7-3　妥当性

7-3-1　技術面

本計画の実施により設備の修復技術とO＆M技術を「ガ」国に移転することによって「ガ」国の技術水準が向上し、「ガ」国独自でかなりの修復及び保守を行うことが出来るようになると期待されることから、「ガ」国の技術面での自立に寄与するところが大きいと判断する。

7-3-2　財政面

現在、当該発電設備の維持管理に当っている要員に対し、ＯＪＴにより技術を移転することにより、外国に維持管理業務を委託する費用を削減出来るようになる。さらに、本設備を維持する上で要員の増加は特に必要なく、「ガ」国の現在の人員で維持管理が可能であると判断される。よって「ガ」国の要員費用の増加が発生しない。

また、供与されるスペアパーツによって予備品調達費用が軽減され「ガ」国の財政の一助となることが期待される。

さらに、熱効率の向上により発電原価の低減が期待される。

7-3-3　維持管理面

本計画で実施するＯＪＴによって、「ガ」国側が、自己技術で今後当該発電設備の維持管理を行い、さらに、その技術を他の発電設備にも応用できると期待される

また、「ガ」国側が当該発電設備の機能・性能を維持管理出来るようになるとともに、設備の寿命を延伸することが期待される。

よって、技術面、財政面、維持管理面から判断しても、本計画の妥当性は大きい。

第8章　結論・提言

第8章　結論・提言

8-1　結論

当該発電設備の現況は、既述したように（2-3-2(3)参照）、給排気系統を含め、かなりの設備及び付属機器の運用・維持管理技術の不足及び資金不足によるスペアパーツの不足など諸問題点が多数見受けられ、各設備及び付属機器が所定の機能、性能を発揮しておらず、当該発電設備の出力低下の原因となっている。このため、当該発電設備の機能・性能、耐用年数のみならず市民生活、産業活動等にも極めて憂慮すべき事態が生じている。この様な状態を放置し、当該発電設備を運転し続けることは、設備の寿命を短くするのみならず、当該発電設備の重大な事故を誘発する恐れがある。

これらの諸問題は、本計画による適切な修復工事の実施と維持管理に必要な資機材の供与、ＯＪＴを通じて維持管理技術を移転することにより当該発電設備の機能・性能が改善され、以後は、「ガ」国関係機関の自助努力により当該発電設備の能力・機能を維持できるようになることが期待される。　また，移転した維持管理技術は，将来計画を含む他発電設備の機能維持にも活用されることが期待される。

また、本計画は既述（2-4-1(3)参照）したように「ガ」国の第2 次5 ケ年計画でうたわれている目標「エネルギー消費の適正化と効率化」及び「現在と将来の需要に対する自国及び輸入エネルギー供給の確保と適正供給」にも合致するものである。

さらに、「ガ」国の電力事情の中で、当該発電設備が首都圏である大バンジュル圏の約65%の電力量をまかなっている事実を考慮すれば、本計画の実施による「ガ」国ならびに地域住民の安定した産業活動、市民生活等への裨益効果は非常に大きい。

上記を総合的に勘案し、本計画が日本政府の無償資金協力により実施されることは意義深いものであり、その妥当性は極めて高いといえる。

8-2　提言

8-2-1　本計画実施上の提言

本計画で修復される当該発電設備は「ガ」国の安定した電力供給体制の基礎をなすものであり、「ガ」国側は、長期的にその機能を維持・確保するために次のような対応を計る必要があると考える。

(1) 「ガ」国側技術者は、当該発電設備とコツ発電所の他の発電設備を含めた全体の運用計画を見直し、当該発電設備の具体的な運転・維持管理計画を策定し、安定した信頼性の高い電力供給体制を確立する必要がある。
このため下記の対応が望まれる。

1) 「ガ」国側は、本計画が効果的に実施され、目的が果されるように、当該発電設備を実際に維持管理する専任技術者を任命しＯＪＴにクラスルームトレーニングから修復工事の完了まで参画させる必要がある。

