSHS and natural gas) but was finally cleared by GOI as a unit utilizing only clean fuels, viz. LSHS and natural gas. In pursuit of higher fuel efficiency considering the premium fuels to be burnt and with a view to introduce a new technology in the country, TEC proposed the installation of a boiler with a steam cycle at super-critical temperatures and a once through flue gases system. After detailed studies and discussions, due mainly to technology transfer problems, GOI, while granting the techno-economic clearance, opted for the established sub-critical type steam cycle. The super-critical alternative would have allowed 2% improvement in the heat rate compared to the sub-critical option. Nevertheless, TEC, TCE and the supplier brought modifications in many parts of the design, such as increasing the reheat temperature and number of reheat outlet headers, modifying design of the blades, reducing auxiliary fuel consumption as well as increasing reliability, which permitted TEC to achieve a net 2% heat rate improvement over Unit 5. The design was modified to take into account environmental aspects (para. 23). The overall design of the project reflects the current state-of-the-art of thermal power plants technologies.

Project Implementation

11. Loan Effectiveness and Project Start-up. Loan 2452-IN was approved on June 6, 1984; the Loan and Guarantee Agreements were signed on December 12, 1984⁷. Creation of a security in favor of the Bank, in form and substance satisfactory to the Bank, was a condition of effectiveness. Government approvals required for the registration of the Trust Deed for the creation of the security took longer than anticipated and the Loan was declared effective only on July 31, 1985, a delay of 4-1/2 months from the date of effectiveness originally determined at signing.

12. Implementation Schedule. The project was sanctioned by GOI in June 1984, and was originally scheduled to be synchronized with the system by March 1989. The appraisal report envisaged that the contracts for the main plant equipment would be awarded during the first quarter of 1985. Because GOI's lack of decision for nearly one year concerning TEC's "super-critical steam cycle" proposal (para. 10), the orders for the turbine-generator and boiler (with sub-critical parameters) were placed only in September 1985 and December 1985, respectively. The unit was synchronized in 54 months⁸ from the award of the turbine-generator contract in spite of intervening stoppage of civil works and delays in deliveries (paras. 13 and 14). The major factors leading to successful completion of the project were the close cooperation between TEC and TCE and the active involvement of the engineering, operation, maintenance, construction and quality assurance personnel of TEC at all stages

⁷ There are no records in the files describing the reasons why the Agreements were signed six months after approval.

8 Compared to 66 months for Unit 5, because TEC used the experience learned during the procurement and implementation of that unit.

of the project, right from preparation of feasibility report. The 220 kV transmission system from Trombay to Carnac was completed and taken into regular service in April 1988 (para. 24).

Implementation Process. The civil works were completed generally 13. as per schedule. In anticipation of the clearance of the project, TEC started the preliminary works as early as January 1984. As an extension to an existing power station, the need for infrastructure was minimal. Bidding documents for civil works were issued only to prequalified contractors. The progress of the civil works, particularly works for boiler foundations, stopped for four months in 1986 when the Bombay Municipal Corporation issued a Stop Work Notice at the instigation of local environmental groups. This notice was withdrawn in August 1986 and TEC mobilized additional manpower and financial resources to overcome the initial delay. The equipment suppliers furnished the design data required for the foundations very early since a part of the advance payment for the equipment was linked to furnishing the design information. This helped to establish an uninterrupted flow of civil construction drawings.

The performance of all suppliers, most of them indigenous 14. manufacturers, was satisfactory, except that sustained follow-up was required to obtain deliveries of delayed equipment. For each of the critical equipment, suppliers were required to furnish intermediate milestone and detailed activity charts which helped in monitoring their program. There were delays on the part of the suppliers of boiler and turbine-generator in placement of orders to sub-contractors and in manufacturing. Sustained follow-up at the working level and frequent intervention by the senior management of TEC and of the suppliers enabled delivery of equipment to meet the commissioning schedules adopted at the date of awards. These delays, though not critical for commissioning, resulted in need for simultaneous works in various areas and a consequent strain on the project manpower. To compensate for the above events, the equipment manufacturers increased mobilization, augmented shifts and gave special emphasis on quality assurance (QA) in order to ensure commissioning within the schedule.

Procurement. All procurement, under international competitive 15. bidding (ICB) as well as that advertized locally, was carried out satisfactorily following the Bank's guidelines. Bidding documents and recommendations for the award of contracts were prepared by TEC with the assistance of TCE. Equipment and materials contracts (worth more than US\$200,000 each) financed under the Bank loan, were awarded under ICB. The total number of contract packages procured under ICB amounted to 96, of which 41 were awarded to indigenous and 55 to foreign suppliers. Contracts worth US\$500,000 or more were subject to prior review by the Bank. In accordance with the Loan Agreement, four contracts, each worth less than US\$200,000 and aggregating to US\$2 million, were awarded on the basis of competitive bidding advertized locally. As projected in the SAR⁹, qualified local contractors won 72.6% of the total procurement. The turbine-generator, financed under the Japanese commercial credits, was procured under a negotiated contract, partly from a foreign supplier, partly from a local supplier (para. 26).

Para. 3.15 and Table 3.2 of the SAR.

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All bidding recommendations of TEC and TCE were accepted by the 16. There were two instances of representation by bidders who were not the Bank. lowest evaluated and acceptable bidders (circulating water pumps and high pressure piping). These issues were clarified to the Bank with additional information and the Bank accepted TEC and TCE's recommendations. Prices in the procurement under local procedures were found to be competitive and the delivery periods were within the overall timeframe. ICB procedures assured that the equipment was available at competitive prices particularly from indigenous manufacturers who had the facility, under such bidding and financing conditions, to have these contracts treated by GOI as "Deemed Exports" and hence to import raw materials required for the contracts free of duty and to be paid other incentives. TEC estimates that the cost of indigenous equipment was about 30% lower (Rs. 300 million; about US\$27.8 million) under ICB than would have if TEC were to procure directly from the Indian domestic market.

17. The appraisal report envisaged an import content of US\$100 million. The final list included contracts amounting to US\$76.6 million with foreign suppliers and imports amounting US\$19.1 million by indigenous suppliers¹⁰, thus amounting to US\$95.7 million equivalent. The import licenses on imported materials were released by the various ministries of GOI in a sequential manner as all relevant conditions for such licenses were duly and carefully followed. In consequence, no undue delay was experienced in obtaining the import licenses when it was necessary.

18. <u>Project Costs</u>. The total cost of the project, including contingencies, taxes and duties, was estimated in the SAR at about Rs. 3,903 million (US\$361.4 million equivalent at the exchange rate of US\$1 = Rs. 10.8), of which about Rs. 1,085 million (US\$100 million -- 28%) represented the foreign exchange cost (Part III, Table 5A). The actual cost was Rs. 4,595.4 million (US\$335.9 million equivalent at the exchange rate of US\$ = Rs. 13.68)¹¹, of which Rs. 1,309 million (US\$95.7 million -- 28.5%) were expenditures in foreign currencies. In terms of Rupees, the project cost increased 17.7%, while in terms of US dollars, it decreased 7.1% (about US\$25.5 million equivalent) due essentially to the devaluation of the Rupee vis-a-vis the US dollar (27.8%), as well as reduction of import duties on power projects (from 65% to 30%) and international price decrease in imported machinery and equipments (para. 16).

19. Cost estimates included customs duty at a rate of 65% on the cost

¹⁰ The imports by indigenous suppliers included computer systems, timers and relays for critical controls, molded case circuit breakers, sequence of event/fault disturbance recorders, castings for large size valves, castings and forging for turbine parts, high pressure piping and fittings, steam generator water circulation pumps, etc.

¹¹ The Rupee/US\$ exchange rate which was Rs.10.8/US\$ at the appraisal time increased to Rs.30.0/US\$ at the end of the project due to continuous erosion of the value of the Rupee against the US dollar. During the implementation period, the weighted average rate was Rs.13.68/US\$.

of imported equipment. In February 1985, GOI reduced the import duty applicable for power projects from 65% to 25%; this was subsequently raised to 30%. Total taxes and duties were US\$40.2 million, about US\$32.1 million less than the appraisal estimates. Consequent to wage revisions, additional manpower employed to complete the project in time and additional services provided, actual project supervision and administration expenditures were higher than the estimates.

20. <u>Disbursements</u>. The estimated and actual disbursements under the Loan 2452-IN are given in Table 3, Part III. The delays which occurred at the start and late deliveries of the main plant equipment adversely affected the disbursements (paras. 13 and 14). In addition, the devaluation of the Rupee vis-a-vis the US dollar resulted in reduced disbursements in terms of US dollars. Therefore, actual disbursements were lower than the appraisal estimates, which projected that the loan would be closed by June 1990. At that time, the actual cumulative disbursement level was 90% of the total loan amount. The closing date of the loan was extended twice by one year each, to June 30, 1992. The extensions were agreed upon by the Bank to allow TEC to complete payments for minor additions brought to the project during implementation. Total disbursement under the loan was US\$134,409,077.98. The undisbursed balance of US\$990,992.02 was canceled on November 12, 1992, when the final disbursement under the loan was made.

Project Results

21. <u>Project Objectives.</u> Overall, the project was successful in meeting its principal objectives of: (i) increasing the installed capacity by 500 MW, near Bombay where the demand growth is substantial, through a least cost production technology and using environmentally clean fuels; and, (ii) saving fuel by replacing the base load generation from the oldest units by generation from the more efficient new unit. TEC estimates that US cents 2.15 is saved for each kWh replaced from the old units (442 GWh were replaced during the April 1990 - December 1992 period; savings are estimated to have amounted to about US\$9.5 million).

22. <u>Physical Results.</u> The physical targets of the generation component were achieved with one year delay, while there was no delay in completing the transmission component. The project has improved the reliability of power supply to the consumers in Greater Bombay and load management measures have been relaxed. However, the Western Region continues to be in deficit in power¹². At appraisal, synchronization of Unit 6 was planned for March 1989¹³. The unit was synchronized on March 23, 1990, and attained full load on June 15, 1990, and as of December 31, 1992, it has generated 7,499.7 GWh. The unit has been operating successfully at specified efficiency. The transmission component was commissioned in October 1988 and has been operating satisfactorily (para. 24).

23.

The project addressed several environmental aspects. Initially

13 Para. 51 of the SAR.

¹² In 1991, underfrequency relays operated and shut down loads 403 times.

proposed to burn coal, gas and LSHS, the unit was approved by GOI only for gas and LSHS. The height of the stack was increased to 275 meters. A modern electrochlorination plant was installed to reduce impact of liquid effluents. In accordance with the clearance granted by GOI, the three oldest units (3x62.5 MW) were to be shut down and de-commissioned, right after Unit 6 was put under commercial operation. In view of the continuing shortages of power in Greater Bombay, GOI amended its clearance in September 1991, so that these units would be retired in 1994, when a 180 MW combined cycle unit, currently under construction at Trombay (Unit 7) is commissioned¹⁴. The units are currently operated during peak periods. In accordance with the original clearance, the fourth unit (150 MW -- in operation since 1961) would be relegated to stand-by duty and operated to meet peaking requirements only when surplus gas is available for its operation.

24. Completion of the transmission lines from Trombay to Carnac improved the supply of South Bombay, reduced transmission losses and overloading of transformers at Carnac and on the 110 kV lines and cables in South Bombay, as well as wheeling of TEC's power through MSEB and thus wheeling charges paid to MSEB. During the engineering of the project, it was also decided to install 110 kV cables from Carnac to Backbay substation, also in South Bombay, to enable transfer of power from Trombay to Backbay. These cables were ordered along with other 220 kV cables and commissioned in October 1988.

25. The project also assisted in the transfer of know-how through: (i) modifications brought in the design of the steam turbine; (ii) adoption of micro processor based controls for the power plant and the switchyard equipment; (iii) installation of an electrochlorination system; and (iv) installation of gas insulated switchgear. In addition, the computer based project monitoring, reporting and management system developed and adopted for the project, is now being used for the other projects undertaken by TEC.

26. Project Financing. Financing remained in line with the one envisaged at appraisal (Part III, Table 5B). The Bank financed US\$134.4 million (40.0%) out of US\$335.9 million of the total cost of the project, including taxes, duties and interest during construction. Taxes and duties were US\$40.2 million. The share of the Bank funding was 45% of the total excluding taxes and duties. About US\$45.4 million of the Bank loan covered direct foreign exchange costs and the balance US\$90 million, was used for financing expenditures in local currency. The balance of the project (US\$201.5 million) was provided from: (i) a foreign commercial loan from Japanese commercial banks (US\$24.0 million); (ii) a loan from a consortium of local financing institutions lead by the Industrial Credit and Investment Corporation of India (US\$67.5 million): and, (iii) TEC's internally generated funds and special reserves (para. 30; US\$110.0 million). The Japanese loan was utilized for financing the procurement of turbine blades, high pressure turbine and the generator from Germany (45%) and procurement of low pressure turbine and other parts of the turbine-generator unit from a local manufacturer, under a Rupee contract (para. 15). The Bank loan was used to purchase the boiler and other components of the unit.

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This unit is financed under the joint Bank/IFC operation for the Private Power Utilities (TEC) Project (Loan 3239-IN).

	Sources	SAR		Actual		
	· · · · · · · · · · · · · · · · · · ·	(US\$ million)	(2)	(US\$ million)	(2)	
I.	IBRD	135.4	37.5	134.4	40.0	
II.	Foreign Com.Bank (Japan)	55.0	15.2	54.8	16.3	
III. IV.	Local Fin. Institutions Self Financing and	81.0	22.4	72.6	21.6	
	Special Reserves	90.0	24.9	74.1	22.1	
	TOTAL	361.4	100.0	335.9	100.0	

Financing of the Project

27. Economic Rate of Return. The economic rate of returns of the project can be calculated in different scenarios, such as the project serving only TEC's system, or as an addition to the Western Region as a whole (Scenarios "A" and "B"). As India's power systems are planned on a regional basis, economic analysis focuses primarily upon the Western Region, of which the components of the project are integral parts. However, when prices are low (as in India), demand and investment can be inflated above economic levels. The project, treated as an addition solely to the TEC system and estimating benefits on the basis of TEC's tariff, yields an ex-post economic rate of return of 19.9% less than the SAR's projection (23.5%) due mainly to increased fuel costs in FY92/93 (Annex 1.1). However treating the project as a part of the Western Region as a whole, with the concomitant decrease in the average tariff, increase in associated transmission and distribution expenditure and increase in system losses, reduces the economic rate of return to 9.5% as projected in the SAR (Annex 1.2). This return, however, is not a reflection of the economic merit of the project because of the prevailing low tariffs. Actually, consumers are willing to pay substantially more for reliable electricity than the actual prices. If the consumers' willingness to pay is incorporated (such as cost of alternative autogeneration or actual prices with 0.9 SCF correction), the economic rate of return increases to 13% compared to 13.2% projected in the SAR (Annex 1.3).

Fuel Supply for the Trombay Power Station

28. The Trombay thermal power station (para. 8) has been linked to a committed quantity of 1.5 MMCMD/day of associated gas from the Bombay High gas fields, 400,000 ton/annum of LSHS and 1.55 million ton/annum of coal. There is also a further offer of 240,000 ton/annum of LSHS. These fuels are adequate for the optimum operation of the plant. As the Guarantor of the loan, GOI had ensured the Bank that it "shall take or cause to be taken all such action as shall be necessary to ensure the availability of adequate supplies of suitable fuel for the optimum operation of the Trombay Power Station" (Guarantee Agreement Section 3.03). Recently due to problems experienced at the offshore gas fields, the amount of gas made available has been lower and has somewhat affected the production at the station, as seen in lower plant load factors (PLF)¹⁵. TEC is taking appropriate measures to secure additional quantities of LSHS and augment the delivery of coal (both domestic and imported). However, if the present unreliability in gas supplies

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^{56.4%} PLF in FY90/91 and 60% in FY91/92.

continues, the Trombay station would risk to be operated at lower and nonoptimal plant load factor.

TEC's Operational and Financial Performance

29. TEC's financial statements and performance, together with appraisal estimates for the FY84/85 - FY91/92 during which the project was implemented and disbursements under the loan were made, are detailed in Annexes 2, 3 and 4 and major operational and financial indicators are summarized in the following table.

