Basic policy for formulating maintenance control plan of No. 4 DEG is as follows:

(1) Conduct of preventive maintenance
(2) Systematic control
(3) Effective use of records and data for reflection to the future plan

6-2 Maintenance Control Plan

6-2-1 Organization of Maintenance Control

To maintain reliability, safety and efficiency of No. 4 DEG, running condition of equipment should be monitored and recorded at all times, monitored and recorded data should be analyzed and evaluated for reflection to preventive maintenance, and economical and effective maintenance control should be carried out.

For this purpose, operation control group should have close connection with maintenance control group, systematic organization of maintenance control including related control group other than operation and maintenance control group shall be established. Fig. 6-2 indicates the organization chart of maintenance control.

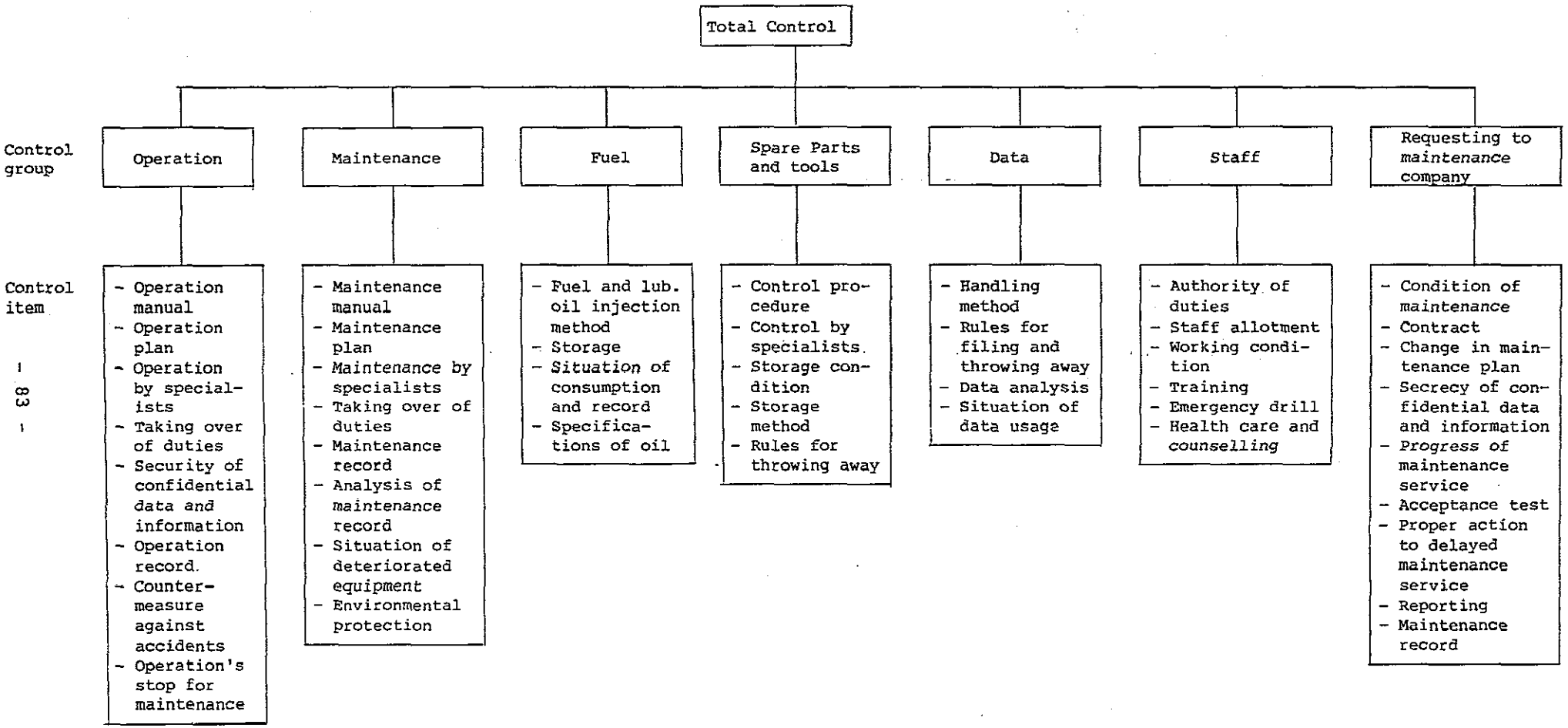


Fig. 6-2 Organization Chart of Maintenance Control

6-2-2 Maintenance Control Procedure

(1) Basic control flow

Control group, as shown in Fig. 6-2, shall perform their duties assigned under the direct control of chief engineer/officer of each group according to the schedule. Records, reports and so on shall be categorized, analyzed and filed according to specified procedures. Stored records and reports shall be used to formulate the future maintenance control plan.

A total coordinator shall totally control work process of each group and instruct for improvement of process.

Fig. 6-3 shows basic control flow.

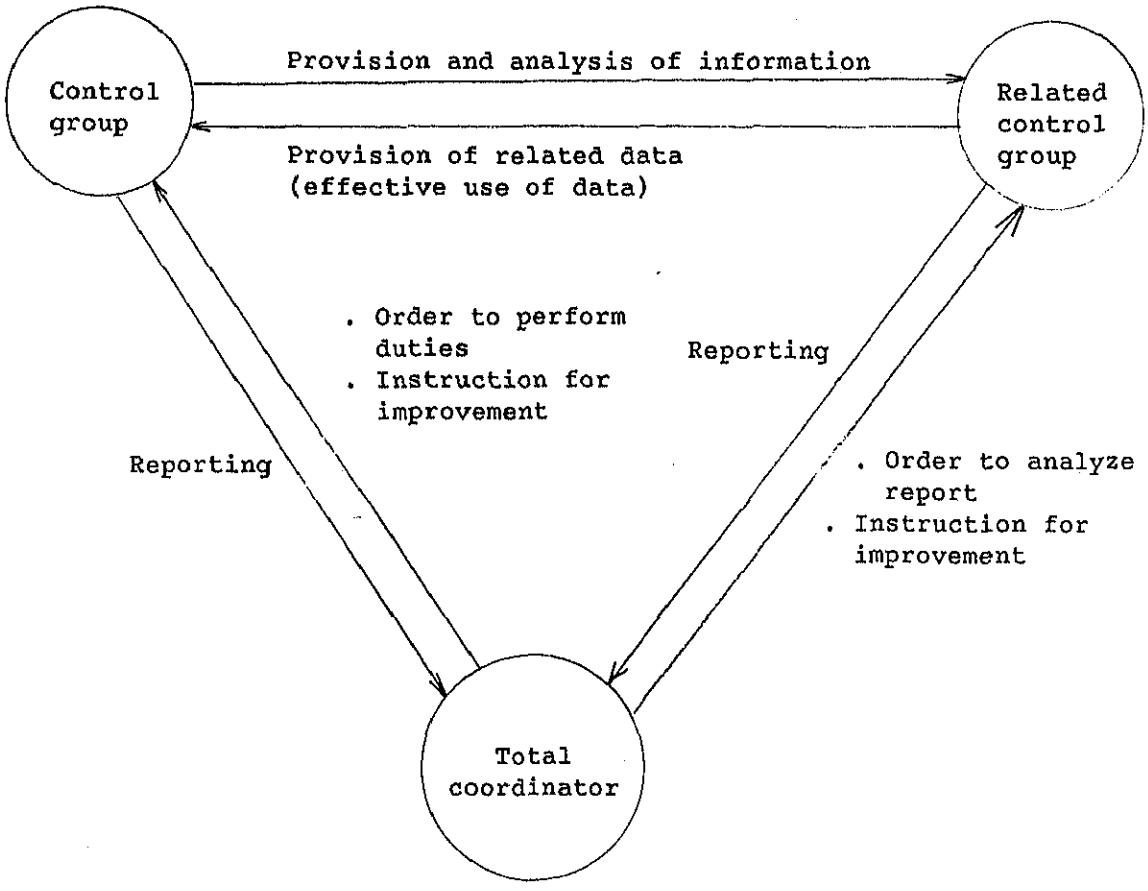


Fig. 6-3 Basic Control Flow

(2) Control items of each control group

Control items of each control group are shown in Fig. 6-2, and each chief engineer/officer of each control group shall control them on consideration of the following points.

1) Fundamental for maintenance control

Each control item shall be executed in accordance with basic conception as shown in Fig. 6-1.

2) Control procedures

Following items shall be considered in preparing procedures.

- Preparation of maintenance control manual
- Filing control of the above manual that are categorized according to proper filing method
- Standardization of preparing manual and preparation of easy-to-understand manual
- Analysis of failure and accident and its cause, working out of countermeasure
- Obtainment of approval of various manual from responsible person at a higher level
- Conduct of orders and reporting according to Fig. 6-3

3) Data analysis and feedback

- Analysis of data for effective use of data analyzed
- Feedback of data to related control group for reflection to the future improvement plan

4) Relationship between Kotu Power Station and GUC headquarters

- Execution of maintenance plan formulated by the GUC headquarters
- Provision of precise data and information to the GUC headquarters
- Timely reporting to the GUC headquarters

CHAPTER 7 PROJECT EVALUATION

CHAPTER 7 PROJECT EVALUATION

Greater Banjul Area, in particular, Banjul City has been developed as a central area, but improvement of social infrastructure is rather behind for full functioning as the central city.

An electric power facility is the first importance as a source for supplying energy that supports the people's livelihood, industrial facilities, social infrastructure, etc. Kotu Power Station is the largest station in the country. As stated in (2) of 2-3-1, electric energy for about 65% of Greater Banjul Area is supplied by No. 4 DEG along (as of 1988). No. 4 DEG is playing a very important role for the stability of the nation's livelihood, industrial development in Greater Banjul Area and the country's development. In view of this situation, the urgency, effects and viability of the Project were evaluated as follows:

7-1 *Urgency*

As stated in 2-3-2, maintenance control of No.4 DEG (i.e., functions, performance and reliability) has been in a serious condition.

As a result, the available capacity now is less than 5MW; about 83% of the rated output, in spite of the fact that the running duration of No. 4 DEG was less than four years.

If No. 4 DEG is left as it is under the present condition without appropriate rehabilitation and maintenance, it will not only affect the life of No. 4 DEG, but also cause some critical accidents, and thus it will result in serious hinderance to the nation's living.

Therefore, the Project should be urgently implemented; Proper rehabilitation will previously the possibility of accidents and transfer of maintenance control technology through OJT will prevent the occurrence of the above-mentioned situations.

Electric energy for about 65% of Greater Banjul Area is supplied by No. 4 DEG alone. Since the role of No. 4 DEG is to keep the base load capacity in the power supply system of Greater Banjul Area even if the ongoing two projects (as described in 2-4-2) are completed, the earlier implementation of the Project will bring about the following merits.

- Securing of stable electric power in Greater Banjul Area
- Stabilization and development of the nation's livelihood and economy

7-2 Effects

Direct and indirect effects expected from the implementation of the Project are as follows:

7-2-1 Direct Effects

As direct effects, the following are expected.
- Effective utilization of the present facilities
- Increase of output and capacity factors
- Reduced generating cost through improvement of heat rate

Table 7-1 shows direct effects after the Project is implemented.

Table 7-1 Direct Effects after Implementation of the Project

Item	Present Condition (1988)	Effect after Implementation of the Project	Remarks
Available capacity	about 5MW	about 6MW	
Capacity factor	about 60%	about 75%	Maintenance period is three months.
Fuel consumption	0.288 ℓ/kWh	0.281 ℓ/kWh	If generated energy per year is 40 GWh, fuel of about 280,000 ℓ/year (about 340,000 D) is expected to be economized.
Estimated profit increase from electric charges	-	about 600,000 D	

Assumptive conditions for estimation of effects

1) Target year of the above effects is 1990. Duration of estimation is one year starting from 1990.
2) Fuel consumption value is recovered up to about 70% of difference between the present fuel consumption value and fuel consumption value at the start of commercial operation.
3) Fuel cost is 1.22D/ℓ (as of September, 1988).
4) Average annual increase rate of minimum electric charges in household is 6%.
5) Power loss is 10%.

The estimated number of users of electric power supplied from Kotu Power Station in 1990 is about 151,000, on condition that electrification rate is 47% (UNSO Report) and population increase rate is 4.7%/year (1983 census, MEPID).

7-2-2 Indirect Effects

Following indirect effects are expected through the implementation of the Project:

(1) Power operation

1) If O & M technology is transferred, improvement of technical level, securing of stable power supply, efficient service of maintenance control and lengthening of facilities' life are expected.

2) If the reliability of No. 4 DEG is improved, stable electric power supply plan will be established.

(2) Socio-economic aspects

1) If energy resources for industrial facilities and public infrastructure are stabilized, improvement of such infrastructure is promoted, and social activation is expected.

2) Promotion of economic activities is expected through stable power supply.

3) Implementation of this Project will encourage the achievement of efficient and judicious consumption of energy that is one of the development objectives of the Second Five Year Plan.

(3) Civic life

1) Stabilization and improvement of daily life, education, medical activities, etc. are expected through improved reliability of power supply.

2) Implementation of the Project will reduce the need for power cut and public security will be maintained.

7-3 Suitability

7-3-1 Technical Aspect

If the Project is implemented and technologies related to rehabilitation of facilities and O & M are transferred, technical level will be improved, and facilities will be rehabilitated and maintained by the Gambian engineers by themselves.

7-3-2 Financial Aspect

If technology is transferred to the present personnel who are responsible for maintenance control, expenses for entrusting maintenance control service to foreign companies will be reduced. Moreover, it will be possible that the present personnel are enough to maintain and control facilities. Thus, personnel expenses will not be increased. If spare parts are granted, fees for procuring spare parts will be reduced.
Also, reduction of generating cost is expected through improvement of thermal efficiency.

7-3-3 Maintenance Control

If OJT is given to the Gambian engineers, they will be able to maintain and control No. 4 DEG by themselves, and that technology will be applied to other generating facilities.

Also, functional performance of No.4 DEG will be maintained and controlled by the Gambian side and the lengthening of facilities' life is expected.

The proposed Project is therefore considered to be highly justifiable from all aspects; technical, financial, and maintenance control.

CHAPTER 8 CONCLUSION AND RECOMMENDATIONS

CHAPTER 8 CONCLUSION AND RECOMMENDATIONS

8-1 Conclusion

As described in (3) of 2-3-2, the existing No. 4 DEG at Kotu Power Station confronts several problems such as shortage of spare parts due to insufficient funds for maintenance control, and deficient technology. Each facility and auxiliary equipment (including supply and exhaust system) do not function properly, thereby resulting in the reduced output of No. 4 DEG. As a result, civic life and industrial activities are forced to be in a serious condition.