2) ＯＪＴに任命された「ガ」国側技術者は、日本の技術者よりＯ＆Ｍ技術を習得し、工事完了後も学習することによって技術力の向上に努める。

3) ＯＪＴに任命された技術者は、ＯＪＴに参画できなかった他の「ガ」国技術者へ習得した技術を移転し、技術の水平展開と向上に努める必要がある。

(2) 「ガ」国側は、設備の修復計画を実施中、当該発電設備の停電に対する地域住民及び工場主等の理解と同意を得るよう努力する。

8-2-2 将来の電力運営に対する提言

「ガ」国は将来の電力運営に対し、次のような対応を計る必要があると考えられる。

(1) 電力供給における信頼性の確保（発電予備力の確保）

電力事業においては、設備の効率的、安定的運用が必須条件であり、適切な維持管理によって、設備故障ならびに事故等による供給力の低下の不安定要素に対して適切な予備力の確保と信頼度をもった設備の拡充に努める必要がある。

現在進行中の2 つのプロジェクト（ＡＤＢ及びＤＡＮＩＤＡプロジェクト）が完成（1989年度予定）した場合、大バンジュル圏の全電力を供給するコツ発電所では当該発電設備を含め5 台の発電設備（計画発電出力は21.9MW）に増大する事となるが、1991年の大バンジュル圏の最大電力需要は、人口等の増大に伴ない安定出力を上回るため、電力供給の信頼度は低下し、ふたたび電力カットが頻繁に発生する事態となることが予想される。（図 2-1参照）

こうした事態に対処するため、適正な発電予備力の確保が必要と思われる。

(2) 技術力向上

「ガ」国は電力運営の計画、運用及び維持管理等の技術力の向上に対し長期及び短期計画を策定し、そのフォローアップも行うべきである。特に、運転・保守については、専門技術者の育成が急務であると考えられる。

(3) 燃料費の低減

ディーゼル発電設備に依存する「ガ」国の電力運営において、燃料費の低減対策は欠くことのできないものである。そのために次のような対策及び調査を行う必要がある。

1) 発電設備の効率向上

2) 軽油から重油への変換

3) 代替エネルギーの可能性調査

資料 - I　協議議事録
(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.

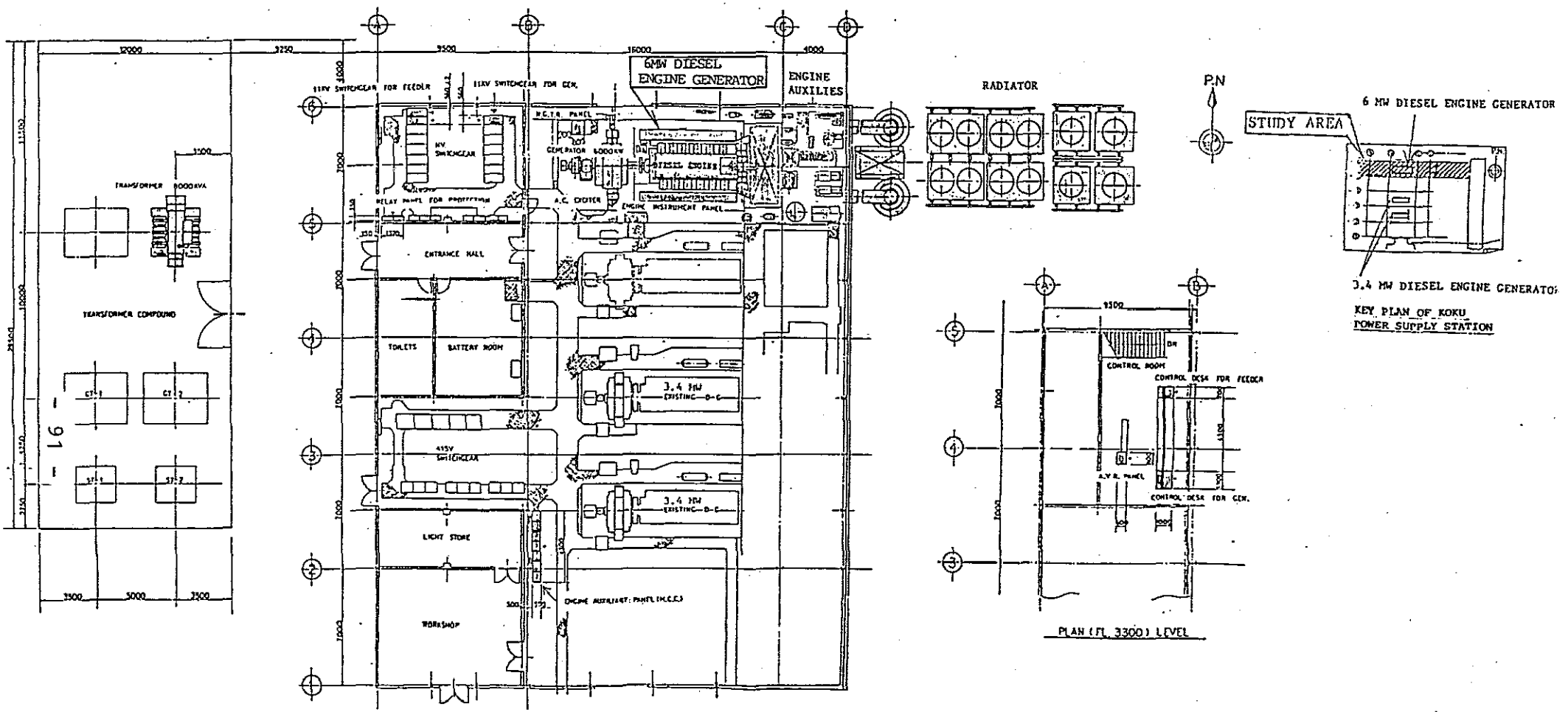
4. The basic concept of the rehabilitation plan shall be described in the field report which will be submitted to Gambia side at the end of this field survey.