	FINANCIAL AND OPERATIONAL SUMMARY						
•	(i	n million	of Rupee	3)			
					FY Ending	g March 3	1"
	1984/85	1985/86	1986/87	1987/88	1988/89	1989/90	1990/91
ENERGY GENERATION AND SALES:							
- Hydro Generation (GWh)	1371.0	1236.0	1182.0	750.0	1308.0	1132.0	1500.0
- Thermal Generation (GWh)	4680.0	3980.0	4597.0	5760.0	4904.0	5732.0	6452.0
Total Energy Generation (GWh)	6051.00	5216.00	5//9.00	1000 0	0212.00	1027 0	7952.00
- Energy Purchased (GWh) Total Energy Available (GWh)	7259 0	7646 0	7912 0	8410.0	8651.0	8791 0	9352.0
Station Use and Losses (GWh)	601.0	577.0	576.0	682.0	684.0	610.0	718.0
Energy Sold (GWh)	6658.0	7069.0	7336.0	7728.0	7967.0	8181.0	8634.0
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OPERATING EXPENSES:							
Cost of Fuel	2611.4	2405.8	2793.7	2983.0	2683.6	3154.7	3718.0
Other Operating Maintenance	569.8	526.3	610.9	703.2	910.8	1060.7	1170.1
Power Purchases	114 1	1020.0	125 7	120 5	132.1	165 5	2408.1
Tax on Sales	30.7	32.8	33.7	36.5	72.6	74.5	78.6
Wheeling Charges Payable to MSEB	51.3	55.4	79.6	76.3	70.3	88.9	92.9
Miscellaneous Write Offs	2.2	2.2	2.2	2.2	2.2	2.2	2.2
Total Operating Expenses	4095.5	4774.9	5713.4	5940.1	6609.1	6974.0	7754.9
NET INCOME BEFORE INTEREST	638.0	632.6	1088.4	916.1	978.7	1473.9	1865.1
<pre>Interest (Incl.Guar.fee in proi.)</pre>	228.6	264.4	314.7	384.7	446.2	550.0	729.5
Foreign Exchange Losses	6.8	6.8	35.3	64.6	86.8	111.0	120.0
Provision for Taxation	20.8	39.1	155.7	95.3	-3.7	-18.3	-
PROFIT BEFORE APPROPRIATIONS	381.8	322.3	582.7	371.5	449.4	831.2	1015.6
PROFIT AFTER APPROPRIATIONS	78.7	55.9	89.5	154.3	73.9	247.2	258.9
******	*******	*******	******	22223232	*******	*******	******
Adj. Prev. Yrs Miscl.	1.6	-	-	-33.8	1.3	-	•
DISTRIBUTABLE PROFIT	80.3	55.9	89.5	120.5	75.2	247.2	258.9
Dividend	52.3	52.3	58.0	71.6	71.4	79.4	79.4
TOTAL ASSETS	4378.2	5252.9	7030.4	8454.9	9704.4	11120.6	12336.4
TOTAL EQUITY	1634.5	1904.6	2501.2	2767.3	3148.4	3912.4	4848.6
TOTAL LONG TERM DEBT	2100.3	2559.1	3232.0	4434.9	5077.7	6032.9	6278.3
Total Cash Generation	754.3	758.4	1216.3	1047.8	1115.0	1641.6	2152.3
Debt Service	377.6	401.9	557.3	590.6	661.8	821.1	1143.9
***********************************		*******	******	*******	*******	******	*******
Average Price (paise/kWh)	69.1	74.2	90.0	85.8	92.1	99.4	107.8
RATIOS:	-						****
Net Long Term Debt/Equity Debt Service Coverage	1.3	1.3	1.3	1.6	1.6	1.5	1.3
Current Ratio(C.A./C.L.)	1.8	1.8	1.4	1.4	1.2	1.9	2.0
Asset Cover Ratio	1.6	1.5	1.6	1.4	1.4	1.3	1.4
Operating Ratio(Op.Ex./Op.Rev.) %	89	91	86	90	90	86	83

30. As a licensee regulated under the Act, TEC is allowed to recover through its tariff all operating costs, depreciation, interest expenses, income tax, certain appropriations to statutory reserves (as defined under the Act), any additional special reserves allowed by GOM and predetermined "reasonable return" on its capital base. TEC's financial performance during the period under review was significantly better than the SAR estimates (Annexes 2; 2.1; 2.2; 2.3; 3.1; 3.2; 4.1 and 4.2).

31. TEC's sales were higher than those projected in the SAR and increased from 6,658 GWh in FY84/85 to 8,723 GWh in FY91/92 (317 increase in total and 3.9% per annum on average), while TEC's generation increased by only 1,776 MWh (from 6,051 MWh to 7,827 MWh, an increase of 29.3% in total and 3.6% p.a. on average). Lower increase in generation was due to the one-year delay in the commissioning of Unit 6 and inadequate fuel supply that TEC has been experiencing lately (para. 28). Higher sales volume resulted from higher purchases of power from MSEB (Annex 2.3). From FY84/85 to FY91/92, the price of the power purchased from MSEB increased 3302 (from paise 59.27/kWh to paise 195.77/kWh). The current price is about twice the current cost of TEC's own generation. The latter has been contained because of TEC's use of moderately priced gas as the main fuel, as well as increased overall operating efficiency due to higher efficiency of Unit 6¹⁶. Increases in TEC's tariff, however, were only 79% (from paise 69.12/kWh in FY84/85 to paise 123.84/kWh in FY91/92). In terms of US cents, TEC's tariffs decreased 15% between FY84/85 and FY91/92 (from US cents 5.59/kWh to US cents 4.76/kWh), while purchased power prices from MSEB increased 57% during the same period (from US cents 4.79/kWh in FY84/85 to 7.53/kWh in FY91/92).

32. TEC's revenues from the sale of electricity increased steadily from Rs. 4,602 million in FY84/85 to Rs. 9,235.7 million in FY90/91 (201%), compared to a 164% increase in tariffs (from 66.44 to 108.86 paise/kWh) during the same period. Comparison of sales and tariffs with those projected in the SAR are given in Part III (Annex 2.3).

33. TEC has had a strong financial position and has always serviced its debt regularly and paid standard dividends. During the last four years the dividend has been 18%. Despite the low depreciation rates allowed under the Act, TEC has had a comfortable cash flow level because GOM has allowed TEC to charge a special reserve to meet the cash flow requirements to implement its projects. The cash raised through this special reserve charged to tariffs was about 1.8 times the amount of depreciation during the FY84/85-FY91/92 period. The majority of TEC's outstanding long-term debt is in foreign exchange (over 65% in FY91/92), hence subject to revaluation in Rupee terms. GOM has allowed TEC another special reserve for debt redemption which has increased TEC's tariffs by less than 2%. In FY91/92, as a result of the devaluation of the Rupee, outstanding long-term debt increased substantially thus debt/equity ratio to 2.4. However, with the conversion of partly convertible debentures issued in May 1992, this ratio will return to its previous level. Through FY90/91, the long-term debt/equity ratio was 1.6

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During the last three years, the cost of gas increased by only 13% (from Rs. 2,059/ton to Rs. 2,329/ton) compared to a 63% increase in fuel oil prices (from Rs. 3,195/ton to Rs. 5,125/ton).

maximum and current ratio 1.2 minimum. Debt service coverage ratio was 1.8 average through FY91/92, with a minimum of 1.7 in FY88/89. In FY91/92, however, the debt service coverage ratio decreased to 1.3 due to a substantial increase in debt service obligations on foreign loans. TEC financed about 20% of its investments from its own internal resources.

Project Sustainability

34. The project is sustainable for the following reasons: (1) the demand for its full output exists since power is in short supply, particularly in the Greater Bombay Area; (2) the current tariff setting procedures and tariffs are adequate enough to recover capital and operating costs, and provide a certain profit margin for TEC; and (3) TEC's consumers pay their bills. TEC has never had any accounts receivables problem. GOI and GOM's recent initiatives to attract further private investments to the power sector provide a sustainable basis for TEC to continue its operations in an improved policy environment.

35. Well designed, constructed and operated projects such as Trombay Unit 6 and its associated transmission system covered under the project, well established and managed companies such as TEC, and GOM's fair administration of the Act and other related legislation provide an excellent example to incite other private investors into the sector.

Bank Performance

36. Through the Fourth Trombay Thermal Power Project, the Bank has continued making appropriate contributions to the physical, technological and institutional development of TEC. The performance of the Bank from the project preparation through project completion was satisfactory. The Bank supervised the project 12 times and continued to maintain excellent relations with the Borrower which started in the 1950s. The joint Bank/IFC operation for the Private Power Utilities (TEC) Project (Loan 3239-IN), approved in June 1990, is the only ongoing operation the Bank has with TEC. To date, the Bank has assisted TEC in implementing a total of five projects with total assistance of about US\$365 million (Part III, Table 1). Throughout these operations, the Bank has helped in strengthening the institutional and financial viability of TEC, through a conditionality which included extensions of operating licenses and establishment of special reserves for funding the local currency requirements of the projects.

Borrower Performance

37. Table 7, Part III contains the review of performance of the Borrowers. The performance of TEC was satisfactory because it was able to overcome many expected and unexpected implementation problems such as choice of steam cycle technology, choice and adequate supply of environmentally benign fuels, clearances from GOI, GOM, Municipal Authorities, etc., and avoid additional delays by properly emphasizing on co-ordination, monitoring and expedition of activities. All these measures played a vital role in the completion of the project in accordance with the schedule revised at the time of contract awards. Implementation of the project comprised more than 3,000 different steps and activities. Some specific areas which have played critical role in the successful implementation of the project are:

- Key operation and maintenance personnel were involved in the design of the project to insure that feedback from their experience about the construction, operation and maintenance of the previous units, was built into the design and incorporated into the specifications;
- TEC continued its well proven practice of QA programs at manufacturer's works. Shipping releases were signed after detailed technical and QA inspections from the raw material stage up to finished product. Inspections were carried out by a special team of nine engineers from TEC and TCE; furthermore, part time and full time individual consultants were employed. In addition, operational personnel were also involved in equipment testing at manufacturers' works and at the site;
- The senior management and site management of TEC paid close attention to the coordination and monitoring of all headquarters and field activities, equipment supplies, transport, erection services and other related matters;
- A sound reporting system was established and daily reports from various fronts at site were obtained. The analysis of these reports provided the list of activities risking inordinate delays. These were scrutinised and areas requiring management intervention were highlighted to TEC's senior management which promptly took the appropriate actions; and
- Synchronization of Unit 6 within 4-1/2 years from the date of contract award for turbine-generator, was preceded by a 5-1/2 year period for preparing the project, negotiating the loans and obtaining approvals from GOI, GOM and other Local Authorities.

38. The financial strength of TEC has reached such a level that the company could now finance its investment needs through commercial resources as well as from its own self generated financing. TEC's financial strength encouraged and allowed the company to borrow from IFC. The first project covered transmission development. The second project was the above mentioned joint Bank/IFC operation (para. 5). All the IFC loans, amounting to about US\$100 million, are fully disbursed and projects are progressing satisfactorily.

39. Finally, the implementation performance and financial strength of TEC indicates that the Bank's involvement with the company should progressively be phased out because of the company's strong position in the international and local financial markets as well as its self financing capabilities and existing structural and managerial strengths.

Project Relationship

40. The Bank's relationship with the GOI, GOM and TEC has been good.

Consulting Services

41. Tata Consulting Engineers (TCE) engineered the project in close

co-ordination with TEC. TCE is an international consulting firm owned by Tata Sons Inc. (para. 4). TCE was also the consultant for the previous project and its performance has been satisfactory. From initiation of the project till 1988, project engineering review meetings during which basic studies, equipment specifications and layouts were finalized, were held monthly in TCE's offices in Bangalore. Later these review meetings were held at site. Construction engineers from TCE were seconded in specialist areas to form part of the TEC project management and supervisory team. Consultants were also responsible for full QA programs at contractor's works, and assisted in expediting supplies from the manufacturers' works by furnishing periodic reports and drawing TEC's attention to possible problems.

42. While TCE carried out most of the engineering and project supervision services in-house, it used the services of Monash University, Melbourne, Australia, and Tileman & Co. Ltd., U.K. for the model studies and design review, respectively, of the 275 meters high chimney which was constructed for the first time in India. These services were financed from TEC's own resources.

43. In April 1991, the Loan Agreement was amended to include the funding of the consultancy services for the review of the engineering of the pumped storage projects in TEC's Bhira and Bhivpuri hydro power stations, as the construction of these projects would result in enhanced utilization of Trombay Units 5 and 6 built under Bank projects. Electricite de France carried out these reviews. Similarly, engineering services for the installation of a fly ash aggregate plant was also financed under Loan 2452-IN as installation of this plant arose out of stipulations specified by the local pollution control authorities. TEC obtained these services from Aaerdelite of the Netherlands.

44. The performance of all the consultants involved with this project was satisfactory.

Project Documentation and Data

45. The project's legal agreements adequately reflected the Bank's interests in a satisfactory manner achieving the objectives of the project. The staff appraisal report of the project provided a relatively useful framework for both the Bank and TEC during project implementation. However, the SAR did not explicitly give certain specific dates such as project starting, unit synchronization, commercial operation and overall project completion dates. This shortcoming has prevented a detailed comparison with the actual implementation and completion dates. The three scenarios used in the computation of IERR were not clearly tabulated and certain basic data were missing. In addition, some errors have been noted in the financial statement tables.

46. TEC regularly submitted Quarterly Progress Reports for the project. These have been used for review of physical and financial performance as well as for planning the visits of the supervision missions to India which often included site visits in addition to review meetings at TEC's corporate office in Bombay.

47. TEC has provided a comprehensive project completion report (seven volumes) for the project and subsequent additional financial information. The report consists of the technical details of the project, like a diary in which every steps and every faces of the project, from the beginning to the end, are detailed, problems studied and actions by various parties commented. It is a unique document in its genre and a practical source and useful experience for power engineers and power technicians. The report has been sent to Asia Information Center.

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PART II: PROJECT REVIEW FROM BORROWER'S PERSPECTIVE

Adequacy and Accuracy of Factual Information in Part III

48. Part III covers statistical summary with six annexes regarding related Bank loans, project schedule and implementation record, project cost estimates and actual expenditure, status of covenants and economic analysis. The data furnished in these annexes has been cross checked with the project records and found to be in order, subject to substitution of financial data in Annexes 2.1 & 2.2, 3.1 & 3.2, 4.1 & 4.2, as shown in the enclosed statements.

Comment on the Analysis Contained in Part I

49. Analysis in Part I regarding project implementation and project results are generally in order. It concludes (para. 39) that the implementation performance and financial strength of TEC indicate that the Bank's involvement with the Companies is progressively to be phased out. TEC would like to highlight that the Bank's financing enables procurement of indigenous equipment at substantially lower costs as manufacturers are permitted duty free imports and the products are not subject to excise duty. This ultimately translates to lower cost of electricity to the consumers but this benefit is not available with commercial loans or from self-generated financing. The ability to borrow is also related to the overall credit rating of the country and the extent of borrowings permitted by the GOI. It is to allow for these varying factors that TEC desires continued Bank involvement. Further, the Bank's appraisal of any project proposal is so well respected by other lending institutions that the fact that the Bank has agreed to lend enables the Borrower to raise commercial loans and thereby lessen the burden on the Bank. Therefore, phasing out of Bank's involvement is not advisable.

Evaluation of Bank's Performance and Lessons Learnt

50. The project progress was monitored by periodic visits of Bank's personnel twice a year during key phases of the project. The reviews were professional and the quarterly reports required by the Bank were concise in format and furnished to the Bank's satisfaction. Bank's response to purchase recommendations forwarded by the purchaser was very prompt and all recommendations of the consultants were accepted by the Bank. There were two instances of representations by the bidders who were not the lowest evaluated bidders. These issues were clarified to the Bank with additional information and the Bank accepted the consultants' recommendations. The Bank was flexible in regard to financing items not originally spelt out in the Loan Agreement but found desirable for the project implementation. The evaluation of the Bank's performance can therefore be deemed as excellent with very close rapport between the project authorities and the Bank personnel.

Evaluation of Borrower's Own Performance and Lessons Learnt

51. The project has been completed based on the original financing pattern and within the estimated time schedule. The borrower's performance can therefore be deemed as satisfying.

52. Regarding profitability of TEC during the project period, it is observed that towards the financial year ended March 1991, the profits after tax and appropriations, substantially exceeded those forecast at the time of appraisal by about 279% in 1990 and 315% in 1991. This was mainly due to expansion projects undertaken by TEC which were not envisaged and/or included in the appraisal report. An increase was also evident in the financial year ended March 1987 of 18% and of 96% in the financial year ended March 1988. This resulted in increase in Capital Base which was also supplemented by the deferment in the withdrawal of loans from the local financial institutions and a substantial increase in the average inventories and cash balance held, which were under-estimated at the time of appraisal.

53. The lessons learnt during the project implementation period relate to: (i) management of the local environment and clearances from local bodies; (i) need to keep abreast of rapidly changing technologies; (iii) quality control both at manufacturer's works and at site; and (iv) expediting with local manufacturers.

54. Local Clearances. It was assumed that when the project was cleared by the GOM and GOI that downstream clearances would follow in time. However this was not so and there was a 4-month work stoppage in 1986 due to a "stop work notice" issued by the Municipal Corporation. This was taken up with the GOM on a war footing to issue necessary directives to the local bodies and the clearances from the Department of Environment, Government of Maharashtra, Maharashtra Pollution Control Board, etc., obtained. The clearances required for setting up power projects are numerous, overlapping between various agencies of the Government and required to be obtained sequentially. The experience with clearances obtained on Unit 6 which numbered over 52 has highlighted the need to streamline the procedure and reduce the number of clearances. To avoid delay in implementation, it is essential to plan and monitor closely all the clearances necessary from local bodies.