If No. 4 DEG continues to be operated under these situations, it will shorten the facilities' life and cause critical accidents.

If appropriate rehabilitation work is executed, necessary materials and equipment for maintenance control are provided and technology of maintenance control is transferred through OJT during the implementation of the Project, it is expected that the Gambian side will be able to improve and maintain the capacity and the functions of No. 4 DEG by themselves, and maintenenace control technology transferred will be applied to maintain other generating facilities including the future plan.

The Project also conforms with the objectives of The Gambia's Second Five Year Plan; 1) to achieve efficient and judicious consumption of energy, and 2) to provide adequate and secure domestic and imported energy for the present and the projected needs as described in (3) of 2-4-1.

Considering the fact that No. 4 DEG supplies power demand of about 65% of Greater Banjul Area, the implementation of the Project will obviously be effective for stable industrial activities and civic life in The Gambia.

Accordingly, the implementation of this Project by Japan's grant aid is considered to be both significant and highly viable.

8-2 Recommendations

8-2-1 Recommendations for the Implementation of the Project

No. 4 DEG that will be rehabilitated under the Project forms the foundation of stable power supply system in The Gambia. It is recommended that the Gambian side takes adequate measures regarding the following matters in order to ensure that the rehabilitated No. 4 DEG will perform its functions for a long period.

(1) The Gambian side should review total operation plan of No. 4 DEG and other generating facilities at Kotu Power Station and formulate detailed plan for operation and maintenance control of No. 4 DEG to establish stable and reliable power supply system. For this purpose, the following is recommended.

1) In order to execute this Project efficiently, the Gambian side will appoint several engineers, who will be responsible for the maintenance control, to participate in OJT from the initial stage to completion of the rehabilitation work.

2) Appointed engineers to participate in OJT should acquire O & M technology from Japanese engineers and make all possible efforts to put such technology into practice by themselves after completion of the work.

3) Such appointed engineers should transfer acquired technology to other engineers who will not participate in OJT, for the purpose of improving technical level in The Gambia.

(2) The Gambian side should make efforts to obtain understanding and consent concerning the operation stop of No. 4 DEG from residents and factory owners during its rehabilitation work.

8-2-2 Recommendations on Future Management of Power Supply

It is recommended that the Gambian side takes following measures regarding the future management of power supply.

(1) Securing of reliable power supply

Efficient and stable operation of generating facilities is indispensable in the energy sector, and it is necessary to make efforts to strengthen generating facilities having adequate firm capacity and higher reliability.

If two projects (ADB and DANIDA) currently under planning are implemented in 1989, total generating capacity by five DEG sets, including No. 4 DEG at Kotu Power Station, will increase to 21.9 MW. However, as shown in Fig. 2-1, a maximum peak demand of Greater Banjul Area in 1991 will exceed the firm capacity because of population increase, and reliability of power supply will be decreased. As a result, power cut will frequently occur again. To cope with this situation, securing of adequate reserve generation capacity is considered necessary.

(2) Improvement of Technical Level

The Gambian side should formulate short- and long-term plans for the power supply management and the improvement of technical level for O & M control, and carry out them. Particularly, engineers who will be responsible for operation and maintenance should be cultivated urgently.

(3) Reduction of Fuel Cost

Reduced fuel cost is indispensable to power supply management in The Gambia depending on diesel generating facilities. For this purpose, the Gambian side should take following measures, and conduct the following survey.

1) Increased efficiency of generating facilities

2) Conversion of fuel for generating facilities from gas oil to heavy fuel

3) Potential survey of alternative energy resources

Appendix I Minutes of Discussions

MINUTES OF DISCUSSIONS
ON
THE PROJECT FOR
REHABILITATION ON KOTU POWER SUPPLY STATION
IN
THE REPUBLIC OF THE GAMBIA

In response to the request of the Government of the Republic of the Gambia, the Government of Japan decided to conduct a basic design study on the Project for Rehabilitation on Kotu Power Supply Station and entrusted the study to the Japan International Cooperation Agency (JICA). JICA sent to the Republic of the Gambia the study team headed by Mr. Takeshi Naruse (Team Leader) from September 29 to October 12, 1988.

The Japanese team had a series of discussions and exchanged views on the Project with the authorities concerned of the Government of the Republic of the Gambia, and conducted a field survey on the site.

As a result of the study and discussions, both parties mutually agreed to recommend to their respective Governments that the major points of understanding reached between them, attached herewith, should be examined towards the realization of the Project.

Banjul, October 4, 1988

Takeshi Naruse
Leader
Basic Design Study Team
JICA

Alieu M. N'Gum
For: Permanent Secretary
Ministry of Economic Planning
and Industrial Development

S. M. Cham
Acting Managing Director
Gambia Utilities Corporation

ATTACHMENT

1. Objective of the Project

The objective of the project is to rehabilitate the existing 6 MW diesel engine generator set in Kotu power supply station, including on-the-job training for operation and maintenance.

2. Responsible and implementation Agency for the Project

Gambia Utilities Corporation

3. Project Site

The project site is located in Kotu power supply station in Banjul City as shown Annex-I.

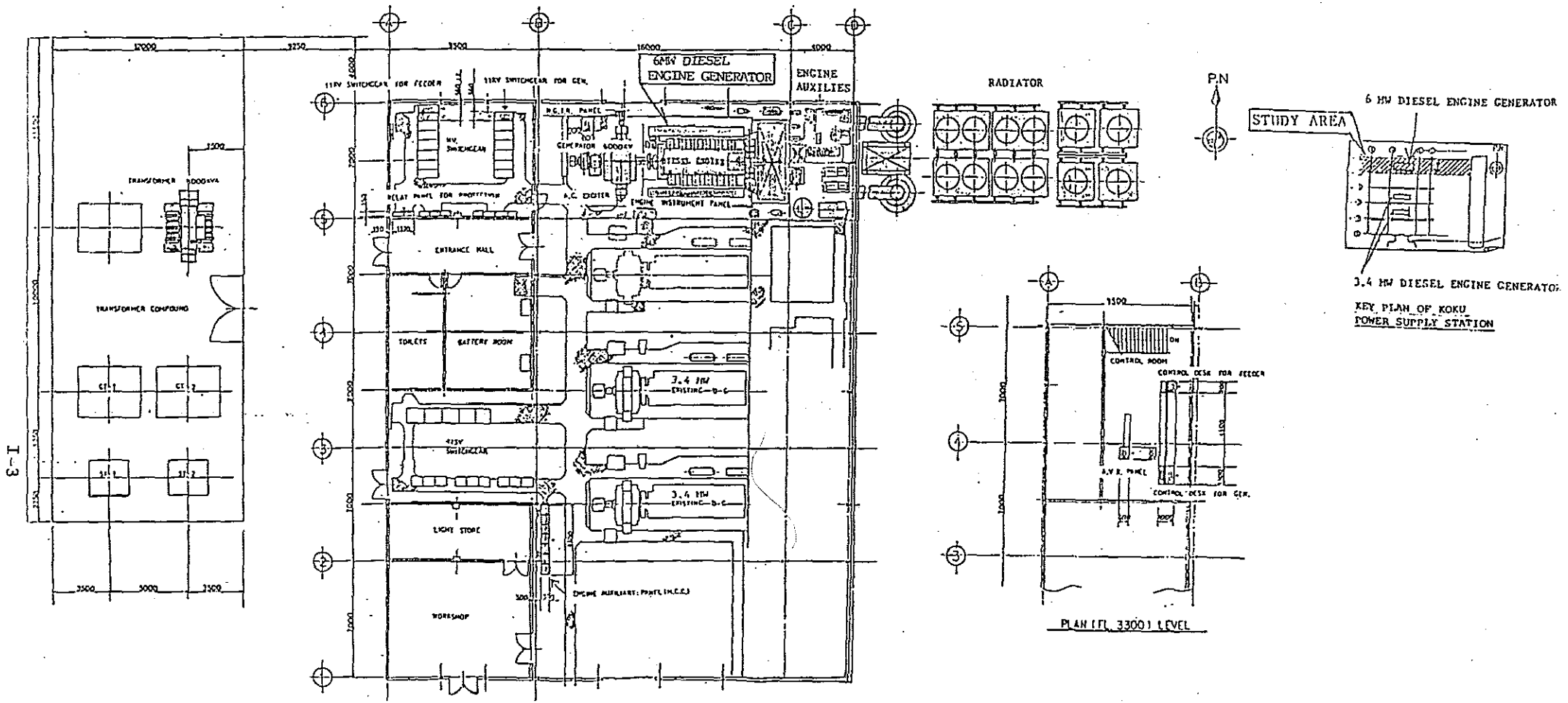
4. The basic concept of the rehabilitation plan shall be described in the field report which will be submitted to Gambia side at the end of this field survey.

5. The Gambia side has understood that the Japan's grant aid system as explained by the study team including contracts are to be concluded with a Japanese consulting firm and Japanese implementing firm for the implementation of the Project.

6. The Government of the Republic of the Gambia has agreed to provide the necessary measures as listed in Annex-II on condition that grant aid by the Government of Japan is extended to the Project.

7. The Government of the Republic of the Gambia has agreed to provide the necessary budget and personnel for proper and effective maintenance of the 6 MW diesel engine generator set after completion of this Project.

8. Final Report (10 copies, in English) will be submitted to the Gambia side before the end of January, 1989.



Note: ▨ shows study area of this basic design study.

DETAILED PLAN OF 6MW DIESEL ENGINE GENERATOR IN KOTU POWER SUPPLY STATION

ANNEX – I LOCATION MAP OF PROJECT SITE

ANNEX-II UNDERTAKINGS BY THE GOVERNMENT OF THE REPUBLIC OF THE GAMBIA

(1) To secure the stoppage of power supply of the 6MW diesel engine generator during the rehabilitation period.

(2) To provide the land for temporary site office, warehouse and stock yard during the rehabilitation period.

(3) To ensure speedy unloading, tax exemption, custom clearance at port of disembarkation in the Republic of the Gambia, of the products purchased under the grant aid.

(4) To give the permission required for all the works related to this project, e.g., entering into the existing Kotu power supply station, carrying out the inspection and maintenance work for the existing 6 MW diesel engine generator set, etc.

(5) To witness and confirm by the authorities concerned when the inspection and maintenance work are carried out.

(6) To carry out inspection and monitoring test of the existing equipment for basic and detailed design, if necessary.

(7) To provide the existing equipment and tools in Kotu power supply station, including electric power, compressor, fork lift, overhead crane, etc., during the rehabilitation period.

(8) To assign on-the-job trainees consisting of a total coordinator, maintenance specialists and technicians for the rehabilitation work, who is belonging exclusively to this power supply station, during the rehabilitation period.

(9) To accord Japanese and other nationals whose services may be required in connection with the supply of the products and the services under the verified contract such facilities as may be necessary for their entry into the Republic of the Gambia and stay therein for the performance of their work.

(10) The Japanese and other nationals involved in the project will not be subject to any customs duties, internal taxes, and other fiscal levies which may be imposed in Gambia with respect to the supply of the products and services under the verified contract.

(11) To bear the following commissions to the Japanese foreign exchange bank for the banking services upon Banking Arrangement.
- Advising commission of Authorization to Pay
- Payment commission

(12) To bear all expenses, other than these to be borne by the grant, necessary for the execution of the grant.

(13) To provide necessary data and information for detailed design.

(14) To provide disposal places of waste water and oil discharged during the rehabilitation period.

(15) To take necessary actions to expedite the approval for executions of this project by the Government of the Republic of the Gambia.

(16) To obtain the permission required for inspection test at the time of detail design, if necessary.

Appendix II Member List of The Basic Design Study Team

Basic Design Study Team

Assignment	Name	Position
- Team Leader	Takeshi Naruse	Japan International Cooperation Agency
- Power Plant Planner	Masuo Seki	Yachiyo Engineering Co., Ltd.
- Generator Facility Planner	Hirohito Seto	Yachiyo Engineering Co., Ltd.
- Diesel Engine Facility Planner	Masatsugu Komiya	Yachiyo Engineering Co., Ltd.

Appendix III Field Survey Schedule

No.	Date	Day of the Week	Weather	Place of Stay	Schedule	Detail of study items
1	Sept. 26	Mon.	Cloudy	Paris	Lv. Narita AF 275 13:00	Departure of Basic Design Study Team from Tokyo
2	Sept. 27	Tue.	Fine	Dakar	Lv. Paris AF 303 07:40	Internal meeting of the Study Team
3	Sept. 28	Wed.	Fine	Dakar	Lv. Paris RK 017 10:30	Study Team Leader, Mr. Naruse arrived at Senegal, and paid a courtesy call to the Embassy of Japan in Senegal.
4	Sept. 29	Thur.	Fine	Banjul	Lv. Dakar DS 431 08:05	Courtesy call to the Ministry of External Affairs, the Ministry of Economic Planning and Industrial Development
5	Sept. 30	Fri.	Fine	Banjul		Courtesy call to the Ministry of Works and Communications, and explanation of inception report, grant aid system and questionnaire to GUC.
6	Oct. 1	Sat.	Fine	Banjul		Site survey at Kotu Power Station
7	Oct. 2	Sun.	Fine	Banjul		Preparation of Minutes of Discussions (M/D)
8	Oct. 3	Mon.	Fine	Banjul		Meeting of M/D
9	Oct. 4	Tue.	Fine	Banjul		Signing of M/D Study Team Leader, Mr. Naruse left Banjul for Japan.
10	Oct. 5	Wed.	Fine	Banjul		Site Survey; collection and study of data and information
11	Oct. 6	Thur.	Fine	Banjul		

No.	Date	Day of the Week	Weather	Place of Stay	Schedule	Detail of study items
12	Oct. 7	Fri.	Fine			(Study Team Leader) Arrival in Japan (Study Team) Site survey; collection and study of data and information
13	Oct. 8	Sat.	Fine			Site Survey; collection and study of data and information
14	Oct. 9	Sun.	Fine			Prearation of Field Report
15	Oct. 10	Mon.	Fine			Explanation and confirmation of Field Report, market survey
16	Oct. 11	Tue.	Fine			Courtesy call to authorites concerned in The Gambia
17	Oct. 12	Wed.	Fine	Dakar	Lv. Dakar GO 001 08:00	Courtesy call to the Embassy of Japan in Senegal
18	Oct. 13	Thur.	Fine	Paris	Lv. Dakar AF 310 14:10	Internal meeting of the Basic Design Study Team
19	Oct. 14	Fri.	Fine	Paris		Meeting with JICA at JICA France Office
20	Oct. 15	Sat.	Fine	in air-plane	Lv. Paris AF 270 11:25	
21	Oct. 21	Sun.	Fine	Tokyo		Study Team's arrival in Japan

