

Document of
The World Bank

FOR OFFICIAL USE ONLY

MICROFICHE COPY

Report No. 10257

Report No. 10257-TU Type: (PCR)
MAUPRIVEZ, / X31709 / T9 069 / OEDD3

PROJECT COMPLETION REPORT

TURKEY

THIRD TEK TRANSMISSION PROJECT
(LOAN 2322-TU)

DECEMBER 31, 1991

Energy Operations Division
Country Department I
Europe and Central Asia Regional Office

This document has a restricted distribution and may be used by recipients only in the performance of their official duties. Its contents may not otherwise be disclosed without World Bank authorization.

CURRENCY EQUIVALENTS

Currency Unit	-	Lira (TL)
At Appraisal (January 1983):		
US\$1	-	TL 190
TL 1000	-	US\$5.26
June 1990:		
US\$1	-	TL 2610
TL 1000	-	US\$0.3831

WEIGHTS AND MEASURES

kW	-	kilowatt
MW	-	1,000 kW
kWh	-	kilowatt hour
GWh (Gigawatt hour)	-	1,000,000 kWh
kV (kilovolt)	-	1,000 volts
One meter (m)	-	3.28 feet
One kilometer (km)	-	0.624 miles
One kilogram (kg) (1,000 grams)	-	2.2 pounds
One ton (metric ton) (1,000 kg)	-	2,205 pounds
One kilocalorie (kcal) (1,000 calories)	-	3,968 BTU
Cumecs (m ³ /second)	-	35.31 cubic feet per second

GLOSSARY AND ABBREVIATIONS

GOT	-	Government of Turkey
MENR	-	Ministry of Energy and Natural Resources
PCR	-	Project Completion Report
SEE	-	State Economic Enterprise
SPO	-	State Planning Organization
TEK	-	Turkiye Elektrik Kurumu (Turkish Electricity Authority)

Fiscal Year = January 1 to December 31

Office of Director-General
Operations Evaluation

December 31, 1992

MEMORANDUM TO THE EXECUTIVE DIRECTORS AND THE PRESIDENT

SUBJECT: Project Completion Report on Turkey
Third TEK Transmission Project
(Loan 2322-TU)

Attached, for information, is a copy of a report entitled "Project Completion Report on Turkey - Third TEK Transmission Project (Loan 2322-TU)" prepared by the Europe and Central Asia Regional Office with Part II contributed by the Borrower. No audit of this project has been made by the Operations Evaluation Department at this time.



Attachment

PROJECT COMPLETION REPORTTURKEYTHIRD TEK TRANSMISSION PROJECT
(LOAN 2322-TU)TABLE OF CONTENTS

	<u>Page Nos.</u>
PREFACE.....	i
EVALUATION SUMMARY.....	ii
 <u>Part I</u>	
1. Project Identity.....	1
2. Background.....	1
3. Project Objectives and Description.....	1
4. Project Design and Organization.....	2
5. Project Implementation.....	4
6. Project Results.....	5
7. Bank Performance.....	6
8. Performance of the Borrower and Guarantor.....	6
9. Consultants' Services.....	7
10. Findings and Lessons.....	8
 <u>PART II</u>	
TEK's Comments on the PCR.....	9
 <u>PART III</u>	
1. Related Bank Loans and Grant.....	12
2. Project Timetable.....	13
3. Loan Disbursement.....	14
4. Project Implementation.....	14
5. Project Costs and Financing.....	15
6. Project Results.....	16
7. Status of Covenants.....	18
8. Use of Bank Resources.....	20

PROJECT COMPLETION REPORT

TURKEY

THIRD TEK TRANSMISSION PROJECT
(LOAN 2322-TU)

Preface

This is the Project Completion Report (PCR) for the Third TEK Transmission Project in Turkey, for which Loan 2322-TU in the amount of US\$163 million was approved on June 23, 1983. After a cancellation of US\$65 million effective April 4, 1988, the remainder of the loan was closed on September 30, 1989, and fully disbursed on January 31, 1990, except for a balance of US\$159,323.68 which was cancelled as of the date of the last disbursement.

The PCR was prepared by the Energy Operations Division, Country Department I of the Europe, and Central Asia Regional Office (Preface, Evaluation Summary, Parts I and III). Part II of the PCR has been prepared by the Borrower (Turkish Electricity Authority - TEK).

The findings of this PCR are based, inter alia, on the Staff Appraisal Report; the Loan and Guarantee Agreements; supervision reports; correspondence between the Bank and the Borrower; and internal Bank memoranda.

PROJECT COMPLETION REPORT

TURKEY

THIRD TEK TRANSMISSION PROJECT
(LOAN 2322-TU)

Evaluation Summary

A loan of US\$163 million was made to the Turkish Electricity Authority (TEK) in 1983 for the development of Turkey's high voltage power transmission grid. The project was the fifteenth Bank group operation in Turkey's power subsector, and was a continuation of the Bank's assistance, started in 1952, for developing the subsector and increasing utilization of indigenous resources. The loan was guaranteed by the Republic of Turkey.

Objectives

The principal objectives of the project were to expand the high-voltage transmission network to permit utilization of power based on indigenous resources, and to support reform of TEK in the context of the Government's aim of SEE reform.

Implementation Experience

Project implementation, originally expected to be completed in 1986, was not completed until September 1989. While technical problems contributed to this delay, the most important factors were: (a) TEK's slow and cumbersome bidding and contracting procedures and its reluctance to use standardized bid documents; (b) the unsatisfactory local cost funding arrangements; and (c) the institutional weakness of TEK. Lack of local currency funds slowed down transmission line completion, and the situation became worse when one of the contractors also started to experience financial difficulties. Also, project management was poor, and liaison between the TEK managers responsible for project implementation and those responsible for generation planning, construction and operation was insufficient to prevent the serious power transmission bottleneck for the new Karakaya hydropower station (6x300 MW), which resulted from the delay in completion of the Keban-Kangal line from 1985 to the fall of 1989. When it became clear that due to lower than expected prices for equipment and materials stemming from the slump in the international market and the use of materials already in stock, actual disbursements would fall considerably short of the Bank loan of US\$163 million, a sum of US\$65 million was cancelled in 1988.

Despite the considerable consulting assistance provided and the diverse nature of the matters addressed (ranging from development of improved operating procedures for the distribution enterprises, urban distribution rehabilitation, load research, tariff design, and demand management, to manpower planning, training, and development of improved accounting, financial reporting, billing and management information systems), most of the technical assistance efforts and studies included in the project have had little or no impact and few of the consultants' recommendations have been implemented, although the relevant studies were completed. TEK's involvement in these studies was, for the most part, unsatisfactory, a symptom both of TEK's lack of commitment to the institutional objectives of the project and shortage of good quality staff.