55. <u>New Technologies</u>. The TEC initially proposed a supercritical unit with the objective of attaining 27 higher efficiency. After nearly a year, the GOI in May 1985 finally conveyed the decision for proceeding with conventional parameters. Since further delays would have led to cost escalation, TEC agreed to the same but still strived and attained higher efficiency by adopting measures like higher reheat temperature, new designs of turbine blading, LCI drives and ID fans, etc. The rapid increase in fuel costs in the recent years has justified the continuing TEC efforts towards achieving higher levels of efficiency and reliability. The ability of the consultants to engineer individual systems of the power plant and procure the equipment from original manufacturers rather than adopt a turnkey approach has contributed to achieving a high overall plant efficiency and reliability. 56. <u>Quality Control</u>. The importance of quality control at manufacturer's works cannot be overstressed and applies in equal measure to both foreign and Indian manufacturers. By timely inspection at works and by involvement of manufacturer's representatives in performance tests at site, the required quality could be ensured. With foreign manufacturers sourcing their components worldwide from Latin American/Far East, etc., and since the supplies of 500 MW power plants represent the state-of-the-art technology worldwide, quality control at manufacturers' works abroad even in Europe or USA has now become even more important.

57. Expediting. The need for close expediting with indigenous manufacturers was very clearly brought out during the course of project implementation. While only one contract had to be cancelled and reordered, deliveries from most of the suppliers were delayed. This was however foreseen and contracts awarded well in advance of the due date. In the case of critical items, purchaser's representatives were posted at suppliers works to ensure timely deliveries and a separate cell of the project management was responsible for expediting.

Relations Between the Bank and the Borrower

58. As explained above, there was a very good rapport between the Bank staff and the Borrower during evolution and implementation of the project.

Performance of Cofinanciers

59. These included the Japanese leasing institutions who financed US\$55 million and local financial institutions whose loans totalled Rs 98 crores. The local institutions with ICICI as the lead institution relied on their own appraisal of the project. During implementation of the project, they relied on the same reports as furnished to the Bank and had fewer supervisory visits. Their disbursements were made in a timely manner at the request of the Borrower.

INDIA	

FOURTH TROMBAY THERMAL POWER PROJECT

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(LOAN 2452-IN)

PART III. STATISTICAL SUMMARY

1. Related Bank Loans

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Loan Title & No.	Purpose	Year of Approval	Closing Date	Status ************************************
1. Trombay Power (Loan 106-IN)	Installation of Units 1 and 2 (62.5 MW each) in Trombay, Bombay.	Nov. 1954	Sept.1966	The project was completed successfully.
2. Second Trombay (Loan 164-IN)	Installation of Unit 3 (62.5 MW) in Trombay.	May 1957	Sept.1966	The project was completed successfully.
3. Third Trombay Thermal Power Project (Loan 1549-IN)	The Project involved the construction of Unit 5 (500 MW) with triple fired boiler (coal, oil or gas), including pollution control equipment at Trombay.	April 1978	Dec. 1984	The project was successfully completed with 34% cost overruns due to, more than anticipa- ted price increases in mate- rials, equipment and custom duties.
<pre>4. Private Power Utili- ties (TEC) Project (Ln 3239-IN)</pre>	The project comprises: - A pumped storage unit at TEC's Bhira hydro electric plant to generate additional 150 MW of peak power; - 220 kV transmission line, from Bhira to Bombay area; - A gas based combined-cycle unit of 180 MW at Trombay. - Supervision of constructio of the Bhira pumped storage scheme and acquisition of know-how for the extension of the FDG facility at Tromb - A second flue gas desulphu ization unit to be installed in Trombay Unit 5.	June 1990 n ay. r-	Dec. 1995	GOI granted the environmental clearance for the Trombay combined cycle unit in September 1991. Therefore the first disbursement was delayed to November 1991 (about 1 year). The project is proceeding in accordance with revised schedule.

2. Project Timetable

÷	s=====================================	박물 교류 등 중 구 후 부 흔 등 로 도 도 크 로 봐 주 ;		
		Date	Date	
I	tem .	Planned	Actual	
=	=======================================			
-	Appraisal Mission	02/15/83	02/14/83	
-	Loan Negotiations		08/29/83	
-	Board Approval	-	06/27/84	
-	Loan Signature	•	12/12/84	
	Loan Effectiveness	•	07/31/85	
-	Loan Closing	06/30/90	06/30/92	
-	Completion of Disbursements	12/31/90	11/12/92	

⋩∊⋺⋷⋺⋷⋇⋼⋾⋨⋴⋾∊⋇∊⋇∊⋇∊⋇∊⋇∊⋇⋺⋇⋳⋇⋇⋇⋇⋇⋳⋬⋬⋇⋹⋻⋳⋳⋇⋇⋇⋇⋐[⋣]⋇⋻⋽⋩⋒⋳⋾⋺∊⋹⋧∊

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3. Loan Disbursement Shedule

*****	***************************************	: A P	PRAIS	A L · · · ·	: A C	TUAL	
Bank Fiscal	: : : Half Year	: Amount	: Cumula- : tive	: Cumula- : tive :	Amount	: Cumula- : tive	: Cumula- tive
Year	: Ending	:	:	: :	:	:	: 1
	:	:US\$ m	illion	: :		illion	:
			:	::		:	:
	:	:	:	: :	:	:	:
1985	:12/31/1984	: 0.50	: 0.50	: 1:	: 0.00 :	: 0.00	: 0
	:06/30/1985	: 7.50	: 8.00	: 6:	: 0.00 :	: 0.00	: 0
	:	:	:	: :	: :	:	:
1986	:12/31/1985	: 12.00	: 20.00	: 15 :	0.47 :	0.47	: 0
	:06/30/1986	: 11.00	: 31.00	: 23 :	8.81 :	9.28	. 7
	:	:	:	: :	: :	: :	:
1987	:12/31/1986	: 13.00	: 44.00	: 33 :	8.30 :	: 17.58	: 13
	:06/30/1987	: 14.00	: 58.00	: 43 :	25.38	42.96	: 32
	:	:	:	: :		: :	:
1988	:12/31/1987	: 20.00	: 78.00	: 58 :	17.91 :	60.87	: 45
	:06/30/1988	: 21.00	: 99.00	: 73 :	9.74 :	70.61	: 52
	:	:	:	: :		: :	1
1989	:12/31/1988	: 9.00	: 108.00	: 80 :	15.83 :	86.44 :	64
	:06/30/1989	: 11.00	: 119.00 :	: 88 :	17.80 :	104.24 :	77
	:	:	:				
1990	:12/31/1989	: 8.00	127.00	. 94 :	11.15 :	115.39	85
	:06/30/1990	: 7.00	: 134.00	. 99 :	5.73 :	121.12	90
	:	:					
1991	:12/31/1990	: 1.40	135.40	100 1	2.00	123.12	9 1
	:06/30/1991	: -			0.88	124.00	92
	:	•	-				
1992	- - 12/31/1991	· -			1.26	125.26	
	:06/30/1992				4.65	129.91	95
	:09/30/1992 /AN	• -	• <u> </u>	· _ ·	4 09 4	134 00	
	· · · · · · · · · · · · · · · · · · ·	•		•	4.05	104.00	

(A): The loan was closed on June 30, 1992 compared to the original schedule of June 30, 1990. Disbursements were completed on November 12, 1992. The total disbursement under this loan was US\$ 134,409,077.98. The undisbursed balance of US\$ 990,922.02 was canceled on November 12, 1992.

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4. Project Implementation

Indicators	Appraisal Estimate	Actual
******************************	37225377335778882	************
1. Area Preparation	01/85 - 09/87	01/86 - 09/88
2. Turbo Generator Equipt.	06/84 - 03/89	06/85 - 06/90
3. TG Building Struc. Syst.	01/85 - 07/87	01/86 - 07/88
4. SG Water Treat. Syst.	01/86 - 03/88	01/87 - 03/89
5. Feed Cycle Equipt. Syst.	02/85 - 01/88	02/86 - 01/89
6. Piping Systm.	01/86 - 03/88	01/87 - 03/89
7. SG Equipt. Systm.	01/85 - 11/88	01/86 - 02/90
8. Instrumt.& Contr. Syst.	02/85 - 04/88	02/86 - 04/89
9. Condensor Cooling Systm.	02/85 - 06/87	02/86 - 06/88
10. Fuel Oil Handling Systm.	01/85 - 06/88	01/86 - 06/89
11. Generator Transfor.Eq.Sys.	01/85 - 06/88	01/86 - 06/89
12. Electric.Outpt.Distr. Sys.	04/85 - 06/88	04/86 - 06/89
13. Area strucrure serv. Sys.	06/85 - 06/88	06/86 - 06/89

In the appraisal estimates, the beginning date of the implementation was not fixed; the generating unit scheduled to be synchronized within 54 months. The project implementation started on September 1985, and reached synchronization within 54 months on March 23, 1990 and 3 months later to full load on June 15, 1990. TEC implemented the project within the projected time period, however, due to starting problems, there was 12 months delay in the implementation schedule compared to SAR.

5. Project Cost and Financing

T T

5A. Comparison of Estim	ated and	Actual Pr	At app	At appraisal : US \$ = Rs 10.80									
				-		At Completion: US \$ = Rs 13.76 - weighted average							
***************************************	232222822 4 T 2			1283222 6 a i			********	******		******	2222333333		
Item /	3 I A	гг Аг		3 A L	K E P U	· K I		A	C T U	A L			
Investment Costs	Re	million			1158 mill	ion	Be	million			t million		
	local	Foreign	Total	Local	Foregn	Total	Local	foreion.	Total		Foreign	Totel	
				832232		222222			85255588		*******		
A. Preliminary Works	35.0	0.0	35.0	3.2	0.0	3.2	90.2	0.0	90.2	6.6	0.0	6.6	
B. Civil Works	254.8	0.0	254.8	23.6	0.0	23.6	605.4	0.0	605.4	44.3	0.0	44.3	
C. Turbogenerator	275.6	380.6	656.2	25.5	35.2	60.8	585.7	199.5	785.2	42.8	14.6	57.4	
D. Turbogenerator Associated Equ	. 192.9	197.6	390.5	17.9	18.3	36.2	180.3	384.9	565.2	13.2	28.1	41.3	
E. Steam Generator	708.5	16.4	724.9	65.6	1.5	67.1	397.0	266.9	663.9	29.0	19.5	48.5	
F. Steam Generat. Assoc. Equip.	144.9	92.8	237.7	13.4	8.6	22.0	153.1	200.9	354.0	11.2	14.7	25.9	
G. Electrical Equipment	217.7	57.4	275.1	20.2	5.3	25.5	259.8	78.6	338.4	19.0	5.7	24.7	
H. Miscelnous. Elect.& Mech.Eqp.	73.7	24.9	98.6	6.8	2.3	9.1	171.0	28.9	199.9	12.5	2.1	14.6	
1. Switchyard & Transmission	123.8	73.9	197.7	11.5	6.8	18.3	604.0	144.4	748.4	44.2	10.6	54.7	
J. Engineering & Administration	64.8	10.9	75.7	6.0	1.0	7.0	239.9	4.9	244.8	17.5	0.4	17.9	
K. Supercritical Contingency	79.2	0.0	79.2	7.3	0.0	7.3	0.0	0.0	0.0	0.0	0.0	0.0	
Total Baseline Costs	2170.9	854.5	3025.4	201.0	79.1	280.1	3286.4	1309.0	4595.4	240.2	95.7	335.9	
Physical Contingencies	119.5	42.7	162.2	11.1	4.0	15.0	0.0	0.0	0.0	0.0	0.0	0.0	
Price Contingencies	527.0	183.9	710.9	48.8	17.0	65.8	0.0	0.0	0.0	0.0	0.0	0.0	
TOTAL PROJECT COST	2817.4	1081.1	3898.5	260.9	100.1	361.0	3286.4	1309.0	4595.4	240.2		335.9	
			RESSERTS:		******								

In 1984, during the appraisal, the estimated cost of the project was about US\$ 361 million or Rs 3,898.5 million at the exchange rate of US\$ = Rs 10.80. At the competion of the project, the actual cost was US\$ 335.9 million or Rs 4,595.4 million at the average exchange rate of US\$ = Rs 13.68. Between appraisal and actual (1984-1992), the project cost, in terms of Rs, increased 17.7% while the same project, in terms of US\$, decreased 6.8% due to essentially 27.4% of devaluation of the Rs, reduction in custom duties and reduced contingency spendings compared to projections. At appraisal, the project cost estimates included customs duty of 65% on imported equipment. In February 1985, GOI reduced the import duty for power projects from 65% to 25%. This was subsequently raised to 30% but resulted in a saving of Rs. 364 million (US\$ 26.5 million). In SAR, taxes and duties were included in "Price Contingencies". In actual position, TEC did not separate taxes and duties projected to reach to Rs 778.8 million (US\$ 72.1 million at US\$=Rs 10.8). At the actual implementation, however, the taxes and duties amounted to Rs 550 million or about US\$ 40.2 million (US\$=Rs 13.68) which were US\$ 31.9 million less than SAR's projections.

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58. Project Financing

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		Planned Loan Agre	******	Actual			
	Source	US\$ million	x	US\$ million	x		
		*********************************	******	**********	******		
1.	The Bank	135.40	37.5	134.41	40.0		
п.	Foreign Commercial Bank (Japon)	55.00	15.2	54.76	16.3		
ш.	Local Financial Institutions	81.00	22.4	72.62	21.6		
IV.	Internally Generated Cash (including special appropriations)	90.00	24.9	74.11	22.1		
		••••••	•••••		•••••		
TOTAL		361.40	100.0	335.90	100.0		

The Bank's loan was disbursed more than 99%. Only, US\$ 990,992 of the loan was cancelled. The project was completed about US\$ 32 million equivalent less than the appraisal cost due to devaluation of Rs, import duty reduction and depressed material and machinery prices.

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6.	Proj	ject	Res	ults

6A. Direct Benefits

Indicator	First Year Operation 1990	Recent Operations 1991-1992
•••••		•••••
 Energy Generation (GWh) Leest-cost (Commercial Based Operation) 	2466 GWh (56.4% PLF)	2589 GWh (59.1% PLF)
 Energy Savings for the same amount of elec- tricity generation. 	110,000 tons Fuel-oil equivalent savings (About US\$ 13.5 million per year savings)	110,000 tons Fuel-oil equivalent savings (About USS 13.5 million per year savings)

68. Economic Impact

Economic Impact	Appraisal	Actual
	Estimate	1991/92
•••••	•••••	
Economic Rate of Return:		
A. As a isolated project	23.5%	19.9%
B. Integrated Project	9.4%	9.5%
C. Integrated Project	13.2%	13.0%
The stand time of the standard states		

Incuding Market Condit.

During the appraisal, the Economic Rate of Return was calculated in two ways: a-) The project was treated as part of TEC system in isolation;

b-) The project was treated as an integral part of the Western Region. Cost assumptions were common to both. Alternative treatments related primarily to benefits and are discribed in the following paragraph.

At Appraisal, Underlying Assumptions:

- Shadow prices were based on the Standart Conversion Factor (SCF) of 0.8. Ratio of shadow wage to financial wage for unskilled labor was 0.7.
- Economic cost of the capital was derived from the financial cost of the capital with shadow price coefficient (0.8);
- Operating fuel cost was based on the appropriate prices of Associated Gas, Residual Oil and Coal;
- In economic terms, O&M costs were estimated 2% of the initial economic value of the plant. Insurance was estimated 1% of the plant value;
- 5. Non-project-costs were assumed 60% of the regional avarage. The
- regional average represented 47% of expenditure on generating assets.
- 6. In the benefits side, two different scenarios were prepared:
 In isolation case (a-); 0.9 factor was used to the
 - price (57.64 paise/kWh x 0.9 = 51.9);
 - In integrated case (b-); 0.8 factor was used for price (53.6 paise/kWh x 0.8 = 42.9 paise/kWh.)

 In isolation case, losses comprised approximately 5% station use and 3% transmission distribution use; the total of 8% of the gross generation.

8. In integrated case, 5% losses for station use stayed the same. Transmission losses, however, amounted to 80% of the average losses of the Western Region. Average losses, in Western Region, are 18% of the gross generation. Average project transmission losses: 0.8 x 18% = 14.4%. Total losses for the project; 5%. + 14.4% = 19.4%.