Appendix IV List of Interviewees

List of Interviewees

The personnel concerned interviewed by the study team are as follows:

Place of Work and Name	Position
Embassy of Japan in Senegal:	
Mr. Sadamu Fujiwara	Consellor
Mr. Kimio Ohsuga	The Second Deputy Secretary
Mr. Mitsuya Yamagishi	
JICA France Office:	
Mr. Hiroshi Yoshimitsu	Representative
Mr. Noriki Asahi	
Ministry of External Affairs:	
Mr. Abdou A. B. Njie	Permanent Secretary
Mr. Omar Y. Njie	Undersecretary
Mr. L. K. Juwara	Assistant Secretary
Ministry of Economic Planning and Industrial Development:	
Mr. A. M. N'Gum	Director of Planning
Mr. B. Sompo Ceesay	Principal Planner
Mr. Ebrima D. Jobe	Documentalist
Ministry of Works and Communications:	
Mr. M. C. Cham	Minister
Mr. Jagne	Permanent Secretary
Gambia Unilities Corporation (GUC):	
Mr. Sainey M. Cham	Ag. Managing Director
Mr. Leon J. Ndow	Ag. Financial Controller
Mr. M. F. Sighateh	Personnel & Administration Manager
Mr. W. Shola Joiner	Managr of Sewerage Division
Mr. E. J. Cham	Transmission & Distribution Engineer
Mr. I. O. Nicol	Ag. Station Engineer (Prov.)
Halfdie Power Station (GUC):	
Mr. Sam J. Forster	Ag. Manager of Electric Division
Mr. A. A. Roberts	Generation Engineer
Mr. Seikh Omar Faye	

Place of work and Name	Position
Kotu Power Station (GUC):	
Mr. A. S. N'dure	Station Engineer
Mr. H. K. Ofori	Electrical Maintenance Manager
Mr. W. Jachson	Senior System Controller
Mr. Sajor Cham	Senior Mechanical Superintendent
Sierra Leone Shipping Agencies Ltd.:	
Mr. Wolfgang Schneider	Managing Director
S. Madi (Gambia) Ltd.:	
Mr. Lamin Sarr	Manager
Kier International Limited:	
Mr. B. S. Adrington	Area Manager
Sobea Company:	
Mr. Beck	Project Manager
China State Construction Co.:	
Mr. Lee	Managing Director
Mr. Tan Ting Jie	General Manager

Appendix V Field Report

THE BASIC DESIGN STUDY
ON
THE PROJECT FOR REHABILITATION
ON KOTU POWER SUPPLY STATION
IN
THE REPUBLIC OF THE GAMBIA

FIELD REPORT

October 10, 1988

JAPAN INTERNATIONAL COOPERATION AGENCY
(JICA)

CONTENTS

1. Introduction

This report is prepared by the basic design study team (hereinafter referred to as "team") based on the field survey and through discussions with the authorities concerned of the Government of the Gambia.

This report describes the preliminary technical findings obtained through the field survey and study, and also basic concept of the rehabilitation plan for the existing 6MW diesel engine generator set (hereinafter referred to as "the DEG").

This report also includes some items to be confirmed between both parties during the field survey.

The final report will be prepared based on this field report as well as data and information collected during the field survey, in consultation with Japanese authorities concerned.

The report will consist of the following items:
- Urgency, propriety and effects of the project
- Basic design
- Operation and maintenance plan
- Proposal for undertakings and necessary measures by the authorities concerned of the Government of the Gambia for the project
- Evaluation and suggestion on the project.

2. Summary of Scope for Basic Design Study

Scope of the basic design study is summarized as follows:

(1) To perform the basic design for the rehabilitation plan for the DEG consisting of engine, generator and auxiliaries including radiator sets.

Equipment list for the DEG is given in the attachment 1 and 2.

(2) To study the supply of spare parts for the DEG.

(3) To study the program of on-the-job training (OJT).

3. Present Situations of the Site

3.1 General situations of the site

The DEG has not been operated during this field survey. It was stopped since September 24, 1988, because of trouble of fretting on conrods of the diesel engine.
Upon a request by GUC, a technical engineer of CCM Sulzer in France has visited to the site for investigation and undertaking measures on the problem.

In the radiator area, it is observed that the lubrication oil was leaking out from the flange adjacent to the radiator set of the DEG.

The existing No.1 and 2 diesel engine generator sets with each 3 MW output have been operated during the field survey.
The leakage of the lubrication oil of the radiator sets is also observed same as No.4 DEG.

3.2 Present situations of No.4 DEG

(1) Operation record and present situation

According to the operation record prepared by GUC, the available generating capacity of the DEG as of September 23, 1988 was about 4.6 MW with the following operation conditions:

- Running hour : 28,590 hr
- Generated energy : 88,853 Mwh

(2) Monitoring record

Monitoring record of the DEG as of September 23, 1988 (just before the DEG stopped) is prepared by GUC.

Regarding the exhaust temperature at turbo charger inlet, it was recorded as 655^{O}C. This is extremely high comparing with the allowable maximum temperature instructed in the instructions for diesel engine prepared by the DEG manufacturer.

As to the exhaust temperature of No.2 cylinder of the right bank, it was recorded as about 440^{O}C. This value is different from the other cylinder's record, e.g., about 520^{O}C.

(3) Maintenance record and future maintenance plan

The latest maintenance record for the DEG is as follows:

1) Maintenance date : November 7, 1987
2) Running hour : 21,128.9 hr
3) Equipment to be maintained : Diesel engine
4) Description of the work : Replacement of all bearing caps
5) Contractor name of the work : CCM Sulzer in France

GUC has scheduled the future maintenance plan for the DEG as follows:

1) Major overhaul

- 24000 hr overhaul : within a few month
- 36000 hr overhaul : around February of 1990

2) Others

Other maintenance work will be carried out in accordance with manufacturer's recommendation.

(4) Stocked spare parts

Existing spare parts list stocked at site is prepared by GUC.

GUC will use their spare parts in accordance with maintenance program of GUC.

(5) Existing tools

Existing tool list stocked at site, which are to be used for maintenance work of the DEG, is prepared by GUC.

3.3 Future extension plan

GUC has the following future extension plan in Kotu power station:

No.	Project Name	Completion Date	Descriptions
(1)	ADB project	March 1989	3.4 MW DEG x 1 (Diesel oil) It will be installed on the existing No.3 foundation in the power house.
(2)	DANIDA project	The beginning of 1990	6.5 MW x 1 (Heavy fuel oil) New power house will be constructed.

3.4 Heavy fuel oil

GUC asked the team the possibility of modification of fuel oil system from distillate diesel oil to heavy fuel oil.

From view of the technical point, the team recommends GUC that it would be better to consider the modification work for the DEG after the completion of DANIDA project.

Therefore, this matter will not be considered in the final report.

4. Field Study on Decreasing of Output of the DEG

As a result of field study on the data and information obtained through this survey, major cause of the decreasing of output of the DEG are supposed to be as follows:

(1) Decreasing of engine output due to contamination of inside of the DEG. The exhaust air temperature recorded seems to be high.

(2) Decreasing of cooling efficiency of radiator sets due to contamination of dust and leakage of lubrication oil.

(3) Deficiency of adequate maintenance because of increase of power demand and lack of spare parts.

5. Conceptual Plan for the Project

5.1 Tentative rehabilitation plan for the DEG

(1) Basic conditions of rehabilitation work

1) Rehabilitation work of the DEG will be done for about 2 months and the DEG will be stopped in this period.

2) Before commencement of the rehabilitation work at site, GUC shall prepare the temporary land, existing tools, etc. Also GUC shall undertake the necessary actions for stoppage of the power prior to commencement of the work.

(2) Tentative rehabilitation plan

1) Diesel engine

Overhaul will be made. This work shall include cleaning of turbo charger, air cooler, silencer and exhaust pipe. Moreover replacement of parts will be considered.

2) Generator

Some parts will be replaced.

3) Auxiliaries

Overhaul or replacement of some parts will be made. Especially, replacement of radiator element will be considered.

5.2 Spare parts supply

Spare parts for stock will be supplied.

The items and quantities to be supplied shall be determined in the final report in accordance with study results of the field survey and spare parts requirement list prepared by GUC, subject to confirmation with Japanese authorities concerned.

5.3 On-the-job training (OJT) program

(1) OJT for Operation and Maintenance (O&M) will be carried out by the Japanese implementation firm of this project during the rehabilitation period.

(2) The program shall contain the following items:

1) O&M plan of the DEG including, O&M schedule control, spare parts control, and O&M record and document control
2) O&M procedure of the DEG
3) O&M execution know-how of the DEG

6. Items to be prepared by Gambia Utilities Corporation (GUC)

6.1 Items to be done immediately

(1) High exhaust temperature of diesel engine

Judging from the monitoring record mentioned in section 3.2-(2), the team points out that the inlet and exhaust system of the diesel engine seems to have a lot of contamination in the equipment.

To avoid serious problem on the DEG set caused by the above matter, the team suggests GUC to solve this problem urgently.

For example, the following measures can be considered:

1) To take out contamination in the air intake filter.
2) To take out contamination in the turbo charger.
3) To maintain the DEG operation within the limit value of the exhaust temperature for normal operation as instructed by the DEG manufacturer's instruction manuals.

(2) Combustion condition of No.2 cylinder of right bank

As to the temperature record of No.2 cylinder of the right bank reported in the said section 3.2-(2), GUC shall undertake to investigate the conditions of the fuel injection nozzle of the cylinder.

(3) GUC shall submit JICA the work schedule of maintenance which will be done by CCM Sulzer until the middle of October, 1988.

The schedule shall include the following :

1) Equipment to be maintained
2) Description of the work
3) Parts to be replaced
4) Spare parts for stock, to be supplied
5) Expected working date

(4) The team suggests GUC that the leakage of lubrication oil of radiator sets of No.1, 2 and 4 DEG sets as mentioned in aforesaid section 3.1 shall be repaired as soon as possible.

6.2 Items for the project implementation

Based on the minutes of discussions agreed between both parties on Oct. 4, 1988, GUC shall supply or undertake the necessary actions to the following items:

(1) To secure the stoppage of power supply of the DEG set during rehabilitation period.

(2) To provide the land for temporary site office, warehouse and stock yard during the rehabilitation period.

Estimated space are as follows:

1)	Site office	:	30 m^2
2)	Stock yard	:	200 m^2
3)	Warehouse	:	50 m^2

(3) To provide the existing equipment and tools in Kotu power supply station, including electric power, compressor, fork lift, overhead crane, etc., during rehabilitation period, such as:

1)	Overhead crane	5 ton	:	1 set
2)	Folk lift	1.5 ton	:	1 set
3)	Compressor	11 bar	:	1 set
4)	Existing tools			

(4) To assign OJT trainees consisting of a total coordinator, maintenance specialists and technicians for the rehabilitation work, who is belonging exclusively to this power supply station, during the rehabilitation period.

The following number of trainees shall be prepared:

Trainee	No. of trainee	Remarks
1) Total coordinator	1	Chief of the station
2) Maintenance specialist		Technical trained
- For diesel engine	1	engineer for diesel
- For generator	1	engine generator set at technical training center or university.
3) Technicians		Having maintenance
- Mechanical	3	experience, at least
- Electrical	1	one year.

(5) To provide disposal places of waste oil and water discharged during the rehabilitation period.

Estimated volume of discharged materials are as follows:

1) Waste oil : 5 m^3
2) Waste water : 10 m^3

(6) To provide the storage space in the existing heavy store for heavy spare parts to be supplied under this project.

Estimated space : 50 m^2

7. Tentative Implementation Schedule

The project may be executed in accordance with the attached tentative implementation schedule on condition that grant aid by the Government of Japan is extended to the Project.

Attachment-1

Mechanical Equipment List for 6MW Diesel Engine Generator Set

Part No.	Equipment Name	Quantity
M-1	Diesel engine (Hitachi Sulzer 12ZV40)	1
M-2	Fuel service tank	1
M-3	Fuel oil supply pump	1
M-4	Fuel oil 2nd filter	1
M-5	Fuel oil drain tank	1
M-6	Fuel oil drain pump	1
M-7	Lubrication oil sump pump	1
M-8	Lubrication oil priming pump	1
M-9	Lubrication oil 2nd filter	1
M-10	Lubrication oil purifier unit	1
M-11	Lubrication oil sludge tank	1
M-12	Lubrication oil sludge pump	1
M-13	Cylinder oil service tank	1
M-14	Lubrication oil radiator	4
M-15	Jacket cooling water pump	1
M-16	Charge air cooling water pump	1
M-17	Charge air cooling/Jacket water radiator	2
M-18	Charge air cooling water radiator	2
M-19	Fuel valve cooling water pump	1
M-20	Fuel valve cooling water heat exchanger	1
M-21	Jacket cooing water expansion tank	1
M-22	Charge air cooling water expansion tank	1
M-23	Fuel valve cooling water expansion tank	1
M-24	Fresh water make up pump	1
M-25	Air compressor	1
M-26	Starting air receiver	1
M-27	Air intake filter	2
M-28	Exhaust gas silencer	1