Results

Of the project's two objectives, only one was fulfilled. The completed physical facilities helped TEK to meet forecast growth in demand, although subsequent load flow studies showed a need also for a further, southern transmission line to evacuate power generated at Karakaya, which was included in the Fourth Transmission Project (Ln.2586-TU). The technical assistance objectives of the project, i.e. to improve TEK's organization, staff development, manpower planning and training, accounting systems, management information system etc., were not attained. TEK's financial targets (current ratio target of 1.0, accounts receivable target of no more than 100 days of electricity sales by December 31, 1988, and a net internal cash generation target of 35% of public power sector investments by FY85 and beyond) have also not been met in recent years. Thus, the project's institutional goals remain largely unfulfilled.

The estimated 3.5% rate of return on the "time slice" of TEK's investment program, of which the project was a part, falls short of the 8.4% estimated at appraisal, mainly because tariffs have been lower than expected at appraisal. Construction of the transmission lines included in the project has not had a significant negative environmental impact or resulted in more than very limited resettlement.

Findings and Lessons

The immediately apparent causes of the problems that beset the project may be summarized as follows: (i) failure to use standardized bid documents; (ii) lack of coordination among the TEK departments concerned; (iii) failure to make efficient use of the engineering consultants for the management of the project; (iv) lack of local funds; (v) lack of commitment on the part of TEK's management to the technical assistance objectives of the project; (vi) absence of a strategic approach in the implementation of the technical assistance components, i.e., failure to define and attain the short-term goals in the pursuit of the longer term objectives, such as the development of the data base needed for the development of a load management program; and (vii) lack of a strategy for the development and deployment of TEK's human resources, and for overcoming the problem of freeing TEK's middle managers from their day-to-day tasks to enable them to devote time to improving the structure and organization of their jobs.

The more fundamental reasons for these deficiencies, however, must be sought in the scarcity, in TEK, of appropriately qualified top and middle managers with the ability and necessary energy and enthusiasm to define and take charge of the institutional efforts needed to improve the performance of TEK as a whole and of its administration and financial management in particular. This in turn may be attributed to TEK's lack of autonomy in establishing its personnel and financial strategies and, in particular, in recruiting and retaining qualified managers and staff on a competitive basis. It is unlikely that these problems can be overcome without partial or total transfer of TEK's activities to one or several corporations functioning independently from the Government and in accordance with normal commercial principles, either by spinning off activities such as TEK's data processing into a commercial company, or by privatizing TEK altogether and transforming it into a utility functioning autonomously within a framework of parameters defined by an independent regulatory authority.

The lessons to be learned from this lending operation are that good quality staff and management cannot be entirely substituted by consulting resources, and that institution building efforts will not be successful unless the borrower takes charge and there is a firm and continuing commitment on the part of both the borrower and the Government to the agreed goals.

PROJECT COMPLETION REPORT

TURKEY

THIRD TEK TRANSMISSION PROJECT
(LOAN 2322-TU)

PART I: PREPARED BY THE ASSOCIATION

1. Project Identity

Project Name	:	Third TEK Transmission Project
Loan No.	:	2322-TU
RVP Unit	:	Europe, Middle East and North Africa Region
Country	:	Turkey
Sector	:	Energy
Subsector	:	Power
Borrower	:	Turkish Electricity Authority (TEK)
Guarantor	:	Republic of Turkey

2. Background

2.01 At project appraisal in 1983, Turkey had been facing a period of serious shortages of electricity which had resulted in factory shut downs and reduced industrial output. With the Karakaya hydro plant scheduled for completion mid 1986 and other plants also being built as part of the generation expansion program, it was essential that the construction of the Karakaya and other transmission lines be started by end 1983 and completed by mid 1986. The subject project was designed to permit the utilization of the power produced by Karakaya and other stations through additions to the transmission network.

3. Project Objectives and Description

3.01 The project had two objectives: (i) to permit utilization of the power produced by Karakaya and other generating stations; and (ii) to continue the institution building activities initiated under the Bank's previous projects in the subsector, especially the financial strengthening of TEK.

3.02 The project was part of TEK's then current 1982-1986 development plan and consisted of the following parts:

- (a) The construction and placing into operation of about 1,500 km of 380 kV transmission lines, including series capacitors, to interconnect various power stations to TEK's bulk supply system; and
- (b) Technical assistance for TEK to:
 - (i) address organizational, financial, technical and operational problems posed by the recent transfer to TEK of municipal power distribution assets throughout Turkey, also through feasibility studies on distribution rehabilitation and extension;
 - (ii) prepare and implement a program of load research, tariff studies, demand management and energy conservation leading to optimum utilization of TEK's existing and future assets;

- (iii) start the implementation of a long-term manpower development and training program; and
- (iv) improve TEK's existing accounting and billing systems and introduce the first stage of a management information system.

3.03 The project cost was estimated at US\$259.1 million equivalent (foreign cost of US\$178 million equivalent), and the interest during construction and front-end fee on Bank loan at US\$35.5 million equivalent. Therefore, the total financing required was estimated at US\$294.6 million equivalent (foreign costs of US\$213.5 million equivalent). Funding for the local costs (US\$81.1 million), and for the foreign exchange not financed by the Bank (US\$50.5 million), was to be provided by foreign cofinancing sources (US\$8.8 million) and by the Government and TEK (US\$122.8 million).

4. Project Design and Organization

4.01 Design. To prepare an adequate design for each new extension of the 380 kV network, including the proposed Project, specific studies were carried out in the following areas:

- (a) load flows for normal and emergency conditions;
- (b) energization of long lines;
- (c) transient and steady state stability;
- (d) switching surges and dynamic over voltages;
- (e) short circuits;
- (f) mechanical and electrical design; and
- (g) optimum line routing.

4.02 Basic design for the project was on hand, and equipment and materials were standardized in accordance with criteria established during previous construction of 380 kV transmission lines in TEK's network. Following the mechanical failure of several 380 kV lines caused by ice and wind in 1975-1980, TEK had revised the mechanical design criteria for 380 kV lines to take into account the findings of extensive investigations conducted by TEK and consultants. Specifically the new specifications called for span lengths not to exceed 500 m, less sagging of center phase conductors, and ACSR conductors with a ratio of aluminum-to-steel sections of about 8/1. In addition, all lattice towers were to have square bases instead of the rectangular bases previously specified. Other minor modifications had also been included in the improved design. Rights-of-way had been obtained and bidding documents were to be issued starting in July 1983. TEK's engineering department was capable of preparing detailed project design and required only highly specialized outside technical assistance in a few areas. No difficulties were foreseen in maintaining adequate flow of construction drawings to the installation and erection contractors.