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7. STATUS OF COVENANTS

********************	\$	*******	*******	#1222#################################
COVENANT	SUBJECT	TYPE	ENTITY	STATUS / REMARKS
*********************	***********		8325328	훕멾껆Z‡ŶŢIJIJ빌빌빌드드드改분구#J드루드드드
Guarantee Agreement				
Dated December 12, 1984				
••••••				
GA / 3.03	GOI shall ensure the availability of	Tech.	GOI	Complied with (1).
	adequate supplies of suitable fuel for			
	optimum operation of Trombay Power Station.			
GA / 3.05	GOI, shall ensure that Maharashtra State	FTN	GOM	Complied with
	shall (i) not limit TECLE licensed area of			No adverse action on far
	shart (1) not (nint fet 3 (fensed area of			to 1001 COM extended
	Ainersial positions (ii) by 13/31/85 sytemat			TECH Ligger up to August
	validity of ligonomy in to 08(15(200) the			2010 motivation data of the
	validity of licenses up to 08/15/2004, the			2010, maturity date of the
Loan Agreement	maturity date.			Loan S239-IN.
Dated December 12, 1984	-			
••••••				
LA / 3.03	Borrowers shall provide Bank with timely and	Tech.	TEC	Complied with. Quarterly
	relevant information regarding their			progress reports were
	performance and project implementation.			provided in timely manner.
LA / 3.04	Borrowers shall execute and operate project	ENV	TEC	Complied with. TEC have
	with due regard for environment, fully in			obtained all required
	compliance with existing ecological			ecological and
	regulations.			environmental clearances.
LA / 4.02	Borrowers shall take out insurance against	FIN	TEC	Complied with by insuring
	risks in such amounts as will be consistent			the plant against fire as
	with appropriate practice			uell as breakdown in
	with appropriate practice.			
14 / 4 07	Recover shall inform Back prior to making	ETN	TEC	Compliant with
	organizational changes	1.14	120	compered wren.
LA / 5.02	Audit: Rorrowers furnish audited financial	ALID	TEC	Compliant with The Latest
	statements within 6 months of FY and		120	audited mont came in
				August 1992 for EV91/92
14 / 5.03	Rorrower shall consult with Bank prior to	FIN	TEC	Complied with TEC
	increasing in the accuste their debt		120	conculta continiously with
	ceiling			the Back
14 / 5 05	Bossquere shall within one year of	6 T N	TEC	Compliant with Towns Dood
LA / 5.05	offentiveness furnish to Park a Trust Bood		IEU	complied with. Trust beed
	for south being posteriord index the sound			executed in June 1985.
	ive essets being montgaged under the agreed Security arrangements			
LA / 5.07	Rornwers shall in annual accounting	FIN	TEC	TEC is complying with the
	allocate any excess of debt principal	670	166	the start of some mont in
	Papayment over depresionies to a secol-			The start of repayment in 1999
	accropriation of debt redemotion			1770.
	appropriation of debt recemption.			
	***************************************	*******	******	

(1): Recently, the amount of gas made available has been lower and has somewhat affected the production of Trombay Units 1-6. As a result, TEC is taking appropriate mesures to secure additional quantities of LSHS and augments the delivery of coal (both domestic and imported).

8. USE OF BANK RESOURCES

٠	٠	-	-	٠	٠	٠	-	•	-	٠	٠	-	-	•	-	٠	٠	-	-	٠	٠	-

A. Staff Inputs

٠	٠	•	٠	٠	•	-	-	-	•	-	•	٠	•	-

Task	Input (Staff-weeks)
- Project Preparation	5.0
- Project Appraisal	36.9
- Loan Negotiation	12.3
- Loan Processing	9.2
- Project Supervision	33.2
- Project Completion Report	7.0
- Project Administration	1.0
••••••	
Total	104.6

B. MISSIONS

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			•				
**********************	B922333	1221373	******		******	******	
	Month/	Number	Days	Speci-	Perfor-	Type of	
Project		of	in	aliza-	mance	Prob-	
Cycle	Year	Persons	field	tion(a)	Rate(b)	Lems(c)	
***********************	*******	8223222	******		******	******	

Through Appraisal

Identification Preparation Preappraisal

Appraisal

Supervisions:

*****************	*******	********	*****	******	*******	******
PCR	01/93	1	0	EC	1	•
Supervision 12	02/92	1	3	E	1	
Supervision 11	08/91	2	10	E; FA	1	-
Supervision 10	07/90	1	4	E	1	-
Supervision 9	07/88	1	3	ε	1	-
Supervision 8	01/88	1	3	Ε	1	-
Supervision 7	03/87	1	3	E	1	-
Supervision 6	11/86	1	3	CON	1	-
Supervision 5	04/86	1	3	Ε	1	-
Supervision 4	08/85	1	5	E	1	-
Supervision 3	03/85	2	10	FA; CO	1 1	-
Supervision 2	09/84	1	3	FA	1	-
Supervision 1	07/84	1	3	LO	1	
•••••						

(a) E: Engineer; LO: Loan Officer; FA: Financial Analyst; EC: Economist; CON: Consultant.

(b) 1= No or minor problem; 2= Moderate problem; 3= Major problem.

(c) I: Implementation delays; PR: Procurement problems and delays.

Annex-1.1

INDIA *****

FOURTH TROMBAY THERMAL POWER PROJECT (LN. 2452-IN)

EX-POST INTERNAL ECONOMIC RATE OF RETURN "Million Rs" (IERR / ISOLATION SCENARIO)

			•••••	•••••	•••••			
******	\$2222222 2 22	*******	¥3253¥23¥2	**********	*********	*******	*****	
	SCF	OPERTG.&			ELECTR.	SCF		
	CAPITAL	MAINT.	FUEL	TOTAL	SALES	PRICE		NET
YEAR	COST	(M3O)	COST	COST	"GWH"	Paise/kWh	BENEFITS	BENEFITS
£128121232	*********	8373823338		85333333333	*********	********	*********	********
FY84/85	12.32		0.00	12.32				-20.95
FY85/86	266.32		0.00	266.32				-433.75
FY86/87	830.64		0.00	830.64				-1279.88
FY87/88	853.56		0.00	853.56				-1215.90
FY88/89	664.65		0.00	664.65				-880.33
FY89/90	672.84	1.00	15.90	689.74	17.52	89.46	15.67	-831.16
FY90/91	162.74	82.00	1471.50	1716.24	2342.00	97.97	2294.55	647.61
FY91/92	193.10	97.00	1529.20	1819.30	2387.33	111.46	2660.82	841.52
FY92/93	94.24	120.00	2013.20	2227.44	2493.69	145.85	3637.14	1281.55
FY93/2020	0.00	120.00	2013.20	2133.20	2760.00	145.85	4025.57	1720.34

**************** IERR : 19.9% *****************

Inputs:

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1.- Shadow prices are based on Standart Conversion Factor (SCF) of 0.8 for local investments as in SAR;

2.- Fuel cost is actual till FY92/93;

3.- All operating and maintenance (O \pm M) costs are actual;

4.- Non-project cost is 0 for the isolation case;

5.- Benefits and losses for isolation case:

A-) As in SAR, SCF of 0.9 has been used for TEC's sale price of electricity;

B-) As in SAR, 8% losses have been accepted (5% station use and 3% distibution losses);

6.- Project's life span is assumed 30 years.

INDIA -----

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FOURTH TROMBAY THERMAL POWER PROJECT (LN. 2452-IN)

EX-POST INTERNAL ECONOMIC RATE OF RETURN (IERR / INTEGRATED SCENARIO "A")

.....

*********	*********	*********	*********	********	*********	*********	*********	********	******
	SCF		OPERTG.4			ELECTR.	SCF		
	CAPITAL	NON PROJT.	MAINT.	FUEL	TOTAL	SALES	PRICE		NET
YEAR	COST	COST	(02M)	COST	COST	"GWH"	Paise/kWh	BENEFITS	BENEFITS
********	********		********	*********	22222323222	*********	*********	*********	********
FY84/85	12.32	3.47	0.00	0.00	15.79				-26.86
FY85/86	266.32	75.10	0.00	0.00	341.42				-556.06
FY86/87	830.64	234.24	0.00	0.00	1064.88				-1640.80
FY87/88	853.56	240.70	0.00	0.00	1094.26				-1558.78
FY88/89	664.65	187.43	0.00	0.00	852.08				-1128.58
FY89/90	672.84	189.74	1.00	15.90	879.48	15.35	79.52	12.20	-1069.39
FY90/91	162.74	45.89	82.00	1471.50	1762.13	2051.80	87.09	1786.87	27.70
FY91/92	193.10	54.45	97.00	1529.20	1873.75	2091.51	99.07	2072.10	198.34
FY92/93	94.24	26.58	120.00	2013.20	2254.02	2184.69	129.65	2832.40	525.81
FY93/2020	0.00	0.00	120.00	2013.20	2133.20	2418.00	129.65	3134.89	910.63

**************** IERR : 9.5% -------

Inputs:

"Million Rs"

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- 1.- Shadow prices are based on Standart Conversion Factor (SC)F of 0.8 for local investments as in SAR;
- 2.- Fuel cost is actual till FY92/93;
- 3.- All operating and maintenance (0 & M) costs are actual;
- 4.- As in SAR, "non-project costs" are assumed to be 60% of the regional average and; regional average is 47% of the expenditures on generating assets;
- 5.- Benefits and Losses for integrated scenario "A":
 - A-) As in SAR, SCF of 0.8 has been used for TEC's sale price of electricity;

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- 8-) As in SAR, 19.4% losses have been accepted (5% station use plus 18% x 0.8 = 14.4%) distribution losses;
- 6.- Project's life span is assumed 30 years.

Annex-1.2

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FOURTH TROMBAY THERMAL POWER PROJECT (LN. 2452-IN)

"Hillion Rs"

EX-POST INTERNAL ECONOMIC RATE OF RETURN (IERR / INTEGRATED SCENARIO "B")

*********	********	********	*********	**********	*********	*********	*********	*********	*******
	SCF		OPERTG.&			ELECTR.	SCF		
	CAPITAL	NON PROJT.	MAINT.	FUEL	TOTAL	SALES	PRICE		NET
YEAR	COST	COST	(0&M)	COST	COST	"GWH"	Paise/kWh	BENEFITS	BENEFITS
*********		*********	*********		2222233 2 32	8388888888	*********	******	*******
FY84/85	12.32	3.47	ò.00	0.00	15.79				-26.86
FY85/86	266.32	75.10	0.00	0.00	341.42				-556.06
FY86/87	830.64	234.24	0.00	0.00	1064.88				-1640.80
FY87/88	853.56	240.70	0.00	0.00	1094.26				-1558.78
FY88/89	664.65	187.43	0.00	0.00	852.08				-1128.58
FY89/90	672.84	189.74	1.00	15.90	879.48	15.35	89.46	13.73	-1067.51
FY90/91	162.74	45.89	82.00	1471.50	1762.13	2051.80	97.97	2010.23	277.82
FY91/92	193.10	54.45	97.00	1529.20	1873.75	2091.51	111.46	2331.11	457.35
FY92/93	94.24	26.58	120.00	2013.20	2254.02	2184.69	145.85	3186.45	847.67
FY93/2020	0.00	0.00	120.00	2013.20	2133.20	2418.00	145.85	3526.75	1266.86

IERR : 13.0%

Inputs:

......

- 1.- Shadow prices are based on Standart Conversion Factor (SC)F of 0.8 for local investments as in SAR;
- 2.- Fuel cost is actual till FY92/93;
- 3.- All operating and maintenance (0 & M) costs are actual;
- 4.- As in SAR, "non-project costs" are assumed to be 60% of the regional average and; regional average is 47% of the expenditures on generating assets;
- 5.- Benefits and Losses for integrated scenario "B":
 - A-) As in SAR, SCF of 0.9 for TEC's average sale price of electricity;
 - B-) As in SAR, 19.4% losses have been accepted (5% station use plus 18% x 0.8 = 14.4%) distribution losses;
- 6.- Project's life span is assumed 30 years.

INDIA FOURTH TROMBAY THERMAL POWER PROJECT (LOAN 2452-IN) TATA ELECTRIC COMPANIES

INCOME STATEMENTS (in million of Rupees)

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"FY Ending March 31"

INCOME DESCRIPTION	1984/8	5	1985/8	6	1986/8	 7	1987/8	8	1988/8	19	1989/9	 0	1990/9	 1
ENERGY GENERATION AND SALES	Appreise	l Actual	Appraisal	Actual	Appraisal	Actual	Appraisal	Actual	Appraisal	Actual	Appraisal	Actual	Appraisal	Actual
Hydro Generation (GWh) Thermal Generation (GWh) Power Purchases (GWh)	1300.0 4000.0 1700.0	1371.0 4680.0 1208.0	1300.0 5000.0 960.0	1236.0 3980.0 2430.0	1300.0 5000.0 1170.0	1182.0 4597.0 2133.0	1300.0 5000.0 1385.0	750.0 5760.0 1900.0	1300.0 4650.0 1920.0	1308.0 4904.0 2439.0	1300.0 6250.0 650.0	1132.0 5732.0 1927.0	1300.0 6700.0 460.0	1500.0 6452.0 1400.0
Total Energy Available (GWh) Station Use and Losses (GWh)	7000.0 530.0	7259.0 601.0	7260.0 595.0	7646.0 577.0	7470.0	7912.0 576.0	7685.0 615.0	8410.0 682.0	7870.0 590.0	8651.0 684.0	8200.0 700.0	8791.0 610.0	8460.0 735.0	9352.0 718.0
Energy Sold (GWh)	6470.0	6658.0	6665.0	7069.0	6865.0	7336.0	7070.0	7728.0	7280.0	7967.0	7500.0	8181.0	7725.0	8634.0
Avarage Price (paise/kWh) Avarage Price (US cents/kWh)	66.4 6.2	69.1 5.8	71.3 6.6	74.2 5.9	74.7 6.9	90.0 7.5	80.8 7.5	85.8 6.6	81.7 7.6	92.1 5.9	88.3 8.2	99.4 5.5	89.4 8.3	107.8 6.0
TOTAL TARIFF REVENUES	4301.6	4607.0	4752.9	5242.3	5129.6	6606.0	5710.8	6631.7	5947.7	7336.4	6622.6	8131.7	6904.7	9308.2
Consumer Benefit A/C Approp.	-	4.9	-	-	-	•	-	•	-	-	• _	•	-	-
OPERATING REVENUES	4301.6	4602.1	4752.9	5242.3	5129.6	6606.0	5710.8	6631.7	5947.7	7336.4	6622.6	8131.7	6904.7	9308.2
Cost of Fuel Other Operating Maintenance Power Purchases Depreciation Tax on Sales Wheeling Charges Payable to MSEB Miscellaneous Write Offs	2001.5 437.6 1023.2 110.6 29.4 90.8 2.2	2611.4 569.8 716.0 114.1 30.7 51.3 2.2	2721.1 465.9 618.4 111.4 30.3 107.7 2.2	2405.8 526.3 1628.8 123.6 32.8 55.4 2.2	2884.4 491.9 799.4 112.5 31.2 107.7 2.2	2793.7 610.9 2067.6 125.7 33.7 79.6 2.2	3057.4 519.4 1002.2 106.5 32.2 107.7 2.2	2983.0 703.2 2009.4 129.5 36.5 76.3 2.2	2833.7 590.6 1472.9 165.3 33.1 101.8 2.2	2683.6 910.8 2735.5 134.1 72.6 70.3 2.2	4142.5 666.5 528.4 231.8 34.1 128.8 2.2	3154.7 1060.7 2427.5 165.5 74.5 88.9 2.2	4574.5 702.4 397.0 243.6 35.1 136.4 2.2	3718.0 1170.1 2408.1 285.0 78.6 92.9 2.2
Total Operating Expenses	3695.3	4095.5	4057.0	4774.9	4429.3	5713.4	4827.6	5940.1	5199.6	6609.1	5734.3	6974.0	6091.2	7754.9
OPERATING INCOME Non Operating Income	606.3 43.4	506.6 131.4	695.9 44.3	467.4 165.2	700.3 45.6	892.6 195.8	883.2 47.4	691.6 224.5	748.1 48.7	727.3 251.4	888.3 50.2	1157.7 316.2	813.5 52.1	1553.3 311.8
NET INCOME BEFORE INTEREST	649.7	638.0	740.2	632.6	745.9	1088.4	930.6	916.1	796.8	978.7	938.5	1473.9	865.6	1865.1

Annex -2.1-

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2 1 INDIA FOURTH TROMBAY THERMAL POWER PROJECT (LOAN 2452-IN) TATA ELECTRIC COMPANIES INCOME STATEMENTS

(in million of Rupees)

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"FY Ending March 31"