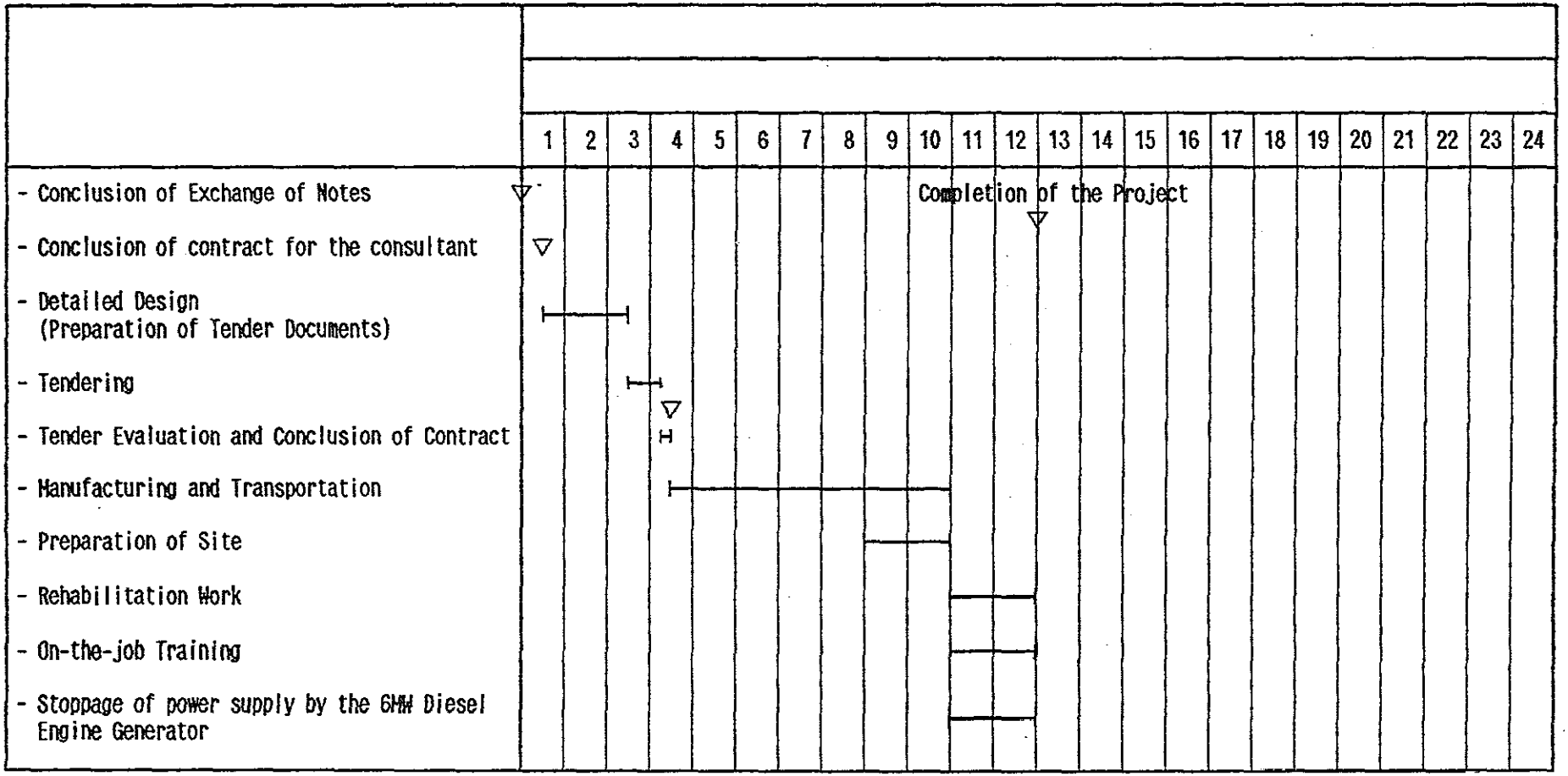
Attachment-2

Electrical Equipment List for 6MW Diesel Engine Generator Set

Part No.	Equipment Name	Quantity
E-1	Generator 6000KW	1
E-2	AC exciter	1
E-3	AVR panel	1
E-4	Engine auxiliary panel (MCC)	1
E-5	11KV switchgear for generator	1
E-6	11KV switchgear for feeder	1
E-7	Relay panel for protection	1
E-8	Neutral grounding transformer panel	1
E-9	Control desk for generator	1
E-10	Control desk for feeder	1
E-11	Transformer 8000KVA	1
E-12	Engine instrument panel	1

Attachment

Tentative Implementation Schedule



Appendix VI GUC's Acknowledge Receipt of Field Report

G.U.C.

GAMBIA UTILITIES CORPORATION

Telephone: BANJUL 275, 276 & 8449
BANJUL 8251 Ext. 68, 69
Telegrams: ELECTRICITY OR WATER WORKS

P.O. BOX 609
BANJUL
REPUBLIC OF THE GAMBIA

GUC/JGG/117

11th October, 1988

Mr. Masuo Seki,
Japanese Study Team,
J.I.C.A.

Dear Sir,

RE: PROJECT FOR REHABILITATION OF KOTU POWER STATION IN THE REPUBLIC OF THE GAMBIA.

We hereby acknowledge receipt of your Field Report on the above Project submitted to us on the 10th October, 1988.

While we accept that a more detailed report will be prepared in due course, we would nevertheless like to make the following observations.

1) We are not so sure that your comment about the lubricating oil leak under Item 3.1 is altogether correct, as such an indication was not detected during actual operation.

2) The turbo-charge inlet temperature of 655 °C abstracted from our records may be suspect. We believe that a new sensor would give us a useful check. Your Item 3.2 refers. You may have noticed that the turbo-charger air intake filter is situated very close to the charge air cooling radiators, which are themselves not as high above ground level as one might expect.

3) We expect the ADB funded 3.44 MW diesel generator to be commissioned by the 1989/90 financial year.

4) The subject of contamination of the air intake filter has bedevilled service engineers in the past, including a service team from Japan during the guarantee period. See Item 6.1 of Field Report.

/2.....

(5) The present unplanned outage has been caused by con: rod bearing shell/cap failure, the second time that such failure has occurred on the Hitachi Zosen engine. It should therefore be useful to investigating the roof cause of this problem with a view to eliminating it altogether.

(6) As communication with previous Japanese engineers has often been diffioult, we think it would be of tremendous benefit to the Project if the members of implementation team are reasonably fluent in English.

We look forward to your continued assistance in ensuring the successful rehabilitation of this most important diesel generator.

Yours faithfully,
FOR: GAMBIA UTILITIES CORPORATION

S.M. CHAM
AG. MANAGING DIRECTOR

c.c. Ag. Manager Elect Div

Appendix VII Country Data

1. Basic Indexes

(1) The Republic of The Gambia
Capital: Banjul

(2) Territorial land and population
Area: 11,295 km^2
Population: 687,817 persons (1983 census)
Population density: 60.9 persons/km^2 (")
Population growth rate: 3.4%/year (")

(3) Currency: US$1.00 = 7.0 D (as of Sept., 1988)

(4) Meteorological Data:
Winter (dry season): Nov. - Apr. Ave. temp. 27°C
Summer (rainy season): May - Oct. Ave. temp. 29°C

2. Socio-economic Indexes

(1) GDP: About US$156 million
(1984/85, Development Issues and Prospects Report, WB)

(2) Per capita GNP:
About US$260 (1984/85, Development Issues and Prospects Report, WB)

(3) Composition of Industry:
Main product: groundnut

Output, Employment and Productivity in 1984

Item	Value Added		Labor Force		V.A. per Worker	
	US$ Mln.	%	Thousand	%	US$	%
Agriculture	54	28	232	70	233	39
Industry	25	13	30	9	833	141
Services and Unallocated	117	59	69	21	1,696	286
Average	196	100	331	100	592	100

(Source: 1984/85 Development Issues and Prospects Report, WB)

(4) Inflation rate

Changes in the rate of price rise

(Unit: %)

Item	1978	1979	1980	1981	1982	1983	1984	1985
Consumer Price Index (1977:100)	110	118	124	135	146	160	185	225
Changes in Consumer Price Index	10.4	7.2	5.0	9.0	8.2	9.3	5.6	21.7

(Source: 1984/85 Development Issues and Prospects Report, WB)

(5) Central Government Finance

Item	D. Min.	Percent of GDP	
	1984*	1984*	1979*
Current Receipts	128	21	23
Current Expenditure	141	23	21
Current Balance	-13	-2	2
Capital Expenditure	70	12	12
Overall Balance	-83	-14	-10

Note: *Fiscal year ending June 30.

(Source: 1984/85 Development Issues and Prospects Report, WB)

(6) Trends in Flows of Development Assistance

(in thousands of US dollars)

	1982/83	1983/84	1984/85	1985/86	1986/87
CAPITAL ASSISTANCE:					
Loan	22,691	19,038	11,255	15,685	15,560
Grant	11,607	9,519	34,666	54,884	53,370
Food Commodity	3,295	2,876	3,604	3,607	8,280
Subtotal	41,955	31,433	49,525	74,176	77,210
TECHNICAL ASSISTANCE:					
Loan	-	-	-	-	-
Grant	16,015	15,593	27,929	22,274	26,051
Food/Commodity	14	-	-	15	-
Subtotal	16,029	15,593	27,929	22,288	26,051
STRUCTURAL ADJUSTMENT SUPPORT:					
Loan	-	-	-	17,500	23,584
Grant	-	-	-	8,608	12,933
Subtotal	-	-	-	26,108	36,517
HUMANITARING & RELIEF ASSISTANCE:					
Food/Commodities	4,899	11,803	7,215	2,134	1,040
Grant	42	122	1,856	14	-
Subtotal	4,941	11,925	9,071	2,148	1,040
TOTAL DEV. ASS'T.	62,925	58,951	86,525	124,720	140,818
OTHER CAPITAL FLOWS:					
Total imports, f.o.b. (A)	(91,735)	(97,812)	(80,246)	(86,557)	(91,438)
Total exports including re-exports, f.o.b. (B)	86,965	87,650	66,510	73,996	65,591
Freight and insurance (C)	(15,307)	(16,318)	(13,377)	(15,142)	(18,069)
Tourists' foreign exchange inflows (D)	15,850	18,692	19,780	24,717	34,473
Trade & Tourism Balance (A + C) - (B + D)	(4,227)	(7,788)	(7,333)	(2,986)	(9,443)
NET TOTAL	58,698	51,163	79,192	121,734	131,375

Source: UNDP, Development Co-operation Report, 1987

3. Others

(1) National holiday (1988)

New Year Day	Jan. 1
Independense day	Feb. 18
Good Friday	Apr. 1
Easter Monday	Apr. 4
Labour day	May 1
Koriteh	May 18
Tobask	Jul. 25
Assumption	Aug. 15
Gamo	Oct. 23
Christmas	Dec. 25

(2) Office Time 8:00 - 16:00 (lunch time: 12:00 - 13:00)
Day off: Saturdays and Sundays
Fridays: 8:00 - 12:00

Appendix VIII Meteorological Data

1. Rainfall

(Unit: mm)

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.	Annual
1978	0	0	0	0	0	98.5	275.1	334.6	272.3	143.8	37.5	-	1161.8
1979	10.6	0	0	0	0.6	267.7	254.6	240.3	215.9	112.5	1.0	9.6	1112.8
1980	0	0	0	0	0	23.9	101.8	101.9	370.1	32.8	0	0.5	631.0
1981	-	0	0	0	5.4	50.2	125.6	272.0	174.3	17.0	0	0	644.1
1982	-	-	0	0	2.0	25.8	260.4	312.4	131.6	106.1	0	-	844.3
1983	0	5.0	0	0	-	18.7	115.4	192.4	87.7	9.3	0	0	423.5
1984	0	0	0	0	-	187.4	131.5	185.4	124.0	33.7	5.2	-	669.2
1985	-	0	-	0	0	19.3	379.9	388.8	197.0	33.7	0	5.1	1023.8
1986	0	0	-	0	-	34.3	48.8	395.7	217.8	65.7	0	0	762.3
1987	0	0	0	0	-	43.8	134.8	292.4	231.0	98.4	0	0	800.4
Average	1.1	0.5	0	0	0.8	77.0	182.8	271.6	202.2	65.3	4.4	1.5	807.3

(Source: GUC, at Yundum Airport)

2. Temperature

2-1 Highest

(Unit: °C)

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
1981	37.0	37.8	39.4	38.5	36.0	35.0	34.7	33.0	32.8	35.2	36.1	35.2
1982	37.5	36.2	38.0	41.0	38.6	35.0	34.5	32.8	34.0	35.1	35.6	34.6
1983	37.3	41.2	42.0	41.5	40.0	35.1	34.2	33.0	34.2	35.7	40.5	36.5
1984	36.8	39.5	38.1	40.5	37.1	37.6	36.5	33.4	32.8	36.6	37.2	35.3
1985	33.7	38.5	40.5	39.5	37.9	35.0	33.8	32.5	36.4	36.1	36.8	36.2
1986	34.0	37.2	39.8	40.3	37.1	36.5	33.7	31.7	32.6	33.6	35.0	37.0
1987	38.5	39.5	39.8	41.4	37.7	34.7	35.6	33.4	33.6	35.3	35.4	36.2

(Source: GUC, at Yundum Airport)

2-2 Lowest

(Unit: °C)

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
1981	12.5	15.0	15.3	16.5	18.8	21.3	21.3	20.2	20.5	20.2	14.9	12.3
1982	12.0	15.0	13.5	17.5	17.0	20.9	21.4	19.2	17.5	18.0	14.7	7.9
1983	10.1	13.2	15.5	15.9	18.0	21.4	21.0	21.7	21.2	20.8	16.5	11.8
1984	12.4	13.8	16.1	17.5	19.4	21.0	19.5	18.5	19.9	18.5	14.0	12.8
1985	12.5	13.3	16.0	15.0	14.5	19.2	18.9	20.5	18.4	20.0	12.5	13.4
1986	13.5	12.8	11.5	9.8	19.5	16.9	20.8	21.5	20.5	19.6	12.4	10.3
1987	18.4	14.3	7.1	17.5	19.8	21.3	21.4	21.6	21.6	20.8	14.0	10.6

(Source: GUC, at Yundum Airport)

2-3 Average

(Unit: °C)

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
1981	24.5	24.5	26.7	26.3	26.9	28.3	27.6	27.1	27.0	27.3	26.5	24.6
1982	24.7	24.5	25.7	25.9	25.9	27.7	27.8	26.8	26.6	25.9	25.1	22.7
1983	24.1	25.7	27.4	25.5	26.8	28.3	27.9	27.6	27.4	27.9	27.3	25.3
1984	24.5	26.4	24.7	25.7	27.0	27.8	26.7	26.4	26.6	26.9	25.1	24.7
1985	23.6	25.4	26.4	25.5	24.5	27.2	26.6	26.3	25.7	27.0	25.8	23.6
1986	23.3	24.8	26.4	26.4	27.2	27.4	27.6	26.8	27.0	27.2	25.0	23.9
1987	23.8	25.1	26.5	27.7	27.9	28.5	28.8	27.9	27.8	28.2	26.5	25.0

(Source: GUC, at Yundum Airport)

3. *Maximum Wind Velocity*

(Unit: km/h)

Year	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sept.	Oct.	Nov.	Dec.
1980	38	38	38	38	38	49	61	61	74	28	19	38
1981	38	38	38	38	38	38	49	74	74	28	38	28
1982	38	38	38	38	38	38	38	74	88	74	78	34
1983	38	38	38	38	38	49	88	74	74	61	78	38
1984	38	38	38	28	49	38	28	74	38	28	28	28
1985	38	38	38	28	38	49	49	49	49	49	28	38
1986	38	38	38	38	49	38	38	38	49	49	38	49
1987	28	38	38	49	38	74	74	74	74	61	28	49

(Source: GUC, at Yundum Airport)