4.03 Organization. The project organization was based essentially on that which existed for the works under the earlier Second TEK Transmission project with improvements for deficiencies during the construction and service period of the earlier lines.

4.04 At project appraisal, implementation of many of TEK's projects was held up owing to a shortage of local funds. To ensure the timely availability of local currency funds, TEK was to establish a TL revolving fund. Two other measures were taken to avoid slippages in project implementation. First, there was an effort to ensure timely completion of related substations. TEK was close to completing negotiations for several 380 kV substations under turnkey supplier financed contracts. To avoid the possibility of slippages, the award of contracts for the substations related to the project was a condition of loan effectiveness. Second, TEK project management capabilities were to be strengthened significantly. The engagement of management consultants, satisfactory to the Bank, under terms and conditions also satisfactory to the Bank, was an additional condition of loan effectiveness. TEK planned to engage the services of ELTEM-TEK, a private local engineering consulting firm, owned jointly by TEK, Cukurova, Kepez and other power subsector enterprises. This arrangement would be satisfactory, subject to Bank review of the firm's capabilities. The firm was established by TEK and the other partners in 1982 to attract and retain experienced power industry professionals without being constrained by the civil service and salary regulations applicable to TEK and other state economic enterprises. By statute, the firm was barred from recruiting civil servants on active duty, but it could tap the private sector. The firm would also seek technical support from abroad as required.

4.05 Stringing of conductors and shield wires would be carried out as follows: one-half by local contractors, and the other half by TEK's own crews (force account). Based on recent TEK experience, no adverse effect on project cost was anticipated. TEK and local transmission line contractors had ample 380 kV line construction capability.

4.06 Technical Assistance. To introduce improvements in the organization and operating procedures of the 18 electricity distribution enterprises recently formed by TEK to take over all municipal distribution activities, TEK agreed to select and appoint consultants satisfactory to the Bank no later than December 31, 1983, under terms and conditions satisfactory to the Bank. This technical assistance component was estimated at 170 man-months.

4.07 TEK also agreed to select and employ consultants satisfactory to the Bank no later than December 31, 1983, under terms and conditions satisfactory to the Bank, for about 50 man-months to conduct feasibility studies for rehabilitation and extension of the urban distribution networks. The studies would be carried out in close coordination with the work of the consultants referred to in para 4.06 above. The studies would be completed by June 30, 1985, and the recommendations implemented in consultation with the Bank.

4.08 As the first stage in improving overall system planning, TEK agreed to select and appoint consultants satisfactory to the Bank no later than December 31, 1983, to undertake a load research, demand management and energy conservation study, estimated to require about 300 man-months. This would include technical assistance for carrying out a tariff study aimed at estimating the long-run marginal costs of supply at the high, medium and low voltage levels.

4.09 To strengthen manpower development at TEK, the project had a training component under which TEK would engage training consultants to help train both technical and accounting staff. Furthermore, to improve accounting and management information systems, TEK would engage consultants satisfactory to the Bank.

5. Project Implementation

5.01 Implementation of the project proceeded more slowly than expected at appraisal despite the steps taken at the outset to speed up project implementation (para 4.04). While technical problems contributed to the delays, the most important factors were: (a) TEK's slow and cumbersome bidding and contracting procedures and its reluctance to use standardized bid documents; (b) the unsatisfactory local cost funding arrangements; and (c) the institutional weakness of TEK. At the request of the Government which did not want to immobilize local funds in a revolving fund for the financing of local project costs, the Bank waived the TL revolving fund requirement under the loan (para 4.04). One of the consequences was that lack of local currency funds slowed down transmission line completion. The situation became worse when one of the contractors also started to experience financial difficulties. Also, although the performance of TEK's engineering consultants, FLTEM-TEK, who teamed up with Kennedy and Donkin of the U.K., was very satisfactory, TEK did not take full advantage of this support, making decisions without prior discussion with the consultants. More importantly, project management was poor, and liaison between the TEK managers responsible for project implementation and those responsible for generation planning, construction and operation was insufficient to prevent the serious power transmission bottleneck for the new Karakaya hydropower station (6x300 MW), which resulted from the delay in completion of the Keban-Kangal line from 1985 to the fall of 1989, and of the Kangal-Kayabasi line from 1986 to the fall of 1988. When it became clear that due to lower than expected prices for equipment and materials stemming from the slump in the international market and the use of materials already in stock, actual disbursements would fall considerably short of the Bank loan of US\$163 million, a sum of US\$65 million was cancelled in 1988.

5.02 For the technical assistance components of the project, very detailed terms of reference and counterpart staffing arrangements were incorporated in the consulting contracts at the outset. However, it subsequently became apparent that TEK's counterpart managers for the different components were, for the most part unable to comprehend the need for TA and unwilling to use it effectively. In some areas, such as the development of technical training programs, the Bank's interventions with TEK's senior management did result in improvements in counterpart project management, but in other key areas, such as accounting and financial reporting, they did not. As a result, although all studies were completed, few of the recommendations have been implemented and they have had little or no impact, despite the considerable consulting assistance provided (paras 9.01 - 9.05) and the diverse nature of the matters addressed (ranging from development of improved operating procedures for the distribution enterprises, urban distribution rehabilitation, load research, tariff design, and demand management, to manpower planning, training, and development of improved

accounting, financial reporting, billing and management information systems). TEK's involvement in these studies was, for the most part, unsatisfactory, a symptom both of TEK's lack of commitment to the institutional objectives of the project and lack of good quality staff. The training efforts for technical staff are being pursued under the Fourth TEK Transmission Project (Ln. 2586-TU), but a formal training and manpower development program has only recently been finalized, although the Bank conveyed its comments on a draft in February 1988.

6. Project Results

6.01 Of the project's two objectives, only one was fulfilled. The completed physical facilities helped TEK to meet forecast growth in demand, although subsequent load flow studies showed a need for a further, southern transmission line to evacuate power generated at Karakaya, which was included in the Fourth Transmission Project. All but one of the transmission lines (Keban-Kangal) were completed by October 1988, about twenty-two months late. The Keban-Kangal line was completed only in September 1989. As noted in para 5.02, the technical assistance objectives of the project, i.e. to improve TEK's organization, staff development, manpower planning and training, accounting systems, management information system etc., have not been attained. TEK's financial targets (current ratio target of 1.0, accounts receivable target of no more than 100 days of electricity sales by December 31, 1988, and a net internal cash generation target of 35% of public power sector investments by FY85 and beyond) have also not been met in recent years (para 8.02). Thus, the project totally failed in its institutional goals.