Annex -2.2-

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INCOME DESCRIPTION	1984/8	5	1985/8	6	1986/8	7	1987/8	8	1988/8	9	1989/9	0	1990/9	1
ENERGY GENERATION AND SALES	Appraisal	Actual	Appraisal	Actual	Appraisal	Actual	Appraisal	Actual	Appraisal	Actual	Appraisal	Actual	Appraisal	Actual
Interest (Incl.Guar.fee in proj.) Foreign Exchange Losses Provision for Taxation	281.2 - -	228.6 6.8 20.8	310.8 - -	264.4 6.8 39.1	347.1 29.6	314.7 35.3 155.7	428.7 170.0	384.7 64.6 95.3	509.8	446.2 86.8 -3.7	560.6	550.0 111.0 -18.3	575.4	729.5 120.0
Non-Operating Expenses	281.2	256.2	310.8	310.3	376.7	505.7	598.7	544.6	509.8	529.3	560.6	642.7	575.4	849.5
PROFIT BEFORE APPROPRIATIONS	368.5	381.8	429.4	322.3	369.2	582.7	331.9	371.5	287.0	449.4	377.9	831.2	290.2	1015.6
Contingency Reserve Investment Allowance Reserve Tariffs & Dividends Control Res. Spec. Approp Deferred Tax	8.8 24.0 -	17.9 86.0 4.9	17.8 100.0 5.0	18.4 8.2 -	18.0 35.5 5.2	19.0 228.3	9.1 4.2	9.6 -0.3 - 25.0	19.2 100.0	12.1 143.9 - 43.0	19.4 205.0	20.6 56.6 - 200.0	19.5 70.6	21.8 280.6 - 207.5
Spec. Approp Debt Redemption Spec. Approp Project Cost	40.0 193.9	194.3	45.0 200.0	27.7 212.1	40.0 205.9	27.8 218.1	40.0 212.2	32.4 150.5	40.0 63.0	32.0 144.5	90.0 •	61.8 245.0	136.6	58.5 188.3
Total Statutory Appropriations	266.7	303.1	367.8	266.4	304.6	493.2	265.5	217.2	222.2	375.5	314.4	584.0	226.7	756.7
PROFIT AFTER APPROPRIATIONS	101.8	78.7	61.6	55.9	64.6	89.5	66.4	154.3	64.8	73.9	63.5	247.2	63.5	258.9
Adj. Prev. Yrs Niscl. DISTRIBUTABLE PROFIT	101.8	1.6 80.3	61.6	55.9	64.6	89.5	66.4	-33.8 120.5	64.8	1.3 75.2	63.5	247.2	63.5	258.9
Dividend	49.1	52.3	56.3	52.3	63.5	58.0	63.5	71.6	63.5	71.4	63.5	79.4	63.5	79.4
PROFIT RETAINED - GENERAL RESERVE	52.7	28.0	5.3	3.6	1.1	31.5	2.9	48.9	1.3	3.6	-	167.8		179.5
Operating Ratio % (Op.Ex./Op.Rev.) 86	89	85	91	86	86	85	90	87	90	87	86	88	83

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GENERAL STATISTICS / TEC

												UEL
							TOT	AL	COST OF	FUEL	Thermal P	roduction
	HYDRO GE	NERATION	THERMAL (GENERATION	POWER PU	RCHASES	POWER AV	AILABLE	(Rs mill	on)	(paise/ki	ስ)
	•••••	• • • • • • • • • • • •			•••••	• • • • • • • • • •				•••••		
FY	SAR	ACTUAL	SAR	ACTUAL	SAR	ACTUAL	SAR	ACTUAL	SAR	ACTUAL	SAR	ACTUAL
•••••	•••••			*******	•••••							•••••
FY84/85	1300	1371	4000	4680	1700	1208	7000	7220	2001.5	2611.0	50.04	55.79
FY85/86	1300	1236	5000	3980	960	2430	7260	7646	2721.1	2406.0	54.42	60.45
FY86/87	1300	1182	5000	4597	1170	2133	7470	7912	2884.4	2794.0	57.69	60.78
FY87/88	1300	750	5000	5760	1385	1900	7685	8410	3057.4	2983.0	61.15	51.79
FY88/89	1300	1308	4650	4904	1920	2439	7870	8651	2833.7	2683.0	60.94	54.71
FY89/90	1300	1132	6250	5732	650	1927	8200	8791	4142.5	3154.7	66.28	55.04
FY90/91	1300	1468	6700	6208	460	1475	8460	9151	4574.5	3711.4	68.28	59.78
FY91/92	-	1636	-	6191	-	1566	•	9393	-	4230.0	-	68.32

REVENUES AND PRICE STRUCTURE

	•••••	•••••	•••••	•••••	•••••	•••••	••••••	••••	••••••	
	TEC'S OP REVENUE (Rs mill	ERATING ES fon)	TEC'S AVE Price (Pa	RAGE sise/kWh)	TEC's AV PRICE(US	ERAGE cents/kWh)	TEC' Pric	s POWER PUR E (Paise/kW	CHASES (h) or US (ents/kWh
									DIFFER.	Actual Price
FY	SAR	ACTUAL	SAR	ACTUAL	SAR	ACTUAL	SAR	ACTUAL	in %	in US cents
••••••				•••••	•••••					•••••
FY84/85	4298.7	4602.0	66.44	69.12	6.15	5.59	60.18	59.27	98.5%	4.79
FY85/86	4752.1	5242.0	71.30	74.15	6.60	5.88	64.42	67.02	104.0%	5.31
FY86/87	5128.2	6606.0	74.70	90,00	6.92	6.94	68.29	96.93	141.9%	7.48
FY87/88	5712.6	6332.0	80.80	85.82	7.48	6,17	72.36	105.76	146.2%	7.60
FY88/89	5947.8	7337.6	81.70	92.10	7.56	5.90	76.71	112.16	146.2%	7.18
FY89/90	6622.5	8131.9	88.30	99.40	8.17	5.52	81.29	125.97	155.0%	6.99
FY90/91	6906.2	9235.7	89.40	108.86	8.27	4.19	86.30	173.90	201.5%	6.69
FY91/92	•	10802.6	-	123.84	-	4.76	-	195.77	-	7.53

FINANCIAL RATIOS

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	OPERATING	RATIO	CURRENT RA	TIO	LONG TERM DEBT/ EQUITY RATIO		DEBT SI COVERA	DEBT SERVICE COVERAGE RATIO		G INCOME ion)	APPROPRIATIONS (Rs million)	
FY	SAR A	CTUAL	SAR A	CTUAL	SAR A	CTUAL	SAR	ACTUAL	SAR	ACTUAL	SAR	ACTUAL
FY84/85	86.0%	89.0%	1.3	1.7	1.3	1.3	1	.8 2.0	603.4	507.0	98.9	71.0
FY85/86	85.4%	91.1%	1.1	1.8	1.2	1.3	1	.5 1.8	695.1	467.0	60.8	34.0
FY86/87	86.4%	86.5%	1.0	1.3	1.2	1.3	1	.8 1.9	698.9	891.0	63.2	51.0
FY87/88	85.4%	89.6%	1.1	1.4	1.4	1.6	1	.8 1.7	885.0	692.0	68.2	60.0
FY88/89	87.4%	90.1%	1.1	1.2	1.4	1.6	1	.5 1.3	748.2	729.1	64.9	75.7
FY89/90	86.6%	85.8%	1.3	1.9	1.3	1.5	1	.5 2.0	888.2	1157.9	63.4	247.4
FY90/91	88.2%	87.5%	1.0	1.9	1.1	1.6	1.	.2 1.3	815.0	1153.5	65.0	201.9
FY91/92	-	88.9%	-	1.6	-	2.4	-	1.3	s -	1201.2	•	236.3

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Annex-2.4

Electric	city Sales	(GWh)		Tariffs	(paise /	Kwh)
FY End.	SAR Est.	<u>Actual</u>	Diff.I	SAR Est.	Actual	Dif.Z
FY84/85	6470	6658	2.92	66.44	69.12	4.02
FY85/86	6665	7069	6.87	71.30	74.15	4.02
FY86/87	6865	7336	5.9 %	74.70	90.00	20.52
FY87/88	7070	7728	9.3 X	80.80	85.82	6.27
FY88/89	7280	7967	9.42	81.70	92.10	12.7 2
FY89/90	7500	8181	9.12	88.30	99.40	12.6%
FY90/91	7725	8484	9.82	89.4	108.86	21.82
FY91/92	(*) -	8723	-	-	123.84	÷

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Increase in TEC's Electricity Sales and Tariffs

(*) FY91/92 was not included in SAR.

INDIA FOURTH THOMBAY THERMAL POWER PROJECT (LOAN 2452-1H) TATA ELECTRIC COMPANIES

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SOURCES AND APPLICATIONS OF FUNDS (in million of Rupees)

"FY Ending Nerch 31"

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•••••	1984/8	5	1985/8	5	1986/8	 7	1987/8	 B	1968/8	 9	1989/9	 0	1990/9	1	
SOURCES OF FUNDS										••••••				•••••	
	Appraisal	Actual	Appraisal	Actual	Appraisal	Actual	Appraisal	Actual	Appraisai	Actual	Appraisat	Actual	Appreisal	Actual	
INTERNAL SOURCES															
Net Income Before Interest Depreciation	649.7 110.6	638.0 114.1	740.2	632.6 123.6	745.9 112.5	1088.4	930.6 106.5	916.1 129.5	796.8 165.3	978.7 134.1	938.5 231.8	1473.9 165.5	865.6 243.6	1865.1 285.0	
Miscellaneous Write Offs	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	2.2	۲۰۵	2.2	2.2 	
Total Cash Generation	762.5	754.3	853.8	758.4	860.6	1216.3	1039.3	1047.8	964.3	1115.0	1172.5	1641.6	1111.4	2152.3	
CAPITAL RAISED															
Equity Subscription Approved Logns (Unit 5)/CCPP/	- Bhr.	1.1	96.0	0.1	-	72.0	-	-	•	-	-	0.8	-	-	1
World Bank	42.0	49.8	i -	0.3	-	-	-	-	-	-	-	-	-	12.0	ىي
ECGD/IFC	-	-	-	•	-	•	-	-	-	-	-	-	-	508.0	9
Local	55.0	55.0	-	-		-	-	-	-	•	•	•	•	-	1
Approuved Loans (Unit 6)															
World Bank	87.8	-	248.5	45.1	292.4	242.0	438.6	538.9	219.3	470.0	1/5.4	3/1.5	-	140.0	
Japonese Leasing Co.	-	•	63.5	•	107.1	293.9	197.2	295.1	115.1	158.4	111.1	5.0	-	-	
Local Financial Inst.	-	-	103.9	70.0	175.2	60.0	322.9	100.0	186.1	-	181.9	430.0	, -	-	
Local-Others	-	22.6	-	-	•	•	-	•	•	•	•			-	
Debentures	38.9	16.3	-	-	-		-		-	•	, -	113.0	-	•	
Cash Credits	-	•		50.6	-	-50.6	-	40.9	-	C4.1	. · •	-05.0	-	-	
Secur.Deposit-Consum./Other	-	-3./		-0.3	-	-3.1	-	1.0		-1.0		•••	-		
TOTAL CAPITAL RAISED	223.7	141.1	511.9	165.8	574.7	614.2	958.7	975.9	522.5	632.1	468.4	858.0	0.0	660.0	
Fixed Deposits Other Items	30.0 1.0	-25.9	, . 1.0	132.0 1.5	- 1.0	11.4	70.0 1.0	78.1 30.6	- 1.0	22.7 8.4	, _ 1.0	94.! 1.4	5. 1.0	- 4.0	
				•••••			•••••								
TOTAL RESOURCES	1017.2	873.6	1366.7	1057.7	1436.3	1847.1	2069.0	2132.4	1487.8	1778.2	1641.9	2595.	5 1112.4	2816.3	

Annex -3.1-

Annex -3.2-

INDIA FOURTH TROMBAY THERMAL POWER PROJECT (LOAN 2452-IN) TATA ELECTRIC COMPANIES

SOURCES AND APPLICATIONS OF FUNDS (in million of Rupees)

"FY Ending March 31"

	1984/85	;	1985/86	5	1986/8	 7	1987/8	 B	1988/8	 9	1989/9	0	1990/9	1
APPLICATION OF FUNDS	Appraisal	Actual	Appraisal	Actual	Appraisal	Actual	Appraisal	Actual	Appraisal	Actual	Appraisal	Actual	Appraisal	Actual
APPLICATION OF FUNDS								•••••		• • • • • • • • • •				
CAPITAL EXPENDITURES														
General Construction Third Trombay Project/CCP/BH Forth Trombay Project/Bhivp.	33.0 - 281.7	41.6 51.4 31.4	36.0 615.9	69.1 2.6 331.6	39.0 - 780.6	86.0 28.1 1149.6	43.0 1170.9	122.9 95.1 992.4	48.0 - 585.5	126.4 16.1 1051.5	53.0 468.4	112.0 103.3 727.3	58.0 - -	140.0 823.0 180.0
TOTAL FIXED ASSETS (Addition)	314.7	124.4	651.9	403.3	819.6	1263.7	1213.9	1210.4	633.5	1194.0	521.4	942.6	58.0	1143.0
DEBT SERVICE										*				
Repayment Interest Amortisation	150.4 281.2	149.0 228.6 -	241.3 310.8 -	137.5 264.4	140.5 347.1	242.6 314.7 -	140.5 428.7 -	205.9 384.7 -	128.7 509.8	215.6 446.2 -	228.0 560.6	271.1 550.0 -	337.0 575.4	414.4 729.5 -
TOTAL DEBT SERVICE	431.6	377.6	552.1	401.9	487.6	557.3	569.2	590.6	638.5	661.8	788.6	821.1	912.4	1143.9
Provision for Taxation Investments Dividends Capital Issue Exp./Conversi. Net Workg.Capital Incr./Dec.	- 8.7 49.1 22.6 190.5	20.8 27.1 52.3 22.6 163.2	- 8.8 56.3 - 97.6	39.1 6.3 52.3 - 212.2	23.6 12.5 63.5 - 29.5	155.7 16.2 58.0 - -155.5	154.6 18.0 63.5 - 49.8	95.3 53.5 71.6 33.8 -48.3	- 19.1 63.5 - 133.2	-3.7 70.5 71.4 -1.3 -99.3	- 19.2 63.5 - 249.2	-18.3 100.1 79.4 -	- 19.4 63.5 - 59.1	- 257.1 79.4 - 64.4
Non Operating Requirements	270.9	286.0	162.7	309.9	129.1	 74.4	285.9	205.9	215.8	37.6	331.9	817.4	142.0	400.9
TOTAL APPLICATION	1017.2	788.0	1366.7	1115.1	1436.3	1895.4	2069.0	2006.9	1487.8	1893.4	1641.9	2581.1	1112.4	2687.8
CASH BALANCE														
Cash Incr./Decrese for Year Opening Balance Closing Balance	0.1 123.9 124.0	85.6 42.6 128.2	2.3 124.0 126.3	-57.4 128.2 70.8	4.0 126.3 130.3	-48.3 70.8 22.5	9.8 130.3 140.1	125.5 22.5 148.0	10.1 140.1 150.2	-115.2 148.0 32.8	29.9 150.2 180.1	14.4 32.8 47.2	4.9 180.1 185.0	128.5 47.2 175.7
Number of Times Debt Services Covered by Internal Cash Gener.	1.8	2.0	1.5	1.9	1.8	2.2	1.8	1.8	1.5	1.7	1.5	2.0	1.2	1.9

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INDIA FOURTH TROMBAY THERMAL POWER PROJECT (LOAN 2452-IN) TATA ELECTRIC COMPANIES

> BALANCE SHEET (in million of Rupees)

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HFY Ending March 31*

	1984/8	5	1985/8	36	1986/8	37	1987/8	8	1988/8	19	1989/9	0	1990/9	1
	Appraisal	Actual	Appraisal	Actual	Appraisal	l Actual	Appraisal	Actual	Appraisal	Actual	Appraisal	Actual	Appraisal	Actual
ASSETS TIXED ASSETS: Gross Fixed Assets	3544.4	3614.0	3580.4	3685.8	3619.4	3836.5	3662.4	3883.3	7119.4	4906.5	7637.3	8241.7	7693.3	8839.0
(Less) Accumulated Depre.	661.0	667.3	771.4	790.2	883.9	913.8	990.4	1041.1	1155.7	1172.9	1387.5	1334.9	1631.1	1618.9
Net Fixed Assets in Service Work in Progress Foreign Exchange Adjustment	2883.4 326.3	2946.7 105.9 93.5	2809.0 1382.5	2895.6 435.9 388.0	2735.5 2254.8	2922.7 1542.9 712.4	2672.0 3445.2	2842.2 2675.7 1003.4	5963.7 458.8 -	3733.6 2842.2 1119.1	6249.8 564.5 -	6906.8 435.2 1309.6	6062.2 596.4	7220.1 975.9 1189.6
TOTAL FIXED ASSETS	3209.7	3146.1	4191.5	3719.5	4990.3	5178.0	6117.2	6521. 3	6422.5	7694.9 ======	6814.3	8651.6	6658.6	9385.6
INVESTMENTS: Contingency Reserve Def.Tax & Other Investments	69.8 10.8	67.9 33.4	78.6 10.8	85.8 21.8	96.4 10.8	104.1 19.7	114.4 10.8	123.1 54.2	123.5 10.8	132.7 115.1	142.7 10.8	146.6 201.3	162.1 10.8	167.2 437.8
TOTAL INVESTMENTS	80.6 =======	101.3	89.4 ======	107.6	107.2	12 3.8	125.2	177.3	134 <i>.</i> 3 ======	247.8	153.5 *******	347.9	172.9	605.0
CURRENT ASSETS:														
Cash & Bank Inventories Consumer Receivables Other Receivables Other Current Assets	124.0 210.0 358.4 13.1 60.0	128.2 381.0 398.2 61.2 143.7	126.3 215.0 396.0 13.1 60.0	70.8 480.9 536.2 83.7 238.0	130.3 230.0 427.5 13.1 60.0	22.5 511.8 674.4 78.3 427.4	140.1 245.0 475.9 13.1 60.0	148.0 509.4 563.9 115.8 407.2	150.2 320.0 495.6 13.1 60.0	32.8 719.3 632.8 123.5 243.5	180.1 400.0 551.9 13.1 60.0	47.2 731.3 644.9 97.0 593.0	185.0 419.3 575.4 13.1 60.0	175.6 776.3 728.4 77.0 583.0
TOTAL CURRENT ASSETS	765.5	1112.3	810.4	1409.6	860.9	1714.4	934.1	1744.3	1038.9	1751.9	1205.1	2113.4	1252.8	2340.3
Deferred Expenses	18.4	18.5	16.2	16.2	14.0	14.2	11.8	12.0	9.6	9.8	7.4	7.7	5.2	5.5
TOTAL ASSETS	4074.2	4378.2	5107.5	5252.9	5972.4	7030.4	7188.3	8454.9	7605.3	9704.4	8180.3	11120.6	8089.5	12336.4