Appendix IX Operation, Trip and Fault Record of No. 4 Diesel Engine Generator

1. Operation Record of No. 4 DEG

Month		Commercial Operation Hour (hr)	Fuel Consumed (kℓ)	Generated Energy (GWh)	Fuel Consumption (ℓ/KWh)	No. of Days Stopped Transient	No. of Days Stopped Full Day	Operation Factor (%)	Remarks
1985	1	695	866	3.1	0.276	6	0		
	2	655	806	3.0	0.273	5	0		
	3	518	618	2.3	0.273	8	7		Maintenance
	4	217	238	0.9	0.280	7	16		
	5	689	727	2.6	0.280	17	0		
	6	545	651	2.3	0.280	17	0		
	7	451	532	1.9	0.282	23	6		Maintenance
	8	681	852	3.1	0.279	19	0		
	9	702	887	3.3	0.272	9	0		
	10	685	794	2.9	0.274	12	0		Maintenance
	11	718	839	3.0	0.277	6	0		
	12	536	644	2.3	0.277	2	0		
Subtotal		7,062	8,454	30.6	0.277	141	29	81	
1986	1	330	371	1.3	0.278	5	15		
	2	577	636	2.3	0.277	2	3		Maintenance
	3	661	788	2.8	0.277	5	2		
	4	585	634	2.3	0.279	7	3		
	5	719	826	2.9	0.283	3	0		
	6	716	804	2.9	0.281	3	0		
	7	572	634	2.3	0.282	8	5		
	8	724	822	2.9	0.281	8	0		
	9	704	806	2.8	0.283	9	0		
	10	740	850	3.0	0.285	1	0		
	11	709	794	2.8	0.284	4	0		
	12	744	823	2.9	0.281	0	0		
Subtotal		7,781	8,788	31.3	0.281	55	28	89	

Month		Commercial Operation Hour (hr)	Fuel Consumed (kℓ)	Generated Energy (GWh)	Fuel Consumption (ℓ/KWh)	No. of Days Stopped Transient	No. of Days Stopped Full Day	Operation Factor (%)	Remarks
1987	1	679	755	2.7	0.282	5	1		
	2	671	600	2.1	0.283	1	0		
	3	510	643	2.3	0.284	6	7		Maintenance
	4	0	0	0.0	0.000	0	30		
	5	224	274	1.0	0.276	4	19		
	6	705	876	3.2	0.277	3	0		
	7	732	948	3.4	0.276	7	0		
	8	692	865	3.1	0.278	6	0		
	9	697	873	3.1	0.279	6	0		
	10	736	940	3.4	0.279	3	0		
	11	557	705	2.8	0.279	5	5		Maintenance
	12	734	880	3.2	0.278	4	0		
Subtotal		6,937	8,359	30.3	0.279	50	62	79	
1988	1	737	832	3.0	0.277	7	0		
	2	680	804	2.9	0.281	3	0		
	3	738	957	3.4	0.282	4	0		
	4	708	873	3.1	0.286	2	0		
	5	741	905	3.2	0.282	3	0		
	6	713	890	3.1	0.283	4	0		
	7	740	919	3.2	0.284	4	0		
	8	729	905	3.2	0.284	3	0		Stopped on
	9	543	670	2.3	0.288	6	6		Sept. 24
Subtotal		6,329	7,755	27.4	0.283	36	6	96	
G. Total		28,109	33,356	119.5	0.280	282	125	86	

(Source: GUC Kotu Power Station)

2. Trip Record of No. 4 DEG

Date	Cause	Action Taken
12-12-84	Cooling medium temp high	Check and Re-started
13-12-84	Oil mist high	- do -
16-12-84	- do -	- do -
17-12-84	- do -	- do -
23-12-84	- do -	- do -
27-12-84	Cooling medium temp high	- do -
14-01-85	Oil mist high	- do -
04-02-85	Unknown	Re-started
07-02-85	- do -	- do -
19-02-85	Overload No. 1 tripped	- do -
25-02-85	Unknown	- do -
04-03-85	Loss of control air	Check and re-started
21-03-85	Unknown	Re-started
24-03-85	fuel pressure low	Filters cleaned
30-04-85	Unknown	Re-started
22-05-85	Inter connector	- do -
28-05-85	- do -	- do -
09-07-85	Unknown	- do -
25-07-85	- do -	- do -
26-07-85	Inter connector	- do -
03-08-85	- do -	- do -
15-08-85	Rain storm	- do -
19-08-85	Oil mist high	Check and re-started
12-09-85	Unknown	Re-started
14-09-85	Inter connector	- do -
14-09-85	Unknown	- do -
02-09-85	Inter connector	- do -
05-09-85	Unknown	- do -
07-09-85	Inter connector	- do -
08-09-85	Unknown	- do -
15-09-85	- do -	- do -

Date	Cause	Action Taken
15-09-85	Unknown	Re-started
15-09-85	- do -	- do -
19-09-85	Inter connector	- do -
19-09-85	Inter connector	re-started
20-09-85	Unknown	- do -
06-03-86	J. W. temp high	Re-started
02-04-86	Cyl. lub oil nonflow	Check and re-started
03-04-86	- do -	- do -
04-04-86	- do -	Replaced
04-04-86	- do -	Check and re-started
05-04-86	- do -	- do -
05-04-86	- do -	By-passed no spare one
10-04-86	Inter connector	Re-started
21-04-86	Cyl. lub oil flow failed	- do -
21-04-86	Oil mist high	Check and re-started
21-04-86	- do -	- do -
21-04-86	- do -	- do -
21-06-86	Cyl. C. W. temp high	- do -
23-06-86	Inter connector	Re-started
07-07-86	Unknown	- do -
10-07-86	- do -	- do -
22-07-86	Fuel pressure low	Filters clean
26-07-86	Unknown	Re-started
26-07-86	Inter connector	- do -
01-08-86	- do -	- do -
11-08-86	Unknown	Re-started
30-08-86	Gen winding temp high	- do -
30-08-86	- do -	- do -
03-09-86	Unknown	Re-started
03-09-86	C. W. pressure low	Check and re-started
03-09-86	Inter connector	Re-started
11-10-86	- do -	- do -

Date	Cause	Action Taken
01-11-86	Inter connector	Re-started
06-12-86	C/C oil mist high	Chck and re-started
09-01-87	Unknown	Re-started
09-01-87	- do -	- do -
25-02-87	- do -	- do -
09-06-87	D. W. S. feeder	- do -
10-06-87	Inter connector	Re-started
17-06-87	Overload when G2 tripped	- do -
18-06-87	Unknown	- do -
06-08-87	Overload - Gen 2 tripping	- do -
17-08-87	Feeder 1	- do -
19-08-87	Inter connector	- do -
28-08-87	Feeder 1	- do -
28-08-87	- do -	- do -
29-08-87	Unknown	- do -
01-09-87	- do -	- do -
08-10-87	Inter connector	- do -
15-20-87	Overload - No. 2 tripped	- do -
28-11-87	Overload - No. 1 tripped	- do -
02-03-88	Inter connector	- do -
02-03-88	Unknown	- do -
16-03-88	Inter connector	- do -
27-03-88	Overload - No. 1 tripped	- do -
10-04-88	Inter connector	- do -
30-04-88	Unknown	- do -
02-05-88	Inter connector	- do -
06-05-88	Overload - No. 2 tripped	- do -
19-05-88	Inter connector	- do -
21-05-88	Overload - No. 2 tripped	- do -
22-05-88	- do -	- do -
28-05-88	- do -	- do -

Date	Cause	Action Taken
30-06-88	Unknown	Re-started
30-06-88	- do -	- do -
08-07-88	Overload - No. 1 tripped	- do -
23-07-88	Rain storm - inter connector	- do -
23-07-88	Inter connector	- do -
15-08-88	- do -	- do -
20-08-88	D. C. fuse blown	Replaced

3. Faults/Check Record of No. 4 DEG

Date	Cause	Action Taken
12-12-84	J. C. W. T. high	Reduced
16-12-84	Cam case	Checked detector
17-12-84	Oil mist high	Retightened tubes and cleaned lense
24-12-84	- do -	Adjust zero point
12-01-85	Purifier fault	Checked
13-01-85	- do -	- do -
14-01-85	- do -	- do -
16-01-85	Lub. oil leakage	Changed expansion joints on lub. oil pipeline
06-02-85	J. C. W. high	Cleaned radiators
07-02-85	- do -	- do -
25-02-85	Oil mist detector	Drain tubes of water
02-03-85	Compressor fault	
19-03-85	Lub. oil leakage between sump & fitter	Repaired
21-03-85	Purifier fault	
24-03-85	1st maintenance	
01-04-85	Oil leakage/turbo changer	Replaced seals
03-04-85	Flow meter faulty	By-passed
11-04-85	Purifier fault	Attached to rountine maintenance
30-04-85	JWT high	Reduced load
30-04-85	Oil mist detector fault	Fuse blown - replaced
03-05-85	Oil mist detector fault	Serviced
15-05-85	Purifier fault	- do -
18-05-85	J.W.E.O.T. high	Load reduced
29-05-85	Fuel leakage	Replaced seal
30-05-85	Purifier fault	Suspcted of air-lock bled
15-07-85	2nd maintenance	
26-07-85	Fuel leakage	Replaced seal
13-09-85	- do -	- do -
03-10-85	J.W. temperature	Cleaned radiators
08-10-85	High	

Date	Cause	Action Taken
08-11-85	Lub. Oil Pressure Low	Replaced filters
11-11-85	Fuel Leakage	Replaced seal
01-12-85	J.W. Temperature high	Reduced load
22-12-85	Air Compressor Fault	
13-01-86	Could not start after routine maintenance work	All possible checks made. Advice soon from Japan. Later started by by-passing slow starting
30-01-86	Air Leakage	Damaged pipe repaired
31-01-86	Lub. Oil Leakage	Cover O-rings changed
14-01-86	Fuel Leakage	Changed seal (O-ring)
03-04-86	Cyl. Lub. oil Lubricating Non flow alarm switch faulty	Replaced
29-05-86	Purifier fault	Serviced but not functioning properly
01-08-86	- do -	
04-08-86	Fuel Leakage	Changed seal
29-09-86	- do -	- do -
01-10-86	Compressor fault	Repaired
02-11-86	Routine Maintenance	Cleaned all filters
07-11-86	Fuel Leakage	Changed seal
15-11-86	Cooling Med. Temp. high	Cleaned radiators
05-12-86	Oil Mist high	Detector serviced
10-01-87	Oil Leakage	Old O-ring used
15-01-87	Turbo Changer	Changed oil
31-01-87	Cooling Med. Temp. high	Cleaned radiators
04-03-87	- do -	Reduced load
05-03-87	- do -	Cleaned radiators
09-03-87	Purifier Fault	
09-03-87	Protector Devices	Recalibrate lub. oil temp. control switches
11-03-87	Cyl. Lub. oil tank level low	To fill up tank

Date	Cause	Action Taken
04-06-87	Purifier fault	Maintained
11-06-87	Cyl. lubricating oil Non flow alarm	By-passed
11-07-87	Fuel leakage	Changed seal
24-07-87	- do -	- do -
25-07-87	Lub. oil pressure low	Changed filters
06-08-87	Turbo charger	Changed oil
08-08-87	Fuel leakage	Replaced seal
30-08-87	Emergency shutdown Solenoid fault	Disconnected from circuit
03-09-87	Changed air cooler unit leaking	Welded pipe leading to unit
12-09-87	Fuel leakage	Changed O-ring on fuel pump
16-09-87	Cooling med. temp. high	Clean radiators
19-09-87	Fuel leakage	Replaced seal
20-09-87	Lub. oil leakage	Pipe welded
29-09-87	Fuel leakage	Replaced seal
10-10-87	- do - Water leakage	- do - Pipe welded
24-10-87	Fuel oil pressure low	Cleaned filters
13-11-87	Bearing cabs	Changed bearing cabs
17-11-87	Lub. oil leakage	Replaced O-ring
28-11-87	Fuel leakage	Replaced O-ring fuel pump
05-12-87	Lub. oil pressure low	Changed filters
17-12-87	Fuel leakage	Changed seal
21-01-88	Fuel leakage	- do -
26-01-88	Water leakage	Repaired pipe
27-01-88	Oil mist	Checked
28-01-88	Detector fault	
30-01-88	Fuel leakage	Replaced seal
12-03-88	- do -	- do -
21-03-88	Lub. oil pressure low	Changed filters

Date	Cause	Action Taken
31-03-88	Fuel leakage	Replaced seal
09-04-88	Cooling med. temp. high	Cleaned radiators
16-04-88	Lub. oil pressure low	Changed seal
01-06-88	Fuel leakage	Changed seal
11-06-88	J.W. temp. high	Reduced load
16-06-88	Water leakage	Repaired pipe
16-07-88	Lub. oil pressure low	Changed filters
23-07-88	Fuel leakage	Changed seal
25-07-88	- do -	- do -
30-07-88	Lub. oil pressure low	Changed filters
20-08-88	Lub. oil solonoid Valve faulty	Checked and repaired
27-08-88	Charged air cooler Unit leaking water	Gaskets changed
03-09-88	Engine notstopping	Stop solenoid valve and governor shutdown solenoid checked
17-09-88	Governor motor faulty	Motor checked and regulator repaired
	Lub. Oil pressure Low	Filters changed
	Fuel leakage	O-ring on pumpchanged

Appendix X GUC's Sixteenth Annual Report

Gambia Utilities Corporation

Sixteenth Annual Report

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Accounts (UNAUDITED)

FOR THE YEAR ENDED
30TH JUNE, 1988

AUDITORS
PANNELL KERR FORSTER
CHARTERED ACCOUNTANTS

BANJUL

THE GAMBIA UTILITIES CORPORATION

ACCOUNTS AND REPORT

YEAR ENDED 30TH JUNE 1988

INDEX

BALANCE SHEET

	30th JUNE 1988	30th JUNE 1987	
EMPLOYMENT OF CAPITAL			
1. FIXED ASSETS/CAPITAL	87,774,099	77,271,066	10,503,033
2. LOANS ANS INVESTMENTS			
3. CURRENT ASSETS			
3a) Stocks	22,717,736	16,908,017	5,809,719
3b) Debtors (1,975,000)	24,038,185	17,327,369	6,710,816
3c) Bank Balances	4,635,442	8,808,078	(4,172,636)
3d) Other (W.I.P.)	1,398,956	409,986	988,970
	52,790,319	43,453,450	9,336,869
4. CURRENT LIABILITIES			
4a) Creditors	21,281,275	27,498,239	6,216,964
4b) Overdraft	56,655	56,655	
4c) Loans, Current portion	7,671,454	11,526,522	3,855,068
4d) Others (Accruals)	522,301	732,924	210,623
	29,531,685	39,814,340	10,282,655
5=3.4. NET CURRENT ASSETS	23,258,634	3,639,110	17,644,524
TOTAL EMPLOYMENT OF CAPITAL (=1+2+5)	111,032,733	80,910,176	28,147,557
CAPITAL EMPLOYED			
6. SHARE CAPITAL	72,264,725	57,885,279	14,379,446
7. RESERVES	35,107,422	32,257,234	2,850,188
8. LONG TERM LOANS	44,750,039	36,687,281	8,062,758
TOTAL CAPITAL EMPLOYED (=6+7+8)	152,122,186	126,829,794	25,292,392
LOSSES CARRIED FORWARD	(41,089,453)	(45,919,618)	4,830,165
	111,032,733	80,910,176	30,122,557