6.02 The estimated 3.5% rate of return on the "time slice" of TEK's investment program of which the project was a part falls short of the 8.4% estimated at appraisal, mainly because tariffs have been lower than expected at appraisal, but also because of the delay in completing the project.

6.03 Six of the transmission lines constructed under the project are located in remote and relatively sparsely inhabited areas in the east of Turkey. Their environmental impact was positive rather than negative in that they led to a more intensive electrification of the areas concerned reducing use of other fuels. In addition, as compensation for rights of way on village land TEK financed improvements in the social infrastructure (for example the schools) of the villages affected. The other four lines, constructed for the transmission of power generated at a new hydropower station in the south (Oymapinar) and at three new lignite-fired power plants in the west (Yatagan, Yeniköy, Kemerköy), as well as for the expansion of the transmission grid (Bursa-Adapazari line), are located in scenic and more densely populated areas of Turkey. While these latter transmission lines had only a limited and relatively insignificant environmental impact, such as the cutting of restricted rights of way through forest areas, the lignite-fired power stations which they connect had negative air quality impacts on a local scale. However, these power stations were not constructed with Bank participation. Very limited resettlement has resulted from the construction of the lines due to their location.

7. Bank Performance

7.01 The Bank closely monitored the progress of the physical and technical assistance components of the project, and during almost every supervision mission stressed the need to accelerate the completion of the transmission lines and to strengthen counterpart staffing and management both for the physical and for the technical assistance components. It also kept a close watch on the financial performance of TEK. After a relatively satisfactory performance in 1985 and 1986 (para 8.02), the Bank agreed to waive the covenants until the end of 1987, when TEK's tariffs and capital were significantly increased and a new general manager, brought in from the outside, initiated a reorganization of TEK. However, the increase of TEK's tariffs and capital (which was not paid up until 1989) was soon eroded by the onset of accelerating inflation, and the attempts to reorganize TEK had stalled by the time the new general manager left TEK in September 1988. The question therefore arises as to whether in regard to the project's institutional objectives the Bank was too ambitious and not sufficiently realistic during project formulation and appraisal. A strategy to put power subsector development back on track, discussed with the Government and TEK in 1989 and 1990, provides for a restructuring program for TEK under a project which is presently in course of preparation.

8. Performance of the Borrower and Guarantor

8.01 In retrospect, it is clear that, except during the reorganization mentioned in para 7.01, there never was sufficient commitment on the part of TEK's management of the time to the project management improvement and institution building objectives of the project (which covered much of the same ground as that covered in predecessor projects).

8.02 Apart from TEK's failure to take charge of the institution building efforts, TEK and the Government also have not lived up to their commitments in areas such as tariffs and financial ratios, and the maintenance of sound accounting principles. In accordance with the agreements under the Karakaya Loan (1844-TU), TEK's annual internal cash generation was to increase from 20% of public power sector capital expenditures in 1981 to 35% in 1986. In addition, to prevent increases in working capital deficits from counting as a positive element in the cash generation calculation, TEK agreed in 1983 under the Third Transmission Loan (2322-TU) to maintain a current ratio of not less than 1.0 from December 31, 1984. Following major tariff increases during the period 1982-84 (during which TEK did not meet the agreed cash generation targets), TEK did achieve a current ratio of 1.16 in 1984 and a cash generation of 41% in 1985. Since then, however, as a result, inter alia, of the Government's unwillingness to raise electricity tariffs sufficiently to cover TEK's financial costs and debt service requirements, cash generation has fallen from 31% in 1986 to an estimated -22% in 1989, and the current ratio from 0.96 in 1985 to an estimated 0.50 at the end of 1989. 1987, 1988 and 1989 were election years (general, municipal and presidential), and 1988 and 1989 also years of high inflation, which may explain why it was difficult to keep tariffs in line with the rapidly increasing costs. As a result, technically, TEK is now insolvent.

8.03 Furthermore, the first audit in 1988 by one of the international auditing firms, who in recent years have been permitted by the Government to open offices in Turkey, has revealed major deficiencies in TEK's accounts, such as receivable balances which are not supported by details explaining by whom the money is owed. The restructuring program for TEK mentioned at the end of para 7.01 includes measures to address these matters.

9. Consultants' Services

9.01 In addition to the engineering consultants discussed in para 5.01, five consulting firms were contracted by TEK for the technical assistance components of the project: (i) a US power utility (organizational and technical improvements and training in the distribution enterprises; improved accounting, financial reporting and billing and collection procedures, development of accrual based accounting and preparation of financial statements more than once a year; introduction of a computerized management information system); (ii) an international accounting firm (definition of a data processing strategy); (iii) a German firm (development and implementation of a program of load research, demand management and energy conservation); (iv) a Canadian power utility (design of manpower development and technical training programs); and (v) a French power utility (tariff study and feasibility studies for urban distribution extension and rehabilitation).

9.02 The consultants performed reasonably well in some respects, less so in others. For example, the US power utility referred to under (i) played an important role in the introduction of micro-computers in TEK and in the training of the technical staff of the distribution enterprises, but did not succeed in getting TEK to accept major improvements in its accounting, financial reporting and billing procedures. They adapted a major financial reporting software package (MSA) to TEK's requirements, but were unable to persuade TEK to use it. They recommended the acquisition of two mini-computers for TEK's Head Office Accounting Department, but the Bank, on the advice of its own computer experts, suggested that this be delayed pending definition of an overall data processing strategy for TEK. The accounting firm referred to under (ii), which did develop a very comprehensive data processing strategy, in the Bank's opinion did not make sufficient allowance for the difficulties of increasing TEK's very limited data processing staff resources and of improving TEK's inadequate organizational and management structures. Their suggestion that these deficiencies could be compensated by increasing the input of consulting resources (estimated by the consultants at US\$17 million, in addition to the cost of hardware, software and modems estimated at US\$40 million) made it impractical to launch the implementation of the recommendations.

9.03 The study of load research and demand management by the German firm referred to under (iii) resulted in not much more than a preliminary report, based on assumptions rather than an actual data base (which TEK did not adequately develop), and providing information of a very general nature on demand management and energy conservation.