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Annex -4.1-

	II	DIA		
FOURTH	TROMBAY	THERMAL	POWER	PROJECT
	(LOAN	2452-IN)	

TATA ELECTRIC COMPANIES

BALANCE SHEET

(in million of Rupees)	FY Endin	g March 3	31"	
1984/85 1985/86 1986/87 1987/88 1988/89	1989/9	0	1990/9	1
Appraisal Actual Appraisal Actual Appraisal Actual Appraisal Actual Appraisal Actual Appraisal Actual Appraisa	ppraisal	Actual	Appraisal	Actual
EQUITY AND LIABILITIES:				· •
Share Capital:		700 7		
Common Shares 318.6 317.8 414.0 317.9 414.6 389.9 414.6 389.9 414.6 389.9	414.0	390.7	414.6	390.7
Preference Shafes 11.6 11.6 11.6 11.6 11.6 11.8 11.8 11.8	11.0	31.0	11.8	11.8
TOTAL SHARE CAPITAL 330.4 329.6 426.4 329.7 426.4 401.7 426.4 401.7 426.4 401.7	426.4	402.5	426.4	402.5
Shareholders! Reserve 340.1 388.5 354.4 392.1 355.5 423.6 358.4 477.5 359.7 476.3	359.7	647.1	359.7	826.6
Contingency Reserve 78.6 85.8 96.4 104.2 114.4 123.1 123.5 132.7 142.7 146.6	162.1	172.3	181.6	194.1
Other Statutory Reserve 188.4 304.8 293.4 313.0 334.1 541.3 338.3 541.0 438.3 684.9	643.3	741.4	713.9	1022.0
Deferred Tax Reserve 74.8 74.8 74.8 74.8 74.8 74.8 74.8 74.8	74.8	346.2	74.8	553.7
Debt Redemotion Reser. 40.0 - 85.0 27.7 125.0 55.5 165.0 87.9 205.0 119.9	295.0	181.7	431.6	240.2
Project Cost Reserve 461.6 451.0 661.6 663.1 867.5 881.2 1079.7 1031.7 1142.7 1176.2	1142.7	1421.2	1142.7	1609.5
Total Reserves 1192.5 1304.9 1565.6 1574.9 1871.3 2099.5 2139.7 2365.6 2363.2 2746.7	2677.6	3509.9	2904.3	4446.1
TOTAL EQUITY 1522 9 1634.5 1992.0 1904.6 2297.7 2501.2 2566.1 2767.3 2789.6 3148.4	3104.0	3912.4	3330.7	4848.6
	******		EELEESSE	FERRELEE
LONG TERME DEBT :				
Cash Credits 50.6 40.9 - 65.6	-	•	-	-
Debentures 170.0 338.2 294.4 312.8 270.2 273.0 246.0 249.7 235.5 238.4	226.5	342.6	217.5	333.8
AID Loan; IFC-TD &CCPP&Bh.	-	-	-	50 8.0
World Bank - Third Proj. 654.6 968.4 369.8 1206.6 451.9 1436.1 286.2 1472.4 1045.2 1320.8	1261.0	1382.7	743.4	1232.0
World Bank - Forth Proj. 241.0 - 711.0 49.1 858.0 315.1 1399.0 964.6 796.0 1529.5	643.5	1969.0	782.0	1952.5
Other Sec.Ln. (Incl. Japon) 619.0 576.7 735.8 590.8 971.5 847.2 1445.0 1268.6 1701.6 1462.0	1887.7	1782.7	1720.5	1696.1
Unsecured Loans (F.D.) 274.5 217.0 274.5 349.2 274.5 360.6 344.5 438.7 114.5 461.4	84.5	555.9	84.5	555.9
TOTAL LONG TERM DEBT 1959 1 2100.3 2385.5 2559.1 2826.1 3232.0 3720.7 4434.9 3892.8 5077.7	4103.2	6032.9	3547.9	6278.3
	*******	22555558	*******	ETTERTER
CURRENT LIABILITIES:				
Sundry Creditors 248.4 258.8 332.2 357.5 341.2 697.6 352.3 621.8 370.6 691.3	415.8	606.6	573.6	640.7
Other Current Liabilities 326.6 363.4 380.6 406.9 490.2 572.3 532.0 601.8 535.1 753.4	540.1	533.2	. 620.1	533.2
TOTAL CURRENT LIADILITIES 575 0 422 2 712 8 744 4 831 4 1240 9 884 3 1223 6 905 7 1444 7	955.9	1130 #	1103.7	1173 0
		2222222		
Consumer Contributions 17.2 21.2 17.2 26.8 17.2 27.3 17.2 29.1 17.2 33.6	17.2	35.6	5 17.2	35.6

TOTAL LIABILITIES 4074.2 4378.2 5107.5 5252.9 5972.4 7030.4 7188.3 8454.9 7605.3 9704.4	8180.3	11120.7	8089.5	12336.4
	1 3		· -====================================	
"Ret Long lette Debt/Equity 1.3 1.3 1.2 1.3 1.2 1.3 1.4 1.0 1.4 1.0 1.4	1.3	1.0	, 1.1 , 1.1	2.0
*deset Courtest Courtest 19 1.6 2.0 1.5 2.0 1.5 1.6 1.8 1.4 1.7 1.4	1.7	1.3	s 1.9	1.4
React Gover Racio 117 110 Etc 110 210 110 110 110				

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Annex -4.2-

INDIA

Annex-5

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FOURTH TROMBAY THERMAL POWER PROJECT (LN. 2452-IN)

ANNUAL CAPITAL SPENDING

"Million Rs"

医胆管虫属鼻周周周炎 医生物性生活性 医血液性生活效应的医胃尿和血管医胃的医胃的医胃的 网络口马马克克马尔斯 医乙烯丙基乙烯基乙烯 机水石不足马尔油石

FOREIGN CAPITAL LOAN

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				*****		TOTAL		
FINANCIAL YEAR	IBRD	RUPEE SPENDING	DM SPENDING	SUB-TOTAL SPENDING	LOCAL SPENDING	TAXES AND DUTIES	PROJECT EXPENDIT.	
195232323£3£	335 *2\$2277	*********	\$=235228 3 3	*********	*		2 2222222222	
FY84/85	0.00	0.00	0.00	0.00	15.40	0.00	15.40	
FY85/86	40.00	0.00	0.00	0.00	282.90	0.00	322.90	
FY86/87	361.20	29.90	263.70	293.60	219.80	80.00	954.60	
FY87/88	351.80	231.10	64.10	295.20	258.20	80.00	9 85.20	
FY88/89	393.80	142.20	0.00	142.20	160.80	220.00	916.80	
FY89/90	330.60	0.00	0.00	0.00	427.80	100.00	858.40	
FY90/91	85.30	0.00	0.00	0.00	96.80	50.00	232.10	
FY91/92	45.10	0.00	0.00	0.00	185.00	10.00	240.10	
FY92/93	231.60	0.00	0.00	0.00	-171.70	10.00	69.90	
**********	*******	*****	********	후 두동 강과코드로맞은	\$\\ \$\\ \$\\ \$\\ \$\\ \$\\ \$\\ \$\\ \$\\ \$\\	********	*********	
TOTAL	1839.40	403.20	327.80	731.00	1475.00	550.00	4595.40	
*********	*********	*******		按도 및 및 도 등 및 도 및 도 및		**********		

Annex 6

Salient Features of 500 MW Unit 6

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 New HP and IP Turbine Modules New turbine blade profile Reheat temperature of 565 deg C instead of 538 deg C 7 heater feed water cycle instead of 6 	Improved heat rate by 22.
- Variable speed drives using (Load Commutated Inverters) for ID fans	Reduced auxiliary power consumption during part load operation
- Use of X-20 steel for main and hot reheat piping in preference to P22 steel	Reduced thickness of large pipes and higher allowable stress at elevated temperature; permits faster start- up, lower capital cost.
- Functionally distributed micro- processor based I&C system as well as a Data Acquisition System	Higher reliability, increased functional capability, greater flexibility, easier expendability, reduced cabling and instruments resulting in lower operating cost.
- Centralized Vibration Monitoring & Analysis System (152 channels)	Real time analysis and diagnostic aid to enable predictive maintenance.
- Spring supported Turbine-Generator Pedestal	Smaller size columns, reduction in number of pipes and reduction of thickness of base raft. Lower cost and 3 months construction time saved.
- 275 m high Chimney, instead of 154 m	As required by the Emission Regulations of GOI.
- Fibre Optic Cables for communication and protection	Reliability and reduced instrumentation cabling.
- Electrochlorination plant, instead of chlorinators	Reliability and safety

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Attachment Page 1 of 12

S P MANAKTALA MANAGING DIRECTOR TATA ELECTRIC COMPANIES AND YICE-CHAIRMAN THE TATA POWER CO. LTD. BOMBAY HOUSE, HOMI MODY STREET, BOMBAY-400 001.

31st. March 1993

Dear Mr. Bauer,

Sub: Trombay 500 MW Unit 6 Loan No. 2452 IN

I refer to your letter dated 9th. March 1993 enclosing Part I and Part III of the Project Completion Report (PCR), for fourth Trombay Thermal Power Project (Loan 2452-IN). Enclosed please find Part II of the PCR viz. Project review from Borrower's perspective as well as our comments on Part I and Part III of the PCR.

The lessons learnt during the implementation of the project have been incorporated by us on the ongoing projects. We trust information contained in Part II of the PCR is useful, for inclusion in final PCR.

With kind regards,

urs sincerely,

(S P Manaktala)

Encl: as above

Mr. Jean-Francois Bauer, Chief, Energy Operations Division, India Country Department, The World Bank, 1818 H Street, N. W., Washington D. C. 20433 U. S. A.

Part II. PROJECT REVIEW FROM BORROWERS PERSPECTIVE

A) Adequacy and Accuracy of factual information in Part III

Part III covers statistical summary with 6 annexures regarding Related bank loans, project schedule and implementation record, project cost estimates and actual expenditure, status of covenants and economic analysis. The data furnished in these annexures has been cross checked with the project records and found to be in order, subject to substitution of financial data in Annexures 2.1 & 2.2, 3.1 & 3.2, 4.1 & 4.2, as shown in the enclosed statements.

B) <u>Comment on the analysis contained in Part I of the PCR</u>

Analysis in Part I of PCR regarding project implementation and project results are generally in order. It concludes (Para 39) that the implementation performance and financial strength of TEC indicate that the Bank's involvement with the Companies is progressively to be phased out. TEC would like to highlight that the Bank's financing enables procurement of indigenous equipment at substantially lower costs as manufacturers are permitted duty free imports and the products are not subject to excise duty. This ultimately translates to lower cost of electricity to the consumers but this benefit is not available with commercial loans or from self generated financing. The ability to borrow is also related to the overall credit rating of the country and the extent of borrowings permitted by the Govt. of India. It is to allow for these varying factors that TEC desires continued Bank's involvement.

Further, the Bank's appraisal of any project proposal is so well respected by other lending institutions that the fact that the Bank has agreed to lend enables the Borrower to raise commercial loans and thereby lessen the burden on the Bank. Therefore, phasing out of Bank's involvement is not advisable.

C) Evaluation of Bank's performance and lessons learnt

The project progress was monitored by periodic visits of Bank's personnel twice a year during key phases of the project. The reviews were professional and the quarterly reports required by the Bank were concise in format and furnished to the Bank's satisfaction. Bank's response to purchase recommendations forwarded by the purchaser was very prompt and all recommendations of the consultants were accepted by the Bank. There were two instances of representations by the bidders who were not the lowest evaluated bidders. These issues were clarified to the Bank with additional information and the Bank accepted the consultant's recommendations.

The Bank was flexible in regard to financing items not originally spelt out in the Loan agreement but found desirable for the Project during implementation.

The evaluation of the Bank's performance can therefore be deemed as excellent with very close rapport between the project authorities and the Bank personnel.

D) Evaluation of Borrowers own performance and lessons learnt

The project has been completed based on the original financing pattern and within the estimated time schedule. The borrowers performance can therefore be deemed as satisfying.

Regarding profitability of TEC during the Project period, it may be observed that towards the financial year ended March 1991, the profits after tax and appropriations, substantially exceeded those forecast at the time of appraisal by about 279% in 1990 and 315% in 1991. This was mainly due to expansion projects undertaken by TEC which were not envisaged and/or included in the appraisal report. An increase was also evident in the financial year ended March 1987 of 18% and of 96% in the financial year ended March 1988. This resulted in increase in Capital Base which was also supplemented by the deferment in the withdrawal of loans from the local financial institutions and a substantial increase in the average inventories and cash balance held, which were under-estimated at the time of appraisal.

The lessons learnt during the project implementation period relate to

- i) Management of the local environment and clearances from local Bodies.
- ii) Need to keep abreast of rapidly changing technologies.
- iii) Quality control both at manufacturer's works and at site.
- iv) Expediting with local manufacturers

Local Clearances

It was assumed that when the project was cleared by the Govt. of Maharashtra and Govt. of India that downstream clearances would follow in time. However this was not so and there was a 4 month work stoppage in 1986 due to a 'stop work notice' issued by the Municipal Corporation. This was taken up with the Govt.of Maharashtra on a war footing to issue necessary directives to the local bodies and the clearances from the Dept. of Environment, Govt. of Maharashtra, Maharashtra Pollution Control Board etc. obtained. The clearances required for setting up power projects are numerous, overlapping between various agencies of the Govt. and required to be obtained sequentially. The experience with clearances obtained on Unit 6 which numbered over 52 has highlighted the need to streamline the procedure and reduce the number of clearances. To avoid delay in implementation it is essential to plan and monitor closely all the clearances necessary from local bodies.

New Technologies

The TEC initially proposed a supercritical unit with the objective of attaining 2% higher efficiency. After nearly a year, the Govt. of India in May 1985 finally conveyed the decision for proceeding with conventional parameters. Since further delays would have led to cost escalation, TEC agreed to the same but still strived and attained higher efficiency by adopting measures like higher reheat temperature, new designs of turbine blading, LCI drives for ID fans etc. The rapid increase in fuel costs in the recent years has justified the continuing TEC efforts towards achieving higher levels of efficiency and reliability.

The ability of the Consultants to engineer individual systems of the Power Plant and procure the equipment from original manufacturers rather than adopt a turnkey approach has contributed to achieving a high overall plant efficiency and reliability.

Quality Control

The importance of quality control at manufacturer's works cannot be overstressed and applies in equal measure to both foreign and Indian manufacturers. By timely inspection at works and by involvement of manufacturer's representatives in performance tests at site the required quality could be ensured. With foreign manufacturers sourcing their components world wide from Latin America/ Far East etc. and since the supplies of 500 MW power plants represent the State of Art technology world wide, quality control at manufacturers' works abroad even in Europe or U.S.A. has now become even more important.

Expediting

The need for close expediting with indigenous manufacturers was very clearly brought out during the course of project implementation. While only one contract had to be cancelled and reordered, deliveries from most of the suppliers were delayed. This was however forseen and contracts awarded well in advance of the due date. In the case of critical items, Purchaser's representatives were posted at suppliers works to ensure timely deliveries and a separate cell of the project management was responsible for expediting.

E) Relationship between the Bank and the Borrower

As explained above, there was a very good rapport between the Bank's staff and the Borrower during evolution and implementation of the Project.

F) Performance of Co-financiers

These included the Japanese leasing institutions who financed 55 Million \$ and local financial institutions whose loans totalled Rs. 98 crores. The local institutions with ICICI as the lead institution relied on their own appraisal of the project. During implementation of the project they relied on the same reports as furnished to the Bank and had fewer supervisory visits. Their disbursements were made in a timely manner at the request of the Borrower.

Part I PROJECT REVIEW FROM BANK'S PERSPECTIVE

Background

1. Para 1/ line 20 - BEST is a department of MCGB. The word "department" is misssing.

19. Procurement/ line 10

In accordance with the loan, four contracts each worth less than US \$ 200,000 and aggregating to US \$ 2 million were awarded on the basis of competitive bidding advertised locally. The word "four" is missing.

Part III STATISTICAL SUMMARY

1. Related Bank Loans

1. Disbursements under Loan Nos. 106-IN, 164-IN and 1549-IN were fully completed.

5B. Project Financing

As explained in our fax message EJ/T6-011 dated 22nd Jan. 1993, we have utilised \$ 54.76 million out of \$ 55 million from foreign commercial loan. The actual utilisation will therefore be as under, which may also be incorporated on pages 9 & 10 of Part I of the PCR.