RATIO

(1) Debit/Equity Ratio	0.62	0.64
(2) Current Ratio	1.08	1.10
(3) Liquity Ratio	1.00	0.66

C.U.C

PROFIT AND LOSS SCHEDULE

	CURRENT (D'000)	BUDGET (D'000)	VAR (%)	YTD (D'000)	BUDGET (D'000)	VARIANCE (D'000)
1. Turnover	12,670	12,223	447	46,298	48,894	(2,596)
2. Cost of sales (if applicable)	7,837	7,595	(242)	33,165	30,381	(2,874)
1-2-3. Trading Profit	4,833	4,628	-205	13,133	18,513	(5,380)
4. Direct Costs						
3-4-5. Operating Profit	4,833	4,628	205	13,133	18,513	(5,380)
6. Sundry Income	357	171	186	1,213	684	529
7. Indirect Costs (overheads)	1,945	1,544	(101)	5,364	6,175	1,111
5+6-7. Gross Profit	3,245	3,255	290	9,282	13,022	(3,740)
9. Depreciation	1,181	846	(335)	3,530	3,387	(143)
8-9-10. Net Profit before interest	2,064	2,409	(45)	5,452	9,635	(3,883)
11. Interest	499	497	(2)	1,995	1,989	(5)
10-11-12. Net Profit before extraordinary item	1,565	1,912	(47)	3,457	7,646	(3,888)
13. Extraordinary items	43	212	(169)	109	212	(103)
14. Net Profit before tax	1,608	1,700	(92)	3,566	7,334	(3,768)
15. Taxation.	—	—	—	—	—	—
16. Net Profit after tax	1,608	1,700	(92)	3,566	7,334	(3,768)
17. Dividends	—	—	—	—	—	—
18. Retained Profit	1,608	1,700	(92)	3,566	7,334	(3,768)

PROFIT AND LOSS SCHEDULE ANNEX I

REVENUE

(All items constituting more than 10% total expenditure to be separately identified)

ITEM	CURRENT QUARTER	BUDGET	VAR %	YTD	BUDGET	VARIANCE	FORECAST FOR YEAR
DIRECT LABOUR							
ELECTRICITY DIVISION	10,336,885	9,374,195	962,690	37,962,074	37,496,780	465,294	
WATER DIVISION	2,261,538	2,847,324	(585,786)	8,037,518	11,389,296	(3,351,778)	
SEWERAGE DIVISION	71,305	71,470		285,715	285,880	(165)	
GAS SECTION				12,495		12,495	
OTHER INCOME	356,894	92,062	264,832	1,213,414	368,250	845,164	
TOTAL	13,026,622	12,385,049	641,573	47,511,218	49,540,206	(2,028,990)	

Notes: Reasons for variance (where greater than 10% from budget. Non-cash items need not be included).

1) .....
2) .....
3) .....

PROFIT AND LOSS SCHEDULE ANNEX 2

DIRECT COSTS

(All items constituting more than 10% total expenditure to be separately identified)

ITEM	CURRENT QUARTER	BUDGET	VAR %	YTD	BUDGET %	VARIANCE
DIRECT LABOUR						
ELECTRICITY DIVISION	7,127,022	6,970,014	(157,008)	25,782,846	27,880,058	(1,902,788)
WATER DIVISION	1,819,571	1,420,600	(398,971)	5,596,781	5,682,400	(914,381)
SEWERAGE DIVISION	71,758	90,912	19,154	306,647	363,650	57,003
GAS SECTION				9,083		(9,083)
TOTAL	9,018,351	8,481,526	(536,825)	31,695,357	33,926,108	(2,769,249)

INDIRECT COSTS (Include seperately items more than 10% of total; and all non-cash items)

ITEM	CURRENT QUARTER	BUDGET	VAR %	YTD	BUDGET %	VARIANCE
DIRECT LABOUR						
ELECTRICITY DIVISION	1,536,017	1,548,093	12,076	4,714,608	6,192,372	1,477,764
WATER DIVISION	850,796	779,545	(71,251)	2,332,986	3,118,181	785,215
SEWERAGE DIVISION	57,170	72,869	15,699	311,147	291,478	(19,669)
GAS SECTION						
TOTAL	2,443,983	2,400,507	(43,476)	7,358,721	9,602,031	2,243,310

Notes: Reasons for variance (Non-cash items need not be included).

1) .....
2) .....
3) .....

GAMBIA UTILITIES CORPORATION
BALANCE SHEET
QUARTER ENDED 30th JUNE 1988

	Notes		30th JUNE 1987
CURRENT ASSETS (Balasis)			
Stocks and Stores	1	22,717,736	16,908,017
Work in Progress at Cost	2	1,398,956	409,986
Trade Debtors	3	11,350,863	8,413,043
Sundry Debtors	4	12,687,322	8,914,326
Cash/Bank Balances	5	4,635,442	8,808,078
		52,790,319	43,453,450
CURRENT LIABILITIES			
Sundry Creditors	6	21,281,275	27,498,239
Accruals	7	522,301	732,924
Bank Overdraft	8	56,655	56,655
Loan Repayments Due within One Year	9	7,671,454	11,526,522
		29,531,685	39,814,340
Working Capital		23,258,634	3,639,110
Capital Work-in-progress at Cost	10	34,175,000	21,950,515
Fixed Assets !	11	53,599,099	55,320,551
Net Assets		111,032,733	80,910,176
FINANCED BY:-			
Government Equity and Funding	12	72,264,725	57,885,279
Reserves	13	35,107,422	32,257,234
Accumulated Losses	14	(41,089,453)	(45,919,618)
		66,282,694	44,222,895
LONG TERM DEBTS	15	44,750,039	36,687,281
		111,032,733	80,910,176
RATIO			
(1) Debit/Equity Ratio		0.62	0.64
(2) Current Ratio		0.56	1.10
(3) Liquidity Ratio		0.40	0.66

GAMBIA UTILITIES CORPORATION — PERIOD: APRIL/JUNE 1988
SUMMARY PROFIT AND LOSS ACCOUNT (CONSOLIDATED)

	ELECTRICITY	WATER	GASES	SEWERAGE	TOTAL	BUDGET	PREVIOUS YEAR 1986/87
SALES	37,962,074	8,037,518	12,195	285,715	46,297,802	48,893,840	36,099,925
DIRECT COSTS	29,782,846	6,596,781	9,083	306,647	36,695,357	33,767,778	29,194,011
OPERATING PROFIT/LOSS	8,179,228	1,440,737	3,412	(20,932)	9,602,445	15,126,062	6,905,914
HEAD OFFICE	(3,121,828)	(2,190,474)		(52,127)	(5,364,429)	(6,174,760)	(6,040,074)
OTHER INCOME	718,099	483,315		12,000	1,213,414	684,000	2,338,781
FINANCIAL COSTS	(1,592,780)	(142,492)		(259,020)	(1,994,292)	(1,989,490)	(1,989,482)
NET OPERATING PROFIT/LOSS	4,182,719	(408,914)	3,412	(320,079)	3,457,138	7,645,810	1,215,119

GAMBIA UTILITIES CORPORATION
INCOME AND EXPENDITURE
YEAR ENDED 30th JUNE 1988

	ELECTRICITY	WATER	SEWERAGE	GAS	TOTAL	1987
REVENUE (Dalasis)	38,680,173	8,520,833	297,715	12,495	47,511,216	38,438,886
EXPENSES						
Generation / Production	25,448,151	4,825,855			30,274,006	23,093,452
Transmission / Distribution	922,992	535,860			1,458,852	1,261,018
Direct Labour	1,004,520	554,637	196,793	9,083	1,765,033	1,678,842
Management	141,342	148,735			290,077	305,105
Depreciation	2,569,829	849,822	109,854		3,529,505	3,279,357
	30,086,834	6,914,909	306,647	9,083	37,317,473	29,617,774
Less: Labour Capitalised	303,988	318,128			622,116	423,763
	29,782,846	6,596,781	306,647	9,083	36,695,357	29,194,011
Net Operating Profit (Loss)	8,897,327	1,924,052	(8,932)	3,412	10,815,859	9,244,875
HEAD OFFICE					0	58,340
Stores Discrepancy			52,127		52,127	50,673
Sewerage					401,065	324,660
Stores and Purchasing	231,942	169,123			1,193,838	1,120,701
Commercial Division	833,043	360,795			566,002	532,773
Accounts	283,001	283,001			1,965,881	2,167,193
General Administration	1,036,616	929,265			512,652	857,589
Transport	288,650	224,002			1,994,292	1,989,482
Loan Interest	1,592,780	142,492	259,020		132,864	351,804
Provision Bad / Doubtful Debts	88,576	44,288			540,000	596,340
Provision for Obsolete Stocks	360,000	180,000				
	4,714,608	2,332,964	311,147	0	7,358,721	8,029,556
Operating Profit / (Loss)	4,182,719	(408,914)	(320,079)	3,412	3,457,138	1,215,119

GAMBIA UTILITIES CORPORATION
PROFIT AND LOSS ACCOUNT
YEAR ENDED 30th JUNE 1988

		1987
TURNOVER (Salesis)	47,519,216	38,438,686
Net Operating Profit / (Loss) For Year	3,457,138	1,215,119
After Charging:		
Provision for Obsolete Stock	240,000	596,340
Depreciation before Indexing	3,961,593	3,766,473
Audit Fees	94,000	100,000
Loan Interest	1,994,292	1,989,482
Directors Fees	31,100	37,800
EXCERTIONAL ITEMS		
Duty Reserve Write Back		217,519
Provincial Losses Refundable by Government	1,908,800	1,335,135
Increase in Depreciation Due to Index Linking	(1,800,000)	(1,746,886)
Net Profit / (Loss) For Year	3,566,018	1,220,905

THE GAMBIA UTILITIES CORPORATION
ACCOUNTS - YEAR ENDED 30th JUNE 1988

REVENUE	1987/88	1986/87	INCREASED DECREASED	%
Electricity Division	38,680,173	30,863,206	7,816,967	20.2%
Water Division	8,830,832	7,149,238	1,371,897	16.1%
Sewerage Division	297,715	286,723	10,992	3.7%
Gas Section	12,495	139,521	(127,026)	-91.0%
Total	47,511,216	38,438,686	9,072,530	80.0%
EXPENDITURE				
(Excluding Head Office Expenses)				
Electricity Division	29,782,046	23,289,461	6,493,385	22.0%
Water Division	6,596,781	5,522,849	1,073,932	16.3%
Sewerage Division	306,647	299,634	7,013	2.3%
Gas Section	9,083	82,067	(72,984)	-89.0%
Total	36,694,357	29,194,011	7,501,346	20.4%
Head Office Expenses	7,358,721	8,029,556	(670,835)	9.1%

Profit and Loss (Operating)	Profit	Loss
1987/88	3,457,138	
1986/87	1,215,119	
1985/86		(2,375,180)
1984/85		(6,295,374)
1983/84		(6,338,535)

GAMBIA UTILITIES CORPORATION
INCOME AND EXPENDITURE
QUARTER ENDED 30th JUNE 1988

	ELECTRICITY	WATER	SEWERAGE	GAS	TOTAL	MARCH 1988
REVENUE (Dalasis)	10,574,675	2,380,642	71,305		13,026,622	13,014,469
EXPENSES						
Generation / Production	5,907,311	1,189,384			7,095,595	7,551,276
Transmission / Distribution	211,178	268,043			479,221	331,763
Direct Labour	258,196	113,312	44,281		415,789	488,005
Management	22,316	33,618			55,934	73,974
Depreciation	814,275	339,329	27,477		1,181,081	920,748
	7,213,275	1,942,587	71,758	0	9,227,620	9,328,766
Less: Labour Capitalised	86,253	123,016			209,269	46,545
	7,127,022	1,819,571	71,759	0	9,018,351	9,282,221
Net Operating Profit (Loss)	3,447,653	561,071	(453)	0	4,008,271	3,732,248
HEAD OFFICE						
Sewerage			16,405		16,405	11,782
Stores and Purchasing	81,918	75,437			157,355	79,174
Commercial Division	245,261	121,393			366,654	333,584
Accounts	88,270	88,269			176,539	141,582
General Administration	251,029	225,034			476,063	420,755
Transport	142,768	140,752			283,520	63,527
Loan Interest	398,195	35,623	64,765		498,583	484,972
Provision Bad / Doubtful Debts	88,576	44,288	(24,000)		108,864	68,000
Provision for Obsolete Stocks	240,000	120,000			360,000	60,000
	1,536,017	850,796	57,170	0	2,443,983	1,673,376
Operating Profit / (Loss)	1,911,636	(289,725)	(57,623)	0	1,564,288	2,058,872

GAMBIA UTILITIES CORPORATION
PROFIT AND LOSS ACCOUNT
QUARTER ENDED 30th JUNE 1988

TURNOVER (Dalasis)	13,026,622
Net Operating Profit / (Loss) For The Quarter	1,564,288
After Charging:	
Provision for Obsolete Stock	60,000
Depreciation before Indexing	1,181,081
Audit Fees	23,500
Loan Interest	498,583
Directors Fees	8,400
EXCEPTIONAL ITEMS	
Provincial Losses Refundable by Government	493,321
Increase in Depreciation Due to Index Linking	(450,000)
Net Profit / (Loss) for Quarter	1,607,609

THE GAMBIA UTILITIES CORPORATION
GAS OIL CONSUMED
PERIOD 1st JULY 1987 TO 30th JUNE 1988

	QUANTITY
KOTU POWER STATION	
JULY 1987	1,360,682
AUGUST 1987	1,243,121
SEPTEMBER 1987	1,263,703
OCTOBER 1987	1,345,866
NOVEMBER 1987	1,311,782
DECEMBER 1987	1,441,115
JANUARY 1988	1,313,206
FEBRUARY 1988	1,260,810
MARCH 1988	1,350,286
APRIL 1988	1,488,774
MAY 1988	1,432,871
JUNE 1988	1,418,426
TOTAL 1987/88	16,250,642
TOTAL 1986/87	14,130,408
PROVINCIAL STATION & OTHERS	
QTR SEPT. 1987	244,294
QTR DEC. 1987	205,567
QTR MARCH 1988	245,434
QTR JUNE 1988	269,477
	964,772
TOTAL FOR THE YEAR 1987/88	17,215,414