9.04 After a poor start, caused partly by requirements set by a counterpart manager who was later replaced by TEK, the Canadian consultants (iv) succeeded in developing technical training programs for TEK, but implementation has not been as far-reaching as had been hoped.

9.05 Finally, the French power utility (v) charged with the feasibility studies for urban distribution extension and rehabilitation did an excellent job in that area but, because TEK subsequently changed the technical parameters, these studies have not been implemented, nor has the very comprehensive tariff study carried out by the same consultants. Their efforts (not financed under the project) of improving TEK's inventory control and Istanbul meter reading and billing procedures, on the other hand, were less impressive.

10. Findings and Lessons

10.01 The immediately apparent causes of the problems that beset the project may be summarized as follows: (i) failure to use standardized bid documents; (ii) lack of coordination among the TEK departments concerned; (iii) failure to make efficient use of the engineering consultants for the management of the project; (iv) lack of local funds; (v) lack of commitment on the part of TEK's management to the technical assistance objectives of the project; (vi) absence of a strategic approach in the implementation of the technical assistance components, i.e., failure to define and attain the short-term goals in the pursuit of the longer term objectives, such as the development of the data base needed for the development of a load management program; and (vii) lack of a strategy for the development and deployment of TEK's human resources, and for overcoming the problem of freeing TEK's middle managers from their day-to-day tasks to enable them to devote time to improving the structure and organization of their jobs.

10.02 The more fundamental reasons for these deficiencies, however, must be sought in TEK's lack of appropriately qualified top and middle managers with the ability and necessary energy and enthusiasm to define and take charge of the institutional efforts needed to improve the performance of TEK as a whole and of its administration and financial management in particular. This in turn may be attributed to TEK's lack of autonomy in establishing its personnel and financial strategies and, in particular, in recruiting and retaining qualified managers and staff on a competitive basis. It is unlikely that these problems can be overcome without partial or total transfer of TEK's activities to one or several corporations functioning independently from the Government and in accordance with normal commercial principles, either by spinning off specific activities such as TEK's data processing into a commercial company, or by privatizing TEK altogether and transforming it into a utility functioning autonomously within a framework of parameters defined by an independent regulatory authority.

10.03 The lessons to be learned from this lending operation are that lack of good quality staff and management cannot be entirely substituted by consulting resources, and that institution building efforts will not be successful unless the borrower takes charge and there is a firm and continuing commitment on the part of both the borrower and the Government to the agreed goals.

PROJECT COMPLETION REPORT

TURKEY

THIRD TEK TRANSMISSION PROJECT
(LOAN 2322-TU)

PART II

TEK's Comments on the PCR

A. In project implementation, it is a fact that there were delays in the completion and putting into operation of the transmission lines when actual commissioning dates are compared with the original estimates. Except for the Keban-Kangal and Kangal-Kayabasi transmission lines, the delays did not have a great effect on the transmission of energy from the related power plants. The Yatagan-Yenikoy, Yatagan-Izmit II, Altinkaya-Kayabasi and Karakaya-Keban transmission lines were completed and put into operation in accordance with the generation plans of the Yatagan, Yenikoy, Altinkaya and Karakaya power plants respectively.

The delays in the construction of the Keban-Kangal and Kangal-Kayabasi transmission lines did not have a direct role in the transmission of energy from the Karakaya power plant since the 380 kV Keban-Karakaya (East-West) transmission lines were able to carry the necessary power, but the high water level in 1985 and lack of the above-mentioned lines put some restrictions on the generation capacity of the Elbistan power plant of course; with the completion of the Keban-Kangal and Kangal-Kayabasi transmission lines there was a more reliable, stable and better transmission system with more capacity.

The major reasons for delay in the construction of the Keban-Kangal transmission line were lack of coordination between tower manufacturer and the erection company, lack of local currency funds from TEK and the financial difficulties experienced by the firm responsible for tower erection, while it was lack of coordination among consortium members for the Kangal-Kayabasi transmission line.

B. Although the Bank may consider TEK's bidding and contracting procedures slow and cumbersome, certain official rules and regulations which are prevailing in Turkey must be followed by TEK. In the early stages, some problems were observed in the use of standardized bid documents, especially in the "Procurement of Works" like construction of transmission lines, but effectiveness of the relationship between the Bank and the Borrower has increased and it has been more fruitful towards the end of the Project.

The reasons for the delays in the approval of bidding documents may be attributed to the following points:

- (i) In the early stages of the Project, there were many changes on the Bank side of the persons who were responsible for the implementation of the Project. Therefore, some points which were approved before were not found to comply with the Bank's Guidelines later. These facts created lack of coordination, time losses and administrative problems.
- (ii) Most of these problems were solved after the seminar held in Ankara for the "Procurement of Goods" but since it was for the ESAL Loan, it did not help much for this Project. We think

that such seminars should be held more often and especially of the "Procurement of Works". If possible, such meetings must be held with each borrower in small groups just at the early days of project implementation so that each party can understand the other better.

C. Local cost funding arrangements had an effect on some of the transmission lines. Especially, the impact was more on contractors who had experienced financial weakness during construction works.

New arrangements have been made for the payment of local costs and this procedure has at least improved the cash flow to the contractors and now they have a better knowledge about the time of payment and amount of payment.

Another way to solve this problem is to increase the amount of financing provided by the Bank for local costs in construction works.

D. We think that liaison between the TEK managers responsible for project management construction and operation was in accordance with TEK's normal procedures. In fact, delays due to local cost funding could not be solved by related departments since it was a general matter existing at TEK at that time. The necessary coordination was made between the Transmission and Construction departments for the lines in which TEK was responsible for wire stringing.

E. Coordination between TEK and the engineering consultant for this project, ELTEM-TEK who teamed up with Kennedy and Donkin, was satisfactory. In fact, there was little which could be done by the consultants since the TEK departments concerned were able to implement the project for transmission lines.

F. Tariff increases are related to the overall economic situation of Turkey, but in recent years tariff adjustments are being done in a more effective manner.

G. The reorganization which was realized in TEK in 1988 did not have a direct influence on the construction of the transmission lines since most of the lines were completed by that time. As is known by the Bank, studies for the restructuring of TEK are being continued. ^{1/}

H. Despite certain delays and some deficiencies, the relationship between the Bank and TEK during the evolution and implementation of the transmission phase of the Project has been fruitful and effective.

^{1/} Para 7.01 of Part I has been changed to clarify this and modify a sentence objected to by TEK.

I. The long range objectives of the Training Development component of the project which was implemented with the help of the Canadian consultants were to provide TEK with a training approach for the development of human resources necessary to carry out its current and projected activities and to train additional staff needed for the planned expansion program. Thus, TEK would be able to conduct a continuous program of education and training so as to permit its staff to keep abreast of technological change.