		<u>US \$ m</u>	<u>%</u>
1.	IBRD	134.41	40.02
2.	FCL	54.76	16.30
3.	Local Fin. Inst.	72.62	21.62
4.	Internal Generation	<u>74.11</u>	22.06
		335.90	100.00

Annexure 3.1 - Financial Statements

The detailed statements of Income, Cash Flow, Balance Sheet, Clear Profit and Capital base for the years 1984-85 to 1990-91 giving figures at the time of appraisal and actuals was handed over to Ms. Chassard during her visit to Bombay in Feb. 1993. Accordingly these Annexures may please be revised. An extra copy of these statements is enclosed for ready reference.

(Rs Willion)												1	Page 1	
Financial Year Ended March 31	198 Appraisal	4/85 Actual A	1985 Ppraisal	/86 Actual A	1986 ppraisal	Actual A	1987 Appraisai	/88 Actual /	1981 Ippraisal	3/89 Actual /	198 Appraisal	9/90 Actual (1990 Appraisal	0/91 Actu
ENERGY GENERATION AND SALES														
Hydro Generation (GUh) Thermal Generation (GUh) Power Purchases (GUh)	1300 4000 1700	1371 4680 1208	1300 5000 960	1236 3980 2430	1300 5000 1170	1182 4597 2133	1300 5000 1385	750 5760 1900	1300 4650 1920	1308 4904 2439	1300 6250 650	1132 5732 1927	1300 6700 460	19 64 19
Total Energy Available (GWh) Station Use and Losses (GWh)	7000 530	7259 601	7260 595	7646 577	7470 605	7912 576	7685 615	8410 682	7870 590	8651 684	8200 700	8791 610	8460 735	9
Energy Sold (GWh)	6470	6658	6665	7069	6865	7336	7070	7728	7280	7967	7500	6181	7725	84
Average Price (paise/kWh) Average Price (US ceats/kWh)	66.4 6.6	69.1 5.8	71.0 7.1	74.2 5.9	74.5 7.5	90.0 7.5	01.2 0.1	85.8 6.6	83.0 8.3	92.1 5.9	88.5 8.9	99.40 5.52	88.2 8.8	107
TOTAL TARIFF REVENUES Consumer Benefit A/C Appropriation	4299.3	4607.0 4.9	4729.2 0.0	5242.3 0.0	5110.9 0.0	6606.0 0.0	5740.7 0.0	6631.7 0.0	6045.3 0.0	7336.4 0.0	6638.6 0.0	8131.7 0.0	6810.6 0.0	930
OPERATING REVENUES	4299.3	4602.1	4729.2	5242.3	5110.9	6606.0	5740.7	6631.7	6045.3	7336.4	6638.6	8131.7	6810.6	930
OPERATING EXPENSES														
Cost of Fuel Other Operating Maintenance Power Purchases Depreciation Tax on Sales Wheeling Charges Payable To MSEB	2001.5 437.6 1023.2 110.6 120.2 0.0	2611.4 569.8 716.0 114.1 30.7 51.3	2721.1 465.9 618.4 111.4 138.0 0.0	2405.8 526.3 1628.8 123.6 32.8 55.4	2884.4 491.9 799.4 112.5 138.9 0.0	2793.7 610.9 2067.6 125.7 33.7 79.6	3057.4 519.4 1002.2 109.6 139.9 0.0	2983.0 703.2 2009.4 129.5 36.5 76.3	2833.7 590.6 1472.9 110.8 134.9 0.0	2683.6 910.0 2735.5 134.1 72.6 70.3	4142.5 666.5 528.4 246.3 162.9 0.0	3154.7 1060.7 2427.5 165.5 74.5 88.9	4574.5 702.4 397.0 247.7 171.5 0.0	371 117 240 28 7 9
Niscellaneous Write Offs Total Operating Expenses	2.2	4095.5	4057.0	4774.9	4429.3	5713.4	4830.7	2.2 5940.1	5145.1	6649.1	5748.8	6974.0	6095.3	775
OPERATING INCOME	604.0 43.4	506.6 131.4	672.2	467.4	681.6 45.6	892.6 195.8	910.0 47.4	691.6 224.5	900.2 48.7	777 . 3 251 . 4	889.8 50.2	1157.7	715.3	155
NET INCOME BEFORE INTEREST	647.4	638.0	716.5	632.6	127.2	1088.4	957.4	916.1	948.9	978.7	940.0	1473.9	767.4	18
Interest Foreign Exchange Losses Provision for Tazation	269.4 0.0 0.0	228.6 6.8 20.8	277.5 0.0 0.0	264.4 6.8 39.1	317.0 0.0 29.6	314.7 35.3 155.7	443.3 0.0 170.0	384.7 64.6 95.3	552.2 0.0 0.0	446.2 86.8 -3.7	560.4 0.0 0.0	550.0 111.0 -18.3	524.9 0.0 0.0	7.
Non-Operating Expenses	269.4	256.2	277.5	310.3	346.6	505.7	613.3	544.6	552.2	529.3	560.4	642.7	524.9	8
PROFIT BEFORE APPROPRIATIONS	378.0	381.8	439.0	322.3	380.6	582.7	344.1	371.5	396.7	449.4	379.6	831.2	242.5	10
Contingency Reserve Investment Allowance Reserve Tariffs & Dividends Control Reserve Spec. Appr Deferred Tax Spec. Appr Debt Rødemption Spec. Appr Project Cost	8.8 24.0 0.0 40.0 194.0	17.9 86.0 4.9 194.3	17.8 100.0 5.0 45.0 200.0	18.4 8.2 0.0 27.7 212.1	18.0 35.5 5.2 40.0 206.0	19.0 228.3 0.0 0.0 27.8 218.1	9.1 4.2 0.0 40.0 212.1	9.6 -0.3 0.0 25.0 32.4 150.5	19.2 100.0 0.0 40.0 161.3	12.1 143.9 0.0 43.0 32.0 144.5	19.4 205.0 0.0 90.0 0.0	20.6 56.6 0.0 200.0 61.8 245.0	19.5 70.6 0.0 90.0 0.0	21
Total Statutory Appropriations	266.8	303.1	367.8	266.4	304.7	493.2	265.4	217.2	320.5	375.5	314.4	584.0	180.1	7
PROFIT AFTER APPROPRIATIONS	111.2	78.7	71.2	55.9	75.9	89.5	78.7	154.3	76.2	73.9	65.2	247.2	62.4	2
Adj. Prev. Yrs - Nisc / Iav. Allo. Res. 5 Tax Adj Ro Iac On Other Invest & Diversi 6 DISTRIBUTABLE PROFIT	111.2	1.6 80.3	71.2	55.9	75.9	0.0 89.5	78.7	-33.8 120.5	76.2	1.3 75.2	65.2	0.0 0.0 247.2	62.4	2
ð Dividead	49.1	52.3	56.3	52.3	63.5	58.0	63.5	71.6	63.5	71.4	63.5	79.4	63.5	
PROFIT RETAINED - GNRL, RESERVE	62.1	28.0	14.9	3.6	12.4	31.5	15.2	48.9	12.7	3.8	1.7	167.8	(1.1)) 1
Operating Ratio (operating expenses as % of operating revenue) %	861	893	861	912	873	861	043	901	851	901	673	863	891	

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Attachment Page 8 of 12 ow of Funds Statement (Rs Hillion)

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Year Ended March 31	Appraisa	84/85 Actual a	198 Appraisal	5/86 Actual A	198 ppraisal	6/87 Actual A	198 opraisal	7/88 Actual	198 Appraisal	8/89 Actual A	198 ppraisal	9/90 Actual A	199 Ppraisal	0/91 Actual
ASH GENERATION													1	
· before Interest .on :ous Write Offs	647.4 110.6 2.2	638.04 114.14 2.24	716.5 111.4 2.2	632.6 123.6 2.2	727.2 112.5 2.2	1088.4 125.7~ 2.2~	957.4 109.6 2.2	916.1 129.5 2.2	948.9 110.8 2.2	978.7 134.1 2.2	940.0	1473.9 165.5 2.2	767.4	1865.1 285.0 - 2.2 -
Cash Flow	760.2	754.3	830.1	758,4	841.9	1216.3	1069.2	1047.8	1061.9	1115.0	1188.5	1641.6	1017.3	2152.3
<pre>-g Capital Incr/(Decr)</pre>	204.1	163.2*	65.2	212.2	17.1	-155.5	46.7	-48.3-	39.4	-19.3	179.7	656.2 /	34.2	64.4
lable to Service Debt	556.1	591.1	764.9	546.2	824.8	1371,8	1022.5	1096.1	1022.5	1214,3	1008.8	985.4	983.1	2087.9
Repayneats	269.4 150.4	228.6 149.0	277.5 241.3	264.4 137.5 v	317.0 / 140,5	314.7 242.6	443.3 140.5	384.7 205.9	552.2 152.3	446.2 215.6	560.4 354.4	550.0 271.1	524.9 354.4	729.5 414.4
C Service	419.8	377.6-	518.8	401.9	457.5	557.3	583.8	590.6	704.5	661.8	914.8	821.1	879.3	1143.9
lable After Debt Service	136.3	213.5	246.1	144.3	367.3	814.5	438.7	505.5	318.0	552.5	94.0	164.3	103.8	943.9
for Taxation Cs	0.0 8.7 49.1	20.8 27.1 52.3	0.0 8.8 56.3	39.1 6.3 52.3	29.6 17.8 63.5	155.7 16.2 58.0	170.0 18.0 63.5	95.3 53.5 71.6	0.0 9.1 63.5	-3.7 70.5 71.4	0.0 19.2 63.5	-18.3 100.1 79.4	0.0 19.4 63.5	0.0 257.1 79.4
pavrs.or Prev Yrs Adjustments	22.6	22.6~	0.0		0.0	0.0	0.0	33.8	0.0	-1.1	0.0	0.0	0.0	0.0
cing Requirements	80.4	122.8	65.1	97.7	110.9	229.9	251.5	254.2	72.6	136.9	82.7	161.2	82.9	336.5
LABLE FROM OPERATIONS	55.9	90.7	181.0	46.6	256.4	584.6	187.2	251.3	245.4	415.6	11.3	3.1	20.9	607.4
ION REQUIREMENTS														
Unstruction abay Project/Sp System Unbay Project	33.0 0.0 253.0	41.6 51.4 31.4	36.0 0.0 436.5	69.1 2.6- 331.6	39.0 0.0 1075.5	86.0 28.1 1149.6	43.0 0.0 1542.0	122.9- 95.1- 992.4-	48.0 0.0 697.8	126.4/ 16.1 1051.5	53.0 0.0 0.0	112.0 103.3 727.3	58.0 0.0 0.0	140.0 823.0 180.0
TO FIXED ASSETS	286.0	124.4	472.5	403.3	1114.5	1263.7	1585.0	1210.4	745.8	1194.0	53.0	942.6	58.0	1143.0
3 BE FINANCED	230.1	33.7	291.5	356.7	858.1	679.1	1397.8	959.1	500.4	778.4	41.7	939.5	37.1	535.6
FINANCE														
bscriptions Loans - Third Proj/Sp System Bank	42.0	1.1 49.8 7	, 96.0	0.1		72.0 0.0		0.0 0.0		0.0 0.0		0.8		0.0
EC Financial Institutions Loaps - Fourth Project	55.0	0.0 55.0	, 	0.0		0.0		0.0	/ 	0.0		0.0		508.0
Bank se Leasing Co Loans Financial Institutions	25.9 40.6 28.9	0.0	//.8	45.15 0.0 70.0	388.5 204.6 , 276.4	293.9	603.4 253.7 472.8	538.9 295.1 100.0	254.4 31.3 250.8	470.0 138.4 0.0		371.9* 3.8* 430.0*		140.0 0.0 0.0
roved Loans Security Deposits its	50.7	22.6	,	0.0 - -0.3 - 50.6 -	/	0.0/ -3.1/ -50.6/		0.0		0.0 -1.0 24.7		0.0/ 4.1/ -65.6/		0.0-
usits ∎s	30.0 1.0	-25.9	1.0	132.0-	1.0	11.4	70.0	78.1 30.6	1.0	22.74	70.0 1.0	94.5%	40.0	0.0
ANCE	233.4	119.3	294.6	299.3	870.5	630.8	1400.9	1084.6	537.5	663.2	71.0	953.9	41.0	664.0
EASE\ (DECREASE) FOR YEAR ALANCE	3.3 123.9	85.6 × 42.6 ×	3.1 127.2	(57.4) 128.2-	12.4 130.3	(48.3) 70.8	3.1 142.7	125.5	37.1 145.8	(115.2)	29.3 182.9	14.4 32.8	3.9 212.2	128.4
ALANCE	127.2	128.2	130.3	70.8	142.7	22.5	145.8	148.0-	182.9	32.8	212.2	47.2	216.1	175.6
mes Debt Service covered rmal Cash Generation	1.8	2.0	1.6	1.9	1.8	2.2	1.8	1.8	/ 1.5	1.7 ^J	1.3	2.0√	1.2	ر ا.ب