THE GAMBIA UTILITIES CORPORATION
STATEMENT OF ACCOUNT - COMMERCIAL SERVICES
AS AT 30th JUNE 1988

	QUARTER JUNE 1988	TOTAL TO DATE
KUDANG	43,561	341,239
STATE HOUSE	38,565	177,550
YORODAWOL	6,238	49,103
BWIAM	18,363	111,946
FATOTO	21,172	114,914
R. V. H.	7,676	16,441
JUFFUREH	11,286	83,985
KEREWAN	7,621	122,472
KARANTABA	211	28,813
KAUR	2,256	8,184
	154,969	1,054,647

SALES AND PRODUCTION ANALYSIS - ELECTRICITY DIVISION FOR THE PERIOD OF APRIL - JUNE 1988

	TOTAL	BANJUL	PROVINCES	BRIKAMA	MANSAKONKO	FARAFENNI	GEORGETOWN	BANSANG	BASSE
GENERATED (Units)	15,713,942	15,176,772	537,170		122,640	105,780	54,950	110,160	143,420
Domestic	4,556,083	4,256,149	339,934	132,033	45,224	43,488	12,519	35,273	67,397
Commercial	1,402,313	1,243,589	158,724	43,451	13,839	26,987	1,993	26,698	45,756
Maximum Demand	3,744,404	3,744,404	0						
Government	755,603	700,103	55,500	4,098	16,792	2,552	6,832	7,521	12,825
Local Authorities	35,928	30,710	5,218	159	3,007	801		1,000	251
TOTAL SOLD	10,534,331	9,974,955	559,376	179,741	82,772	78,798	21,344	70,492	126,229
GUC own consumption	803,993	780,854	23,139	7,600	3,700	7,710	1,000	977	2,152
Used in power house	1,127,250	1,122,369	4,881	1,109	335	569	744	763	1,862
Total Recorded	12,465,574	11,878,178	587,396	188,450	86,807	87,076	23,088	71,732	130,243
System losses									
Percentage lost									
DOMESTIC SALES (Balasis)	3,464,745	3,205,103	259,642	96,524	37,360	34,249	12,951	28,112	50,436
Commercial	1,332,328	1,181,540	150,788	41,278	13,147	25,637	1,894	25,363	43,469
Maximum demand	4,081,401	4,081,401	0						
Government	727,640	673,813	53,827	3,893	15,967	7,146	6,853	7,384	12,184
Local authorities	34,132	29,175	4,957	151	2,857	751		950	238
TOTAL SALES	9,640,246	9,171,032	469,214	141,946	69,331	67,782	21,698	62,209	106,325
Own consumption	695,834	677,262	18,572	6,592	3,159	7,367	755	745	1,764
TOTAL I	10,336,080	9,848,294	487,786	148,478	72,370	74,180	22,402	63,058	108,093

SALES AND PRODUCTION ANALYSIS - WATER DIVISION FOR THE PERIOD OF APRIL - JUNE 1988 12-Sep-88

	TOTAL	BANJUL	PROVINCES	BRIKAMA	MANSAKONKO	FARAFENNI	GEORGETOWN	BANSANG	BASSE	KEREWAN	KUDA
GALLONS PRODUCED		397,422,343									
Domestic	330,512,143	318,102,910	12,409,233	3,762,148	747,730	3,186,092	191,000	1,048,245	2,927,977	340,344	1,207,327
Commercial	18,022,589	16,368,723	1,653,866	363,000	60,210	789,737	13,555	191,788	205,576		
Maximum Demand	42,889,258	42,889,258									
Government	30,566,657	26,452,208	4,114,249	969,634	4,063,000	233,901	337,500	293,663	627,000	180,251	337,057
Local Authorities	51,518,938	39,625,254	11,893,684	5,346,509	231,605	3,228,502	760,000	5,000	500,000	694,095	1,522,973
TOTAL SOLD	273,509,365	243,438,353	30,071,012	10,641,291	2,137,585	7,418,225	702,085	1,534,896	3,302,443	1,184,939	3,217,557
GUC own consumption	1,309,190	866,553	442,637	43,000	20,000	189,774	20,000	47,000	65,000	57,863	
Total Recorded	224,818,555	244,304,906	30,513,649	10,684,291	2,157,585	7,607,999	722,085	1,581,896	3,367,443	1,127,792	3,217,557
System losses											
Percentage lost											
DOMESTIC SALES (Balasis)	912,285	826,529	85,756	28,124	4,460	21,786	2,610	7,785	10,982	1,895	8,114
Commercial	155,793	140,096	15,697	3,449	523	7,477	153	1,825	1,956		
Maximum demand	578,948	578,948	0								
Government	292,985	254,033	38,952	9,063	16,095	2,223	3,211	3,793	6,451	1,920	3,512
Local authorities	314,560	241,861	72,699	33,857	1,446	19,691	976	29	3,157	4,249	9,308
Total Sales	2,254,571	2,041,487	213,084	74,493	16,860	51,177	6,950	12,439	22,543	7,664	21,018
GUC consumption	6,967	4,659	2,308	151	108	1,022	108	377	350	312	
TOTAL I	2,261,538	2,046,146	215,392	74,644	16,968	52,199	7,058	12,707	22,893	7,967	21,018

ZONE	OUTSTANDING BALANCES	CREDITORS BALANCES	OUTSTANDING 60 DAYS	OUTSTANDING 90 DAYS	OUTSTANDING OVER 90 DAYS
1	84,951.05	8,877.43	55,184.04	11,625.00	27,019.44
2	63,046.08	1,485.08	31,666.56	7,613.30	25,251.30
3	93,835.86	8,973.19	46,173.00	19,171.13	37,464.92
4	69,111.03	1,439.14	41,328.81	4,908.87	24,312.79
5	52,647.63	2,646.00	42,600.30	4,293.26	8,400.07
6	74,983.33	2,866.97	26,180.82	2,380.03	39,289.75
7	76,851.77	4,154.97	50,442.87	8,417.17	21,936.76
8	63,833.11	2,179.62	32,745.22	5,804.95	27,462.56
9	45,837.02	1,668.36	33,845.65	1,529.30	12,330.43
10	153,622.53	2,894.49	90,731.05	15,664.79	50,121.18
11	78,071.26	2,396.39	51,204.70	10,522.68	18,740.27
12	79,087.26	2,655.15	41,369.81	10,898.41	29,474.19
13	183,875.06	4,223.31	87,652.40	19,848.47	60,597.30
14	144,202.26	5,532.99	76,290.82	21,804.75	51,639.68
15	315,976.35	9,265.88	159,559.74	65,317.02	100,365.47
16	760,045.99	124,915.95	732,057.08	113,352.92	39,551.94
17	218,826.65	11,375.76	184,307.67	18,005.76	27,888.98
18 UNIT 5	186,535.15	11,811.85	158,199.44	22,598.48	17,549.08
18 UNIT 6	224,212.32	9,048.60	164,259.23	16,763.75	52,237.94
18 UNIT 7	257,484.10	15,841.86	179,037.95	32,338.59	41,849.62
18 UNIT 8	281,792.36	16,508.71	222,877.56	34,872.20	40,551.31
19 YUNDUM	187,205.30	2,216.76	112,305.85	38,465.05	45,651.18
19 BRIKAMA	228,013.15	9,037.46	130,828.87	15,692.77	90,528.97
20 M/DEMAND	2,882,938.59	45,624.33	2,563,936.08	150,751.66	213,875.18
21	77,547.80	15,817.20	88,553.88	2,380.13	2,430.99
22	155,584.99	14,376.53	142,175.79	12,106.66	15,679.07
23	41,230.44	2,187.51	41,350.33	186.40	1,881.22
24	71,304.63	2,447.46	65,075.02	4,119.56	4,557.51
25	41,360.24	234.00	39,160.74	2,433.50	
M/KONKO	191,730.85	1,012.47	93,897.36	76,468.38	22,377.58
G/TOWN	114,126.47	312.35	49,552.17	29,541.45	35,345.20
BANSANG	174,080.31	(1,208.64)	105,221.10	38,589.93	29,060.64
BASSE	329,271.35	3,624.24	197,627.89	74,015.93	61,251.77
F/FENNI	153,889.22	3,223.25	113,229.16	18,059.33	25,823.98
KEREWAN	10,992.91	45.00	7,642.10	1,450.36	1,945.45
BARRA	5,179.91	383.65	5,744.78	62.00	(243.24)
TOTAL	8,135,081.33	350,095.25	6,274,014.54	911,851.42	1,299,310.62

GAMBIA UTILITIES CORPORATION

ANALYSIS OF GOVERNMENT & LOCAL COUNCILS DEBTS ELECT. & WATER
AS AT JUNE 1988

NAME	OUTSTANDING BALANCES	LESS THAN 3 MONTHS	3 - 6 MONTHS	6 - 12 MONTHS	OVER 12 MONTHS
CENTRAL GOVERNMENT	831,069.46	1,020,621.74	(189,552.28)		
BRIKAMA AREA COUNCIL	171,671.55	33,987.75	66,946.55	70,737.25	
KANIFING AREA COUNCIL	1,123,469.80	133,610.90	269,516.95	484,673.12	235,668.83
KEREWAN AREA COUNCIL	200,480.59	33,999.05	63,552.30	102,929.24	
M/KONKO AREA COUNCIL	81,592.01	4,302.35	8,866.05	16,037.10	52,386.51
G/TOWN AREA COUNCIL	42,703.46	1,954.50	3,079.79	21,344.10	16,325.11
BASSE AREA COUNCIL	41,269.83	3,390.45	11,133.45	26,745.93	
BANJUL CITY COUNCIL	1,155,332.54	137,444.80	247,327.55	515,547.28	255,012.91
TOTAL	3,647,609.24	1,369,311.54	480,890.32	1,238,014.02	559,393.36

GAMBIA UTILITIES CORPORATION

ANALYSIS OF SEWERAGE DEBTS AS AT JUNE 1988

NAME	OUTSTANDING BALANCES	LESS THAN 3 MONTHS	3 - 16 MONTHS	6 - 12 MONTHS	OVER 12 MONTHS
BAJARA HOTEL	388,266.66	17,920.00	35,840.00	71,680.00	262,826.66
BAKOTU HOTEL	23,494.13	2,695.00	5,390.00	15,409.13	
B. B. HOTEL	47,842.63	7,840.00	15,680.00	24,322.63	
KOTU STRAND HOTEL	18,368.13	3,010.00	6,020.00	9,338.13	
SENEGAMBIA HOTEL	130,285.76	21,350.00	42,700.00	66,235.76	
KOMEO BEACH HOTEL	17,500.00	17,500.00			
HALIFA SOWE	900.00	450.00	450.00		
PARADISE BAR	900.00	450.00	450.00		
TOTAL	627,557.31	71,215.00	106,530.00	186,985.65	262,826.66

THE GAMBIA UTILITIES CORPORATION
GAS OIL PRICES DURING THE PERIOD
JULY '87 TO 30th JUNE 1988

	GAS OIL EX MINISTRY OF FINANCE DATE	QUANTITY	PRICE BUTUTS	BUDGET BUTUTS
	28th April 1987	2,500,000	110.00	110
	14th June 1987	1,500,000	97.00	110
O/T SUNNY AL	31st Aug. 1987	1,500,001	132.78	110
O/T SIOUX	26th Oct. 1987	2,987,927	141.61	110
O/T MANITU	7th Dec. 1987	3,007,477	122.60	110
O/T SIOUX	23rd Jan. 1988	2,893,679	118.24	110
O/T INDIO	9th March 1988	3,140,852	102.96	110
O/T VINGA COR	25th May 1988	2,843,852	108.60	110
O/T VINGA COR	22nd June 1988	2,945,818	99.00	110

ELECTRICITY DIVISION

PROJECT	TOTAL EXPENDED COST	EXPENDITURE TO DATE	ACTUAL EXPENDED/ PHY. PROGRESS	BUDGET FORECAST TOTAL TIME TABLE YEAR. EXPEND.	SOURCE	REMAINING FINANCE
ELECTRICITY DIVISION BANJUL AND KOMBOS						
A. GENERATION						
1. VALVE GRINDING MACHINE	90,000.00	423.38			GUC	
2. VW 10-11 SECTION VEHICLES	157,500.00	200,000.00			GUC	
3. ELEVATION FOR RADIATOR OF UNIT NO.4	80,000.00	52,415.20			GUC	
4. SPARES FOR K.P.S.						
TURBO CHARGER	120,000.00	14,798.44			GUC	
MIRRLEES SPARES	535,000.00	1,085,150.89			GUC	
5. BEARING CAP K.P.S.	320,000.00	81,701.40			GUC	
8. TRANSMISSION AND AND DISTRIBUTION						
1. BAKOTEH ELECT. SUPPLY	200,000.00	4,520.72				GLF
2. OLD JESHWANG EXT.	200,000.00	83,344.64				GLF
3. FEEDER 4	400,000.00	136,129.10			GUC	
4. MILE 7 RADIO GAMBIA SUB-STATION	167,000.00					
5. GERMAN HEALTH CENTRE SUB-STATION	167,000.00					
6. HV UNDERGROUND CABLE-KOMBOS	176,000.00					
	2,612,500.00	1,638,480.77				

PROJECT	TOTAL EXPENDED COST	EXPENDITURE TO DATE	ACTUAL EXPENDED/ PHY. PROGRESS	BUDGET FORECAST TOTAL TIME TABLE YEAR. EXPEND.	SOURCE	REMAINING FINANCE
B/F	2,612,500.00	1,638,480.77				
7. REINFORCEMENT HV CABLE RING BANJUL	176,000.00					
8. LV CIRCUIT BREAKER 1200A SPARE	14,064.00	4,015.75			GUC	
9. HV UNDERGROUND CABLE & ACCESSORIES FOR K.P.S.	92,000.00					
10.UNGRADING & EXT. OF LV NETWORK	120,000.00	471,681.74			GUC	
11. 4 NOS MOBILE RADIO SET COMPLETE	28,000.00					
12.WORLD BANK LOAN FOR TRANS/DIST.SYST.	3,187,500.00					WORLD BANK
13.ELECTRIFICATION OF KOLOLI VILLAGE	1,311,000.00	33,772.90				GLF
14.ELECTRIFICATION OF MANJAI KUNDA	579,000.00					GLF
C. TOOLS EQUIPMENT AND VEHICLES						
1. WORK BENCHES AND TOOLS TRANS/DIST.	15,000.00	1,140.60				
	8,435,064.00	2,149,091.76				