This project component can be considered as fruitful when the outputs are evaluated. During the project, the counterpart TEK personnel has been trained on the preparation of training programs with a new approach. A pilot program has been prepared together with the consultants.

After the completion of the Project, new programs have been prepared by using the same approach and technique.

The implementation has also been carried out and approximately 2,000 TEK personnel have been trained by using those programs.

There are still more programs on which the work is continuing.

PROJECT COMPLETION REPORT

TURKEY

THIRD TEK TRANSMISSION PROJECT
(LOAN 2322-TU)

PART III

1. Related Bank Loans and Grant

<u>Title</u>	<u>Purpose</u>	<u>Year</u>	<u>Status</u>	<u>Comments</u>
T/A Grant	Assistance in reorganizing Turkey's power industry	1967	Complete	
568-TU Keban Transmission	380 kV Transmission Lines	1968	Complete	PPAR issued 11/81
1844-TU Karakaya	Construction of hydro dam and 6 x 300 MW power station	1981	Complete	PCR being prepared
1194-TU TEK Transmission II	Construction of sub-stations and trans. lines, as well as training of TEK staff in the design and operation of the transmission system, and tariff, manpower and power system studies.	1976	Completed in June 1984 as against estimated date of June 1979.	PCR issued 10/84. Institutional objectives only partially achieved.
2586-TU TEK Transmission IV	380 kV trans. lines, connecting power plants in east to load centers in west.	1985	Slightly behind schedule.	
2856-TU ESAL	Assistance in carrying out an energy sector adjustment program	1987	Behind schedule.	

2. Project Timetable

<u>Item</u>	<u>Date Planned</u>	<u>Date Revised</u>	<u>Actual Date</u>
Identification			Late 1981
Preparation			Early 1982
Appraisal Mission			Jan.31-Feb.18,1982
Loan Negotiations			May 1983
Board Approval	June 21, 1983		June 23, 1983
Loan Signature			June 27, 1983
Loan Effectiveness	Sept.19, 1983		Dec. 1, 1983
Loan Closing	Dec. 31, 1987		Sept.30, 1989
Project Completion	Dec. 31, 1986		Sept.30, 1989

2.01 The issues facing the project at the Issues Paper stage were as follows:

- (a) determination of the loan amount; and
- (b) Internal cash generation targets and clarification of the circumstances in which any reduction in net working capital other than cash would count as ICG funds generated under the project.

2.02 During negotiations, the following changes of substance were agreed.

(a) The loan amount was increased to US\$163 million to cover the following additional foreign expenditures: (i) US\$3 million to finance the development of a management information study for TEK; (ii) US\$4 million to finance the installation of capacitors at the Kayabasi substation; and (iii) US\$6 million to cover a shortfall in cofinancing previously expected from Saudi Arabia and the EIB.

(b) Internal Cash Generation. The Bank dropped its proposal that the cash generation covenant under the Karakaya project (Ln. 1844-TU) be replaced by one requiring tariffs to reach the long run marginal costs of electricity over a period of five years. In the face of opposition from the Turkish delegation, it was agreed that studies would be undertaken under the project on which a restructuring of tariffs could be based. During negotiations it was recognized that the cash generation target under the Karakaya Loan Agreement was not achieved in 1982, and would not be achieved in 1983, mainly because of: (i) substantial slippages in the construction program such as for Elbistan; (ii) abnormally low water levels in the country's hydroelectric reservoirs; and (iii) delays in tariff increases. The Turkish delegation clarified that in the circumstances there would be two tariff increases of 15% each in June 1983 and November 1983. Thus, it was agreed at negotiations that the increase of June 1, 1983 would be a condition of Board presentation, and the second tariff increase of 15% would go into effect not later than December 1, 1983. The effect of the tariff increases would be to raise the 1983 cash generation to about 21%. On this basis, it was agreed to continue the Karakaya Loan Agreement provisions, but with revised targets as follows:

<u>Karakaya</u>	<u>Revised</u>	
1982	22%	12%
1983	25%	21%
1984	29%	32%
1985 and thereafter	35%	35%

The Bank also made it clear that on completion of the various studies then contemplated, and before the end of 1984, the Bank would wish to begin consultation with GOT and TEK regarding restructuring of power tariffs aimed at reaching economic pricing of power rates within 5 to 10 years.

3. Loan Disbursement

Cumulative Estimated and Actual Disbursements (US\$ Million)

	<u>1983</u>	<u>1984</u>	<u>1985</u>	<u>1986</u>	<u>1987</u>	<u>1988</u>	<u>1989</u>	<u>1990</u>
Appraisal Est.	1.0	24.5	102.7	158.1	163.0			
Actual	0.4	17.4	20.2	32.6	73.3	81.4	92.4	97.8
Actual as % of est.	40%	71%	20%	21%	45%	50%	57%	60%

The slow disbursements were mainly due to slow procurement and to lower than expected prices for equipment and materials stemming from the slump in the international market and the use of materials already in stock. When it became clear that the actual disbursements would fall considerably short of the loan amount, a sum of \$65 million out of the loan amount was cancelled in 1988. The Bank's books were kept open through January 31, 1990 to permit disbursements against commitments already made before the loan closing date.

4. Project Implementation

<u>Indicators</u>	<u>Orig. Estimate</u>	<u>Actual Commissioning</u>
-------------------	-----------------------	-----------------------------

Line Section:

No.1 Oymapinar-Kepez	1984	March 1986
No.2 Bursa-Adapazari	1984	Sept. 1984
No.3A Yeniköy-Kemerköy -Yatagan	1985	Sept. 1988
No.3B Yatagan-Yeniköy	1985	Sept. 1986
No.4 Yatagan-İzmir II	1985	March 1987
No.5 Keban-Kangal	1985	Sept. 1989
No.6 Kayabasi-Cankiri	1985	Dec. 1987
No.7 Cankiri-Osmanca	1985	Jan. 1988
No.8 Kangal-Kayabasi	1986	Oct. 1988
No.9 Altinkaya-Kayabasi	1986	Oct. 1987
No.10 Karakaya-Keban (east)	1986	Sept. 1987
No.10 Karakaya-Keban (west)	1986	Feb. 1987