171															
172	As At March 31	198 Appraisal	Actual Ap	1985 praisal	/86 Actual Ap	1986 praisal	/87 Actual Ap	1987 praisal	788 Actual A	1988 ppraisal	/89 Actual A	1989 ppraisal	Actual A	1990 Ippraisal	/91 Actual
174 175 176	ASSETS							••••••	\checkmark]		
177 178 179	FIXED ASSETS: Gross Fixed Assets (Less) Accumulated Depreciation	3542.4	3614.0	3577.4 771.4	3685.8 790.2	3636.4 882.9	3836.5 913.8	3677.9 991.5	3883_3 1041_1	7724.2 1101.3	4906.5 1172.9	7771.7 1346.6	8241.7 1334.9	7825.7 1593.3	8839.0 1618.9
16(181 181 181) Net Fixed Assots in Service Vork in Progress Foreign Exchange Adjustment	2001.4 297.6	2946.7 105.9 93.5-	2006.0 733.1	2095.6 435.9 308.0	2753.5 1786.6	2922.7 1542.9 712.4	2686.4 3328.1	2842.2 2675.7 1003.4	6622.9 25.6	3733.6 2842.2 1119.1	6425.1 29.1	6906.8 435.2 1309.6	6232.4 31.1	7220.1 975.9 1189.6
184 165 186	TOTAL FIXED ASSETS	3179.0	3146.1"	3539.1	3719.50	4540.1	5178.0	6014.5	6521.3	6648.5	7694.9	6454.2	8651.6	6263.5	9385.6
18) 181 181 181	9 INVESTNENTS: 9 Coalingency Reservo 9 Other Investments	69.0 10.8	67.9° 33.4	78.6 10.8	85.8¥ 21.8≠	96.4 10.8	104.1 19.7	114.4 10.8	123.1 54.2	123.5 10.8	132.7 115.1	142.7 10.8	146.6 201.3	162.1 10.8	167.2 437.8
192 193	TOTAL INVESTMENTS	80.6	101.3	89.4	107.6~	107.2	123.8	125.2	177.3	134.3	247.8	153.5	347.9	172.9	605.0
191 193 194 193 191 193 193 200 200 200	CURRENT ASSETS: Cash Laventories Consumer Receivables O Other Receivables O Other Current Assets	127.2 269.3 378,8 13.1 85.0	128.2 381.0 398.2 61.2 143.7	130.3 279.3 412.5 13.1 05.0	70.8 480.9 536.2 83.7 238.0	142.7 289.3 442.1 13.1 85.0	22.5 511.8 674.4 78.3 427.4	145.8 299.3 490.5 13.1 85.0	148.0 509.4 563.9 115.8 407.2	182.9 354.3 514.1 13.1 85.0	32.8 719.3 632.8 123.5 243.5	212.2 409.3 560.1 13.1 85.0	47.2 731.3 644.9 97.0 593.0	216.1 419.3 573.4 13.1 85.0	175.6 776.3 728.4 77.0 583.0
20 20	TOTAL CURRENT ASSETS	873.4	1112.34	920.2	1409.6	972.2	1714.44	1033.7	1744.3	1149.4	1751.9	1279.7	2113.4	1306.9	2340.3
20 20	Deferred Expenses	18.4	18.5	16.2	16.2 4	14.0	14.2	11.0	12.0	9.6	9.8	7.4	1.1	5.2	5.5
200 201 202	5 101AL ASSETS	4151.4	43/8.2	4584.9	5252.9*	5633.5	/030.4*	/185.2	8454,9	/941.8	9/04.4	/894.8	11120.6	//40.5	12336.4
200 201 210 211 211 211 211 211 211 211	LIABILITIES AND MET WORTH EQUITY: Share Capital: Comeon Shares Preference Shares	318.6 11.8	317.8 ^V 11.8 -	414.6 11.8	317.9 11.0	414.6 11.0	389.9 11.8	414.6 11.8	389.9 11.8	414.6 11.8	389.9 11.8	414.6 11.8	390.7 11.8	414.6 11.8	390.7 11.8
21	5 Total Share Capital 7 Reserves:	330.4	329.6	426.4	329.7 "	426.4	401.70	426.4	401.7	426.4	401.7	426.4	402.5	426.4	402.5
21 21 22 22 22 22 22 22 22	B Shareholders' Reserve 9 Contingency Reserve 0 Other Statutory Reserves 1 Deferred Tax Reserve 2 Debt Redemption Reserve 3 Project Cost Reserve	389.0 78.6 188.4 74.8 40.0 461.7	388.5 85.8 304.8 74.8 451.0	403.9 96.4 293.4 74.8 85.0 661.7	392.1 104.2 313.0 74.8 27.7 663.1	416.3 114.4 334.1 74.8 125.0 867.7	423.6 123.1 541.3 74.8 55.5 881.2	431.5 123.5 338.3 74.8 165.0 1079.8	472.5 132.7 541.0 99.8 87.9 1031.7	444.2 142.7 438.3 74.8 205.0 1241.1	476.3 146.6 684.9 142.8 119.9 1176.2	445.9 162.1 643.3 74.8 295.0 1241.1	647.1 172.3 741.4 346.2 181.7 1421.2	444.0 181.6 713.9 74.8 385.0 1241.1	826.6 194.1 1022.0 553.7 240.2 1609.5
22 22 22	5 Total Reserves 6 TOTAL EQUITY	1232.5	1304.9	1615.2	1574.9 1904.6	1932.3 2358.7	2099.5 -	2212.9 2639.3	2365.6 2767.3	2546.1 2972.5	2746.7 3148.4	2862.2 3288.6	3509,9 3912,4	3041.2 3467.6	4446.1 4848.6
22. 221 234 234 235 235 235 235 235 235 235 235 235 235	7 B LONG TERM DEBT: 9 Cash Credits 9 Debantures 1 World Bank - Third Project/Sp System 2 World Bank - Fourth Project 3 IFC 6 Other Secured Loans	337.1 -876.0 619.6	338.2 968.4 0.0 576.7	294.4 890.8	50.6 312.8 1206.6 49.1 590.8	270.2 1216.3	0.0 273.0 1436.1 315.1 0.0 47.2	246.0 1756.7 1704 1	40.9 249.7 1472.4 964.6 0.0 1268.6	235.5 1948.1 1937 4	65.6 238.4 1320.8 1529.5 0.0 1462.0	226.5 1795.1 1745 0	342.6 1382.7 1969.0 0.0 1782.7	217.5 1642.1 1552.6	333.8 1232.0 1952.5 508.0 1696.1
23	5 Unsecured Loans	274.5	217.0	274.5	349.2 ~	274.5	360.6 -	344.5	438.7	314.5	461.4	384.5	555.9	424.5	555.9
23	7 TOTAL LONG TERM DEBT 8 *****	2106.6	2100.3 ^{-/}	2062.9	2559.1	2791.9	3232.0°	4051.3	4434.9	4435.5	5077.7	4151.1	6032.9	3836.7	6278.4
23 24 24 24 24	9 CONSUMER CONTRIBUIIONS 6 CURRENT LIABLITIES: 1 Sundry Creditors 2 Other Current Liabilities	17.2 193.2 271.5	21.2 258.8 363.4	17.2 159.5 263.7	24.8 357.5 406.9	17.2 174.6 291.1	27.3 697.6 572.3	17.2 191.5 285.9	29.1 621.8 601.8	17.2 230.7 285.9	33.6 691.3 753.4	17.2 152.0 285.9	35.6 606.6 533.2	17.2 141.1 285.9	35.6 640.7 533.2
24 24	I TOTAL CURRENT LIABILITIES	464.7	622.2	443.2	764.4	465.7	1269.9	477.4	1223.6	516.6	1444.7	437.9	1139.8	427.0	1173.9
24	7 TOTAL LIABILITIES	4151.4	4378.2	4564.9	5252.9	5633.5	7030.4	7185.2	8454.9	7941.8	9704.4	7894.8	11120.7	7748.5	12336.4
	9 0 Debt/Debt plus Equity %	58.6	57.4	51.2	50.3	55.0	57,1	61.2	62.4	60.5	62.8	56.4	62.8	53.1	59.4
25	2 Current Ratio	1.9	1.87	2.1	1.8	2.1	1.4	2.2	1,4	2.2	1,7	2.9	1.\$	3.1	2.9

Attachment Page 10 of 12

Tata Electric Companies - Annual Financial Statements

22222	Derivation Of Average Tariff Statement Of Clear Profit (Rs Million)													Page 4	
261	Financial Yoar Ended March 31	19 Appraisal	84/85 Actual	198 Appraisal	5/86 Actual	190 Appraisal	i/87 Actual	198) Appraisal	7/88 Actual	198 Appraisal	8/89 Actual	198 Appraisal)/90 Actual	1990 Appraisal	/91 Actual
263	NOMISSIBLE EXPENSES														
263 266 267 261 261 269 270	Power Purchases Cost of Fuel Tax on Sales Wheeling Charges Payable To MSEB Admissible Operating Expenses	1023.2 2001.5 120.2 416.9	716.0 2611.4 30.7 51.3 536.3	618.4 2721.1 138.0 445.2	1628.8 2405.8 32.8 55.4 487.7	799.4 2884.4 138.9 471.2	2067.6 2793.7 33.7 79.6 520.4	1002.2 3057.4 139.9 498.7	2009.4 2983.0 36.5 76.3 569.0	1472.9 2833.7 134.9 569.9	2735.5 2683.6 72.6 70.3 687.9	528.4 4142.5 162.9 645.8	2427.5 3154.7 74.5 88.9 736.6	397.0 4574.5 171.5 681.7	2408.1 3718.0 78.6 92.9 988.3
271 272 273 274 275 276	laterest - Third Project/Sp System: World Bank ECGD/IFC Local Financial Institutions Debeatures Consumer Security Deposits	89.3 3.7 68.6 22.7 6.3	72.8 3.4 66.9 22.5 6.0	83.9 2.8 57.9 20.5 6.3	81.4 3.0 63.8 21.2 5.5	77.5 1,8 47.8 18.4 6,3	136.6 2.2 43.1 19.3 5.3	71.0 0.9 42.6 17.3 6.3	110.4 1.2 43.2 18.4 5.2	64.5 0.2 37.2 16.3 6.3	113.7 0.1 31.9 16.6 5.3	58.1 31.9 15.1 6.3	99.8 4.7 32.1 15.4 5.3	51.6 26.6 14.1 6.3	142.2 19.5 26.3 53.3 5.7
278 279 280 281 282 283	Interest - Fourth Project: World Bank Japanese Leasing Cos Local Financial Institutions Interest on System Debentures Jeterest on Cash Credits & Discounting Admissible Depreciation	12.5 2.4 0.0 17.3 8.0 109.6	19.2 2.7 113.0	17.7 12.1 10.0 17.6 8.0 110.4	15.1 5.7 17.8 6.0 120.3	45.1 31.5 23.7 16.1 8.0 111.5	31.7 11.9 22.2 16.3 4.9 121.1	103.4 59.0 74.2 14.7 8.0 108.6	67.3 28.1 29.5 14.0 2.9 123.3	153.8 76.1 123.1 13.9 12.0 109.8	95.6 51.7 34.6 13.8 10.9 125.0	163.1 74.1 134.2 13.9 12.0 245.3	145.9 52.7 81.3 27.7 22.8 155.8	151.9 66.3 122.5 13.9 12.0 246.7	208.3 56.6 91.8 30.8 15.0 278.1
284 285 286 287 288 288 289	Taration Urite Off Niscellaneous Exp. Appropriations to Reserves: Contingency Reserve Investment Allounace Reserve Deforred Tar Reserve	0.0 2.2 8.8 80.0	4.5 2.2 17.9 97.7 0.0	0.0 2.2 17.3 100.0	5.0 2.2 18.4 16.8 0.0	29.2 2.2 18.0 35.5	150.3 2.2 19.0 199.9 0.0	169.6 2.2 9.1 4.2	90.2 2.2 9.6 33.0 25.0	2.2 19.2 100.0	6.3 2.2 12.1 66.4 43.0	2.2 19.4 205.0	-17.6 2.2 20.6 127.5 200.0	2.2 19.5 70.6	0.0 2.2 21.8 399.0 200.0
299 291 292 293 293 294 295	Debt, Redemption Reserve Project Cost, Reserve Fized Deposit Int, Diff, Res. For, Exchange Linb, Reserve Int Diff MSEB Loan & Guarantee Fees etc	40.0 194.0 6.5	0.0 194.3 5.5 6.8 0.2	45.0 200.0 6.9	27.7 212.1 6.5 15.5	40.0 206.0 6.9	27.8 218.1 8.9 47.7 4.8	40.0 212.1 7.8	32.4 150.5 9.1 85.0 55.4	40.0 161.3 8.3	32.0 144.5 0.0 104.8 135.1	90.0	61.8 245.0 9.1 128.9 263.8	90.0	58.5 188.3 8.3 120.0 100.0
296 297 298	TOTAL ADMISSIBLE EXPENSES	4233.7	4581.3	4641.8	5254.5	5019.4	6588.3	5649.2	6610.1	5955.6	7304.3	6559.0	8167.0	6729.1	9311.6
300 301 302	ADHISSIBLE REVENUE	4320.2	4699.2	4756.0	5374.3	5139.2	161.3 6749.6	116.4 	6787.7	115.7 	215.3 ********	107.3 6666 3	197.3 ********** 8364 3	6840 2	210.2
303 304 305	(Less) Wheeling Charges (Less) Other Income	20.9	92.1	21.8	132.0	23.1	110.1 33.5	24.9	111.0 45.0	26.2	133.0 50.2	27.7	160.0 72.6	29.6	140.0 73.6
306 307 308	IOTAL TARIFF REVENUE	4299.3	4607.1	4734.2	5242.3	5116.1	6716.1	5740.7	6742.7	6045.3	7469.4	6638.6	8291.7	6810.6	9448.2
310	ENERGY SALES (GIN)	6470	6658	666 5	7069	6865	7336	7070	7728	7260	7967	7500	8181	7725	8634
313 314	ADNISSIBLE TARIFF (PAISE/WH)	66 .4	69.2	71.0	74.2	74.5	91.5	61.2	87.3	63.0	93.8	88.5	101.4	88.2	109.4

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381 382 383															
384 385 386	Reasonable Return & Capital Base (Rs Million)												F	'age 5	
387 388 389	As At March 31	19 Aporaisal	84785 Actual i	1985 Appraisal		1986 Appraisal	5/87 Actual 4	198) Monraisal	//88 Actual /	1988 Appraisal	8789 Actual 4	1989 Appraisal	1/90 Actual A	199(1991	0/91 Actual
390 391		******													
392 393	CAPITAL BASE COMPUTATION		2022.0	25.40.0						3/05 0	1300.0			1107 0	0112 4
395 395	(Less) Consumer Contributions	17.2	21.2	3549.0 17.2	24.8	3608.0	27.3	3649.5 17.2	29.1	17.2	4/99.8	17.2	35.6	17.2	35.6
397 398	Shareholders' Fixed Assets	3496.8	3561.8	3531.8	3628.1	3590.8	3748.4	3632.3	3773.1	7678.6	4766.2	7726.1	8090.5	7780.1	8677.8
399	Licenses & Capital Issues Advances to MSEB	25.8	25.8	25.8	25.0 60.0	25.8	25.8 50.0	25.8	25.8 40.0	25.8	25.8 30.0	25.8	25.8 20.0	25.8	109.8 10.0
401	Work in Progress - System Work in Progress - Third Proj/Sp System Nork in Progress - Tourth Project	40.3 0.0 253.0	46.1 27.7	39.3 0.0 499.5	58.5 7.2 361.7	17.3 0.0 1745 0	62.6 26.9	16.8 0.0 2307.0	132.5 109.2	21.3 0.0	173.5 3.7 2643.5	24.8	121.8 107.0 187.3	26.8	71.8 880.0
404	Coatingency Reserve Investments Average Inventories	69.8 220.0	67.9 359.6	78.6	85.8 394.3	96.4 250.0	104.1	114.4	123.1	123.5 300.0	132.7	142.7 350.0	146.6	162.1 370.0	167.2 667.7
406	Average Cash Average Cash Credits	62.4 -10.0	82.4 -7.1	64.4 -10.0	84.6 -4.2	66.4 -10.0	98.6 -9.6	68.4 -10.0	105.1 -0.3	70.4 -10.0	76.0 -47.1	72.4 -10.0	186.4 (74.3)	74.4 -10.0	188.4 (10.0)
408	Non Operational Assets	661.3	632.5	1127.6	1073.7	2210.9	2225.7	3782.4	3424.4	531.0	3551.7	605.7	1354.8	649.1	2084.9
411 412	ADMISSIBLE ASSETS	4150.1	4194.3	4659.4	4701.8	5801.7	5974.1	7414.7	7197.5	8209.6	8317.9	8331.8	9445.3	8429.2	10762.7
413 414 415	EXTERNAL SOURCES OF FINANCE														
416	Admissible Accum. Depreciation Amort Lic. & Cap. Issue Exps.	651.3 7.4	658.3 7.4	760.6 9.6	778.1 9.6	871.7 11.8	897.4 11.7	978.7 14.0	1016.7 13.8	1087.5 16.2	1140.1 16.0	1331.8 18.4	1293.6 18.2	1577.5 20.6	1567.7 20.4
418	Approved Loans - Third Proj/System World Bank	850.1	872.6	787.1	824.9	724.1	777.2	661.1	709.9	598.1	642.6	535.1	575.1	472.1	519.5
420	Local Financial Institutions Approved Loans - Fourth Project	546.1	545.1	419.7	493.5	375.6	383.3	331.5	342.3	287.4	297.1	243.3	251.8	199.2	206.2
423	World Bank Japanese Leasing Cos	25.9 40.6		103.7 160.4	45.1	492.2 365.0	287.2 293.9	1095.6 618.7	826.2 589.0	1350.0	1296.2 727.4	1260.0 585.0	1606.6 731.2	1170.0 520.0	1615.1 731.2
425	Local Financial Institutions Consumer Security Deposits	0.0 57.6	50.7	0.0 57.6	70.0 50.4	276.4	130.0	749.2 57.6	230.0	1000.0	230.0	916.7 57.6	660.0 51.4	833.4 57.6	619.2 51.4
428	Debentures - Inito Project Debentures - System T.A.D. Control Reserve	164.9	165.3	149.7	150.3	134.5	135.2	119.3	120.2	117.8	117.7	117.8	230.7	117.8	230.7
430	Consumers Benefit Account Investment Allowance Reserve	16.0 181.9	16.0 177.8	0.0 281.9	21.0 194.5	5.0 317.4	21.0 394.5	5.2 321.6	21.0 424.2	0.0 421.6	20.5 490.6	0.0 626.6	20.3 618.1	0.0 697.2	0.0 1017.1
432	Deferred Tax Reserve Debt Redemption Reserve	74.8 40.0	74.8	74.8	74.8	74.8	74.8	74.8	74.8	74.8	74.8	74.8	74.8	74.8 385.0	49.8 240.2
434	Project Lost Reserve Other Approved Loans	. 461.7	V.1CP		003.1			10/9.8	1031./						1649.5
437	TOTAL EXTERNAL FINANCE	3329.2	3225.5	3726.1	3594.4	4859.9	4547.3	6420.2	5675.1	7241.5	6521.9	7428.6	7851.5	7482.7	9093.9
439	SHAREHOLDERS' CAPITAL BASE	828.9	968.8	933.3	1107.4	941.8	1426.8	994.5	1522.4	968.1	1796.0	903.2	1593.8	946.5	1668.8
442	REASONABLE RETURN														
444 445	7% of Pre 1965/66 Capital Base	33.2	33.2	33.2 55 0	33.2 75 9	33.2 56 1	33.2	33.2 62 4	33.2 125 8	33.2 59.3	33.2 158.6	33.2 51 5	33.2 134 3	33.2	33.2
447	Other Income 0.5% of World Bank Loans	0.7	0,8 4.4	0.7 4.5	1.2	0.7	1.3 5.3	0.7 8.8	1.9 7.7	0.7 9.7	4.0	0.7 9.0	6.0 10.9	0.7 8.2	6.0 10.7
449	0.5% of Local Fin. Insts. Loans 0.5% of Foreign Co-Financing	2.7	2.7	2.1 0.9	2.5 0.1	3.3 1.9	2.6	5.4 3.1	2.7 3.0	6.5 3.2	2.5 3.6	5.8 2.9	4.5 3.7	5.2 2.6	4.1 6.2
451	0.5% of Debentures 0.5% of Invest, Allow, Reserve	1.7 0.9	1.7 0.9	1.5	1.6	1.3	2.0	1.2	1.2 2.1	1.2	2.5	3.1	1./ 3.1	1.1 3.5	1.7 5.1
454	ANOUNT OF REASONABLE RETURN	86.5	103.2	99.3	119,8	104.2	161.2	116.4	177.6	115.9	215.3	107.3	197.3	111.1	210.2
456 457 458	Reasonable Return/Capital Base %	10.4	10.7	10.6	10.8	11.1	11.3	11.7	11.7	12.0	12.0	11.9	12.4	11.7	12.6

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