PROJECT	TOTAL EXPENDED COST	EXPENDITURE TO DATE	ACTUAL EXPENDED/ PHY. PROGRESS	BUDGET FORECAST TOTAL TIME TABLE YEAR. EXPEND.	SOURCE	REMAINING FINANCE
B/F	8,435,064.00	2,149,091.76				
2. SAFETY EQUIPMENTS	25,000.00					
3. MEASURING INSTRUM.	15,000.00	6,314.03			GUC	
4. 1 DIESEL PICK UP	130,000.00	135,000.00			GUC	
5. 1 TRUCK FOR CONST.	300,000.00	350,000.00			GUC	
6. 1 DIESEL PICK UP FOR TRANS/DIST ENG.	130,000.00	102,500.00				
D. BUILDINGS						
1. FENCING BAKAU AND TOILET	15,000.00	1,624.00				
2. TOILET KANIFING AND STAND PIPE	13,000.00	1,624.00				
3. EXT. OF RADIATOR AREA K.P.S.	25,000.00					
E.RURAL ELECTRICATION SUPPLY						
1. GEORGETOWN	220,000.00					
2. BRIKAMA	150,000.00					
	9,498,064.00	2,746,153.79				

PROJECT	TOTAL EXPENDED COST	EXPENDITURE TO DATE	ACTUAL EXPENDED/ PHY. PROGRESS	BUDGET FORECAST TOTAL TIME TABLE YEAR. EXPEND.	SOURCE	REMAINING FINANCE
B/F.	9,498,064.00	2,746,153.79				
3. M/K GENERATING SET	2,820,000.00	693,638.09				IDB
B. F.FENNI GENERATING SET	5,640,000.00					IDB
C. G/TOWN GENERATING SET	1,980,000.00					IDB
D. BASSE GENERATING SET	5,640,000.00					IDB
E. B/SANG GENERATING SET	5,640,000.00					IDB
4. SPARES FOR PROV.						
5. STANDBY SET FOR M/KONKO (250KVA)	500,000.00					
6.G/TOWN DISTRIBUTION SYSTEM	220,000.00					
7. 250 KVA GENERATING SET (PROVINCES)	360,000.00					
F. SERVICE CONNECTION						
1. SINGLE PHASE METER 300 NOS	105,000.00	21,270.75			GUC	
	32,403,064.00	3,461,062.63				

PROJECT	TOTAL EXPENDED COST	EXPENDITURE TO DATE	ACTUAL EXPENDED/ PHY. PROGRESS	BUDGET TIME TABLE	FORECAST TOTAL YEAR. EXPEND.	SOURCE	REMAINING FINANCE
B/F	32,103,064.00	3,461,062.63					
2. THREE PHASE METER 100 NO.	82,000.00	31,120.97				GUC	
3. CONCRETE CABLES 20 DRUMS OF 500 M	350,000.00						
N/KONKO GENERATING SET						GUC	
SEAGULL COLD STORE SUB-STATION BALANCE OUTSTANDING		82,058.88				GUC	
TOTAL	32,835,064.00	3,574,542.48					

WATER DIVISION

PROJECT	TOTAL EXPENDED COST	EXPENDITURE TO DATE	ACTUAL EXPENDED/ PHY. PROGRESS	BUDGET TIME TABLE	FORECAST TOTAL YEAR. EXPEND.	SOURCE	REMAINING FINANCE
H. WATER DIVISION BANJUL PRODUCTION							
1. SPARES FOR B/HOLES	146,000.00	197,265.64				GUC	
2. BOREHOLE PUMP REPLACEMENT	173,000.00						
3. BUILDING FOR S/BY GEN. AT MILE 2	30,000.00						
4. MILE 2 SWITCH GEAR	28,800.00 217,200.00					GUC IDA	
5. FENCING BOREHOLE 18A AND 17	75,000.00	14,515.00					
6. BOREHOLE 1A DRILLING & EQUIPPING	31,000.00						
7. LIME DOSING PLANT AT FAJARA	51,000.00	50,075.84				GUC	
8. DRILLING & EQUIP. B/HOLE 4,18,19,7 & 8	4,178,200.00	1,819,367.38				GUC	
9. FLOW METER FAJARA	54,500.00						
10. 4 NO.30 KVA S/BY GENE. FOR FAJARA WELLFIELDS	272,160.00						
	5,257,160.00	2,081,223.86					

PROJECT	TOTAL EXPENDED COST	EXPENDITURE TO DATE	ACTUAL EXPENDED/ PHY. PROGRESS	BUDGET TIME TABLE	FORECAST TOTAL YEAR. EXPEND.	SOURCE	REMAINING FINANCE
B/F	5,257,160.00	2,081,223.66					
11. 1 NO. 350KVA S/BY GEN. FOR MILE 2 PUMPING STATION	256,925.00						
12. FLOW METER S/KUNDA	54,500.00						
13. WATER METER FOR TANK OUTLETS	28,100.00						
14. FLOW METER KANIF.	36,000.00						
15. BOOSTER PUMP FOR CHLORINATION ATFAJARA	21,200.00	85,650.80					
16. SPARES FOR ENGINE	16,000.00	11,665.73				GUC	
17. PABX TEL. WITH ACCESSORIES S/KUNDA	25,000.00						
I. DISTRIBUTION							
1. SECOND CONNECTION FAJARA 'M' SECTION	19,000.00						
2. OLD JESHWANG WATER SUPPLY PHASE 2	110,000.00	59,891.24					GLF
	5,823,885.00	2,238,431.43					

PROJECT	TOTAL EXPENDED COST	EXPENDITURE TO DATE	ACTUAL EXPENDED/ PHY. PROGRESS	BUDGET TIME TABLE	FORECAST TOTAL YEAR. EXPEND.	SOURCE	REMAINING FINANCE
B/F	5,823,885.00	2,238,431.43					
3. SECOND CONNECTION FAJARA 'F' SECTION	19,000.00						
4. FAJARA 'M' SECTION EXTENSION	70,000.00						GLF
5. KOTU EXTENSION PHASE	150,000.00						GLF
6. NEW JESHWANG EBOE TOWN	50,000.00	45,889.02					GLF
7. WELLINGARA/N.KUNKU WATER SUPPLY EXT.	160,000.00						GLF
8. SERVICE CONNECTION MATERIALS	425,500.00	149,168.85				GUC	
9. DISTRIBUTION MAINS EXTENSION MATERIALS	500,000.00	415,025.17				GUC	
10. CABSTER TRUCK	215,000.00	350,000.00				GUC	
J. PROVINCIAL WATER SUPPLY							
1. NO. HELIX METERS	38,500.00						
2. 8 NO. HELIX MASTER METERS	46,900.00						
	7,498,785.00	3,198,514.47					

PROJECT	TOTAL EXPENDED COST	EXPENDITURE TO DATE	ACTUAL EXPENDED/ PHY. PROGRESS	BUDGET FORECAST TOTAL TIME TABLE YEAR. EXPEND.	SOURCE	REMAINING FINANCE
B/F	7,498,785.00	3,198,514.47				
3. 2ND.UNDER PRESSURE TAPPING MACHINES	18,900.00	84,801.82			GUC	
4. CHAIRS AND TABLES FOR P/ATTENDANTS	9,600.00					
5. BASSE DISTRIBUTION	97,900.00					
6. CABSTER TRUCK	220,000.00	350,000.00			GUC	
TOTAL	7,845,385.00	3,613,116.29				

SEWERAGE DIVISION

PROJECT	TOTAL EXPENDED COST	EXPENDITURE TO DATE	ACTUAL EXPENDED/ PHY. PROGRESS	BUDGET FORECAST TOTAL TIME TABLE YEAR. EXPEND.	SOURCE	REMAINING FINANCE
K. KOTU SEWERAGE						
1. 1 No 25 KVA Standby Set	64,000.00	49,219.71			GUC	
2. Workshop For Treatment Plant	5,000.00					
	69,000.00	49,219.71				
1. BANJUL SEWERAGE						
1. Civil Works	19,000,000.00	28,561,746.66				ADF/ERC/ EDF/CLF
2. Machine & Equip.	1,000,000.00					EDF
3. Consultancy	500,000.00					
	20,500,000.00	28,561,746.66				

PROJECT	TOTAL EXPENDED COST	EXPENDITURE TO DATE	ACTUAL EXPENDED/ PHY. PROGRESS	BUDGET FORECAST TOTAL TIME TABLE	YEAR. EXPEND.	SOURCE	REMAINING FINANCE
TRANSPORT							
1.		220,197.56					
HEADOFFICE							
1.		248,453.65					

GENERAL

PROJECT	TOTAL EXPENDED COST	EXPENDITURE TO DATE	ACTUAL EXPENDED/ PHY. PROGRESS	BUDGET FORECAST TOTAL TIME TABLE	YEAR. EXPEND.	SOURCE	REMAINING FINANCE
M. GENERAL ADMIN.							
1. 5 REVENUE OFFICES 1 BAKAU 1 FAJARA 1 P/LINE 3 S/KUNDA	375,000.00	117,527.82					
2. COMPUTER SOFTWARE	100,000.00	9,327.00				GUC	
3. 6 NCR CASH REGISTERS FOR REVENUE OFFICES	672,000.00						
4. ACQUISITION OF 5 PLOTS TO BUILD REVENUE OFFICES	200,000.00						
5. OFFICE FURNITURE FOR SECURITY SECTION	19,200.00						
6. OFFICE FURNITURE AND EQUIPMENT FOR FOR BUILDING CONT. MAINT. UNIT	6,310.00						
7. KIT CAR FOR BCKU	135,300.00	102,500.00				GUC	
8. OFFICE FURNITURE FOR KO's OFFICE	100,000.00	122,600.00				GUC	
9. PABX TEL. EQUIP. FOR H/DIE S/KUNDA H/OFFICE	270,000.00	71,358.45				GUC	
10. 1 KIT CAR FOR COMMERCIAL SECTION	155,000.00	102,500.00				GUC	
	2,032,810.00	525,813.35					

PROJECT	TOTAL EXPENDED COST	EXPENDITURE ACTUAL EXPENDED/ TO DATE	PHY. PROGRESS	BUDGET FORECAST TOTAL TIME TABLE	YEAR. EXPEND.	SOURCE	REMAINING FINANCE
B/F	2,052,810.00	525,813.33					
11. OFFICE FURNITURE FOR COMMERCIAL SECT.	38,210.00						
12. AIR CONDITIONER FOR COMMERCIAL SECT.	64,000.00						
13. TYPEWRITER NO.1 AT D6,000	24,000.00						
14. RESTRUCT. OF 1st AND 3rd FLOOR H/O	132,000.00	295,953.43					
ONE TRANSPORT L/YEAR BUDGET		102,500.00				GUC	
TOTAL	2,311,020.00	924,266.76					

(4)

(Currency – Dalasi)

GAMBIA UTILITIES CORPORATION

CASH FLOW STATEMENT FOR FY 1987/88 – ACTUAL

CASH RECEIPTS:	JULY	AUG.	SEPT.	OCT.	NOV.	DEC.	JAN.	FEB.	MARCH	APRIL	MAY	JUNE	TOTAL
	D	D	D	D	D	D	D	D	D	D	D	D	D
SALES: PRIVATE	2,436	2,514	2,290	2,313	2,988	3,100	2,428	3,205	5,037	1,882	4,466	3,785	36,414
GOVT.	-	-	447	-	-	895	1,049	-	-	-	-	1,061	3,452
SEWERAGE	12	-	-	8	43	5	33	179	-	29	-	41	349
DEPOSITS	98	162	164	230	184	209	410	138	236	266	105	216	2,418
OTHER INCOME	252	54	193	181	65	35	412	241	204	257	30	689	2,613
TOTAL CASH RECEIVED	2,818	2,730	3,094	2,732	3,280	4,244	4,331	3,763	5,477	2,384	4,601	5,792	45,246
CASH PAYMENTS:													
SALARIES/WAGES	410	282	322	293	266	423	357	532	482	553	478	460	4,858
PENSION CONTRIBUTION	-	165	-	112	-	-	7	-	223	-	1	-	508
MATERIALS: GAS/LUB. OIL	768	465	1,390	1,587	2,377	2,157	2,262	2,194	2,245	88	149	4,370	20,052
FOREIGN SUPPLIERS	51	399	6	532	-	-	-	-	136	-	59	47	1,230
LOCAL SUPPLIERS	102	163	160	201	180	104	188	41	197	10	386	168	1,900
STATIONERY	20	4	30	11	4	5	7	4	12	29	7	5	139
EXPENSES: TRAVEL	19	16	20	41	65	51	32	16	19	40	18	19	356
MAINTENANCE	10	27	8	12	27	62	18	12	27	5	44	13	265
ALLOWANCES	10	12	10	14	12	12	10	16	9	12	10	11	138
CABLE/TELEX/TEL.	12	-	56	25	13	25	26	15	26	35	27	36	296
HIRED TRANSPORT	49	83	50	58	21	83	33	32	45	32	60	121	675
INSURANCE	138	-	41	-	-	16	-	-	-	-	36	3	254
AUDIT	-	-	84	-	-	-	-	-	-	-	-	-	84
LEGAL	4	-	-	-	-	4	-	-	-	-	-	1	9
OTHER	807	367	617	474	740	199	158	338	353	560	829	366	6,028
TOTAL CASH PAID OUT	2,400	1,983	2,802	3,360	3,705	3,141	3,098	3,220	3,974	1,364	2,124	5,620	36,791
CASH SURPLUS OVER REVENUE EXP.	418	747	292	(628)	(425)	1,103	1,233	543	1,503	1,020	2,477	172	8,455
FINANCIAL CHARGES	-	-	-	-	-	33	-	-	-	-	-	33	66
CAPITAL EXPENDITURE	43	117	8	1,367	968	1,509	330	576	3,591	1,498	1,105	990	12,302
NET CASH INFLOW(OUTFLOW)	375	630	284	(2,195)	(1,393)	(439)	903	(33)	(2,088)	(498)	1,372	(851)	
OPENING CASH BALANCE	8,866	9,241	9,871	10,155	7,960	6,567	6,128	7,031	6,998	4,910	4,432	5,804	
CLOSING CASH BALANCE	9,241	9,871	10,155	7,960	6,567	6,128	7,031	6,998	4,910	4,432	5,804	4,953	