5. Project Costs and Financing

A. Project Costs (US\$ millions)

ITEM	Appraisal Estimate			Revised Estimate			Actual		
	Local	Foreign	Total	Local	Foreign	Total	Local	Foreign	Total
Transmission Lines									
Right-of-way	2.4	0.0	2.4	0.7	0.0	0.7	1.5	0.0	1.5
Steel Towers /1	32.3	35.9	68.2	14.9	17.9	32.8	8.0	30.4	38.4
Conductors	0.0	52.3	52.3	3.7	32.0	35.7	0.0	41.9	41.9
Shield Wire	0.0	3.6	3.6	0.0	1.1	1.1	0.0	1.8	1.8
Insulators	0.0	13.8	13.8	0.0	3.7	3.7	0.0	1.8	1.8
Hardware	0.0	12.3	12.3	1.2	3.9	5.1	0.0	5.4	5.4
Series Capacitors	0.5	3.9	4.4	0.2	3.1	3.3	0.0	5.7	5.7
Installation & Erection	9.1	3.5	12.6	2.7	3.6	6.3	9.6	1.6	11.2
Engineering & Administration	3.9	1.5	5.4	1.2	1.5	2.7	15.5	1.4	16.9
Subtotal	48.2	126.8	175.0	24.6	66.8	91.4	34.6	90.0	124.6
Technical Assistance									
Consultants	2.4	6.2	8.6	0.7	6.2	6.9	0.0	5.9	5.9
Computer Soft/Hardware	0.0	2.5	2.6	0.0	2.6	2.6	0.0	1.0	1.0
Training & Training Aids	0.8	2.9	3.7	0.2	2.9	3.1	0.0	0.5	0.5
Subtotal	3.2	11.7	14.9	0.9	11.7	12.6	0.0	7.4	7.4
Base Cost (early 1983 prices)	51.4	138.5	189.9						
Physical Contingencies	4.8	12.7	17.5	2.4	7.2	9.6	0.0	0.0	0.0
Price Contingencies	24.9	26.8	51.7	19.4	23.9	43.3	0.0	0.0	0.0
Total Project Cost	81.1	178.0	259.1	47.3	109.6	156.9	34.6	97.4	132.0
Interest During Const. /2	0.0	35.1	35.1	0.0	35.1	35.1	0.0	27.4	27.4
Front-end Fee	0.0	0.4	0.4	0.0	0.4	0.4	0.0	0.4	0.4
Total Financing	81.1	213.5	294.6	47.3	145.1	192.4	34.6	125.2	159.8

/1 Including replenishment of stock later used for TRK IV Project (2586-FU)

/2 Bank loan only, including commitment charge

B. Project Financing (US\$ millions)

Source	Planned	Revised	Final
IBRD	163.0	98.0	97.8
European Settlements Fund	6.3	0.0	0.0
Bilateral Financing (France)	2.5	0.0	0.0
TRK and Government	122.8	94.4	62.0
Total	294.6	192.4	159.8

6. Project Results

Economic Impact

	<u>Appraisal Estimate</u>	<u>Actual (At Final Development)</u>
<u>Economic Rate of Return</u>	8.4%	3.5%
<u>Underlying Assumptions</u>		
Capital Expenditure		Shown in current billions of TL
Deflators		As provided by Turkish State Planning Organization (SPO)
Sales		Actual and as currently forecast for TEK Restructuring Project
Electricity Prices		Actual up to 1989, and at the equivalent of 6 US Cents/kWh from 1990 (exchange rate of US\$1 = TL 2121.2)
Revenue, fuel and O&M costs		Incremental revenues and costs compared with 1983

KEY
TEK03 IER

0.03551 0.0

YEAR	POWER SY. (TL\$B)			DEFLATORS	SALES (NET)	INCREMENT. SALE	ELECTRIC. PRICE	REVENUE	FUEL COST	INC.FUEL COST	O&M COST	INC.O&M COST	TOTAL INC. COST	NET BENEFIT	PRESENET VALUE
	DSI	TEK	TOTAL		(GWh)	(GWh)	(TL/kWh)	(TL\$B)	(TL\$B)	(TL\$B)	(TL\$B)	(TL\$B)	(TL\$B)	(TL\$B)	(TL\$B)
1 1983	76.966	272.424	343.396	0.08321	21291.0	0.0	11.0	0.00	105.00	0.0	5.0	0.0	0.0	-4126.8	-4126.8
2 1984	111.802	293.147	404.949	0.12866	25483.0	4192.0	17.9	74.87	126.00	21.0	10.0	5.0	26.0	-2768.9	-2674.0
3 1985	356.344	447.223	803.567	0.18141	27584.0	6293.0	32.7	205.47	184.00	79.0	30.0	25.0	104.0	-3870.2	-3609.4
4 1986	384.405	683.178	1067.583	0.27429	30051.0	8760.0	43.0	376.50	565.00	260.0	45.0	40.0	300.0	-3613.2	-3254.2
5 1987	648.764	1126.585	1775.349	0.38624	33917.0	12626.0	47.6	601.50	353.00	248.0	117.0	112.0	360.0	-3971.2	-3453.9
6 1988	922.173	2454.200	3376.373	0.68564	36787.0	15496.0	71.4	1106.72	395.00	290.0	185.0	180.0	470.0	-3995.8	-3356.1
7 1989	1170.000	2832.029	4002.029	1.00000	39290.0	17999.0	96.4	1735.82	421.88	316.9	197.6	192.6	509.5	-2775.7	-2251.4
8 1990				1.00000	43250.0	21959.0	127.3	2795.38	464.40	359.4	217.5	212.5	571.9	2223.5	1741.7
9 1991				1.00000	47852.0	21959.0	127.3	2795.38	513.81	359.4	240.6	212.5	571.9	2223.5	1681.9
10 1992				1.00000	52943.0	21959.0	127.3	2795.38	568.47	359.4	266.2	212.5	571.9	2223.5	1624.3
11 1993				1.00000	58576.0	21959.0	127.3	2795.38	628.96	359.4	294.5	212.5	571.9	2223.5	1568.6
12 1994				1.00000	64809.0	21959.0	127.3	2795.38	695.89	359.4	325.9	212.5	571.9	2223.5	1514.8
13 1995				1.00000	71705.0	21959.0	127.3	2795.38	769.93	359.4	360.6	212.5	571.9	2223.5	1462.3
14 1996				1.00000	79334.0	21959.0	127.3	2795.38	851.85	359.4	399.0	212.5	571.9	2223.5	1412.7
15 1997				1.00000	87775.0	21959.0	127.3	2795.38	942.48	359.4	441.4	212.5	571.9	2223.5	1364.3
16 1998				1.00000	97114.0	21959.0	127.3	2795.38	1042.76	359.4	488.4	212.5	571.9	2223.5	1317.5
17 1999				1.00000	107447.0	21959.0	127.3	2795.38	1153.71	359.4	540.3	212.5	571.9	2223.5	1272.3
18 2000				1.00000	118879.4	21959.0	127.3	2795.38	1276.47	359.4	597.8	212.5	571.9	2223.5	1228.7
19 2001				1.00000	131528.3	21959.0	127.3	2795.38	1412.28	359.4	661.4	212.5	571.9	2223.5	1186.6
20 2002				1.00000	145523.0	21959.0	127.3	2795.38	1562.55	359.4	731.8	212.5	571.9	2223.5	1145.9
21 2003				1.00000	161006.8	21959.0	127.3	2795.38	1728.81	359.4	809.7	212.5	571.9	2223.5	1106.6
22 2004				1.00000	178138.0	21959.0	127.3	2795.38	1912.75	359.4	895.8	212.5	571.9	2223.5	1068.6
23 2005				1.00000	197092.0	21959.0	127.3	2795.38	2116.27	359.4	991.2	212.5	571.9	2223.5	1032.0
24 2006				1.00000	218062.7	21959.0	127.3	2795.38	2347.45	359.4	1096.6	212.5	571.9	2223.5	996.6
	3664.454	8108.786	11773.24		2075438			51622.4	21933					0.03551	0.0

7. Status of Covenants

<u>Loan Agreement Section</u>	<u>Compliance Deadline</u>	<u>Description of Covenant</u>	<u>Comments</u>
3.02	Appointments: 12/31/83 Feasibility studies: 6/30/85	Appoint consultants to develop detailed recommendations and to assist with implementation of technical and administrative improvements and procedures for the new distribution enterprises, and to conduct feasibility studies for investments in distribution.	Studies completed, but not implemented. Strategy for the divestiture of distribution enterprises is being radically revised, in consultation with the Bank.
3.02	12/31/83	Appoint training consultant.	Complied with, but delayed.
3.03	Appointments: 12/31/83 Diagnostic report: 9/30/84 Final report: 7/31/85	Appoint consultants to undertake a load research, demand management and tariff study, which would include a tariff analysis and formulation component, the full diagnostic report for which would be completed by 9/30/84, and the final report of which would be completed by 7/31/85.	Complied with, but delayed.
3.04	3/31/84	Furnish an action plan for a training program to the Bank for its comments, and implement a training satisfactory to the Bank.	Action plan supplied but not implemented.
3.01		Establish a TL revolving fund adequate to carry out the project in a timely manner.	GOT requested waiver, because it found that revolving funds needlessly immobilize funds.
5.01		Maintain TEK's accounts in accordance with sound accounting practices.	Not complied with: Auditors have indicated that they are unable to certify TEK's 1988 accounts because of material deficiencies, such as receivable balances which are not supported by details of who owes the money.

<u>Loan Agreement Section</u>	<u>Compliance Deadline</u>	<u>Description of Covenant</u>	<u>Comments</u>
5.02		Submit TEK's audited annual financial statements to the Bank no later than five months after year end.	Not complied with.
5.04		The Government will take, or cause TEK to take, all necessary actions, including changes in the level or structure of tariffs, to obtain internal cash generation at least equal to 35% of capital expenditures in electric power by TEK and DSI.	Target met in 1985 and nearly attained in 1986 (31%). Target waived for 1987 (during negotiations for Ln.2856-TU), and not complied with since then. Ratio has been deteriorating.
5.04		Take actions necessary to enable TEK to maintain a fuel adjustment clause in its electricity supply contracts and enforce a provision that its charges will be increased automatically to take account of increases in its fuel costs.	Not complied with, but tariffs were regularly adjusted for fuel cost increases.
5.04		Reflect all increases affecting bulk (high voltage) tariffs, including fuel cost adjustments, in retail (low voltage) tariffs.	Not complied with in 1984/85, but complied with since then.
5.06		Take actions necessary to enable TEK to bring current ratio to 1.0 by the end of 1984, and to keep it above 1.0 thereafter.	Complied with in 1984, but not complied with since then. Ratio has been deteriorating.
5.07	6/30/84	Submit to the Bank a report explaining the capital structure of the new distribution enterprises.	Report no longer required because the strategy to divert distribution enterprises is undergoing a radical revision. The Bank is being consulted in the context of the preparation of a new loan.

8. Use of Bank Resources

A. Staff Inputs /¹
(Staffweeks)

<u>Stage of Project Cycle</u>	<u>Planned</u>		<u>Revised</u>		<u>Actual</u>	<u>Comments</u>
	<u>HQ</u>	<u>Field</u>	<u>HQ</u>	<u>Field</u>	<u>HQ and Field</u>	
Thru appraisal					63.3	
Post-appraisal Thru Board approval					8.8	
Board appraisal Thru effectiveness					1.3	
Supervision					<u>115.7</u>	
					<u>189.1</u>	

Total

B. Missions

<u>Cycle</u>	<u>Month/Yr</u>	<u>No. of Persons</u>	<u>Days in Field</u>	<u>Spec. Repres.</u>	<u>Perform. Rating Status</u>	<u>Problems</u>
Appraisal	Jan/Feb 1983	9	19	Power EGR FNA Power Econ (2) Con. Org. MAA Con. MPWR Dev. + TRG Con Sys PLN(3)	-	-
Appraisal thru Bd Approval	April 1983	1	11	FNA	-	-
Bd Approval thru Effect- iveness	July/Aug 1983	3	14	Power EGR Power Econ FNA	-	-
<u>Supervision</u>						
I.	March/April 1984	3	10	Power ECR Power Econ FNA	1	-
II.	Sept. 1984	1	1	Procurement Spec.	-	-
III.	Oct./Nov 1984	3	10	Power EGR Power Econ FNA	-	-
IV.	Oct 1985	2	11	FNA (2) Power EGR CMP Specit.	-	-
V.	March 1986	4	3	FNA (2) Power EGR EMP SPLT	2	M
VI.	June 1986	2	2	FNA Power EGR	-	-
VII.	Oct./Nov. 1986	4	33	FNA (2) Power EGR (2)	-	-
VIII.	March/April 1987	2	27	FNA Power EGR	-	-
IX.	Dec. 1987	4	13	Power EGR (2) FNA (1)		
X.	June/July 1988	3	25	Power EGR (3)		
XI.	Nov./Dec. 1988	3	20	FNA, Power EGR(2)	-	-
XII.	Sept. 1989	3	16	Power EGR (2) Adm. Asst.	-	-