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: [redacted] 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.

資料 － II　調査団員名簿

調 査 団 員 名 簿

氏　　名	担 当 業 務	現　　職
成瀬　猛	団　　長	国 際 協 力 事 業 団
関　万寿男	発 電 計 画	八千代エンジニヤリング㈱
瀬戸　寛二	発　電　機	八千代エンジニヤリング㈱
小宮　雅嗣	ディーゼルエンジン	八千代エンジニヤリング㈱

資料 － Ⅲ　現地調査の日程

現 地 調 査 の 日 程

昭和63年9 月26日より10月16日まで実施した本調査団の現地調査日程は以下のとおりである。

日順	月 ／ 日	曜日	天候	宿泊地	工 程	調 査 業 務 の 概 要
1	9 月26日	月	曇り	パ リ	成田発 AF 275 13: 00	コンサルタントチーム東京発
2	27日	火	晴	ダ カ ー ル	パリ発 AF 303 07: 40	団内打ち合せ
3	28日	水	晴	ダ カ ー ル	パリ発 RK 017 10: 30	成瀬団長セネガル着 日本大使館訪問
4	29日	木	晴	バンジュル	ダカール発 DS 431 08: 05	Ministry of External Affairs, Ministry of Economic Planning and Industrial Development 表敬訪問
5	30日	金	晴	〃		Ministry of Works and Communica- tions, GUC訪問・Inception Report 及びQuestionnaire の説明
6	10月1 日	土	晴	〃		Kotu Power Station訪問
7	2 日	日	晴	〃		M/D(Draft)作成
8	3 日	月	晴	〃		M/D(Draft)協議
9	4 日	火	晴	〃		M/D 調印 成瀬団長ガンビア発

日順	月 ／ 日	曜日	天候	宿泊地	工　程	調 査 業 務 の 概 要
10	10月5 日	水	晴	バンジュル		サイト調査、資料収集、市場調査
11	6 日	木	晴	〃		〃
12	7 日	金	晴	〃		成瀬団長東京着 サイト調査、資料収集、市場調査
13	8 日	土	晴	〃		サイト調査、資料収集、市場調査
14	9 日	日	晴	〃		Field Report作成
15	10日	月	晴	〃		Field Report提出、説明、市場調査
16	11日	火	晴	〃		「ガ」国関係先表敬訪問
17	12日	水	晴	ダ カ ー ル	バンジュル発 GO 001 08: 00	日本大使館訪問
18	13日	木	晴	パ　リ	ダカール発 AF 310 14: 10	団内打ち合せ
19	14日	金	晴	パ　リ		JICAフランス事務所打ち合せ
20	15日	土	晴	機　内	パリ発 AF 270 11: 25	
21	16日	日	晴	東　京		コンサルタントチーム東京着

資料－IV　面談者リスト

面談者リスト

本調査団が面談した関係者は、以下のとおりである。

所属及び氏名	職位
在セネガル日本国大使館：	
藤原　定　氏	参事官
大須賀公郎氏	二等書記官
山岸　光哉氏	
JICAフランス事務所：	
吉満　博　氏	所長
朝日　紀樹氏	所員
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 Utilities 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	Manager 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	

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

資料－Ⅴ　フィールドレポート

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

Attachment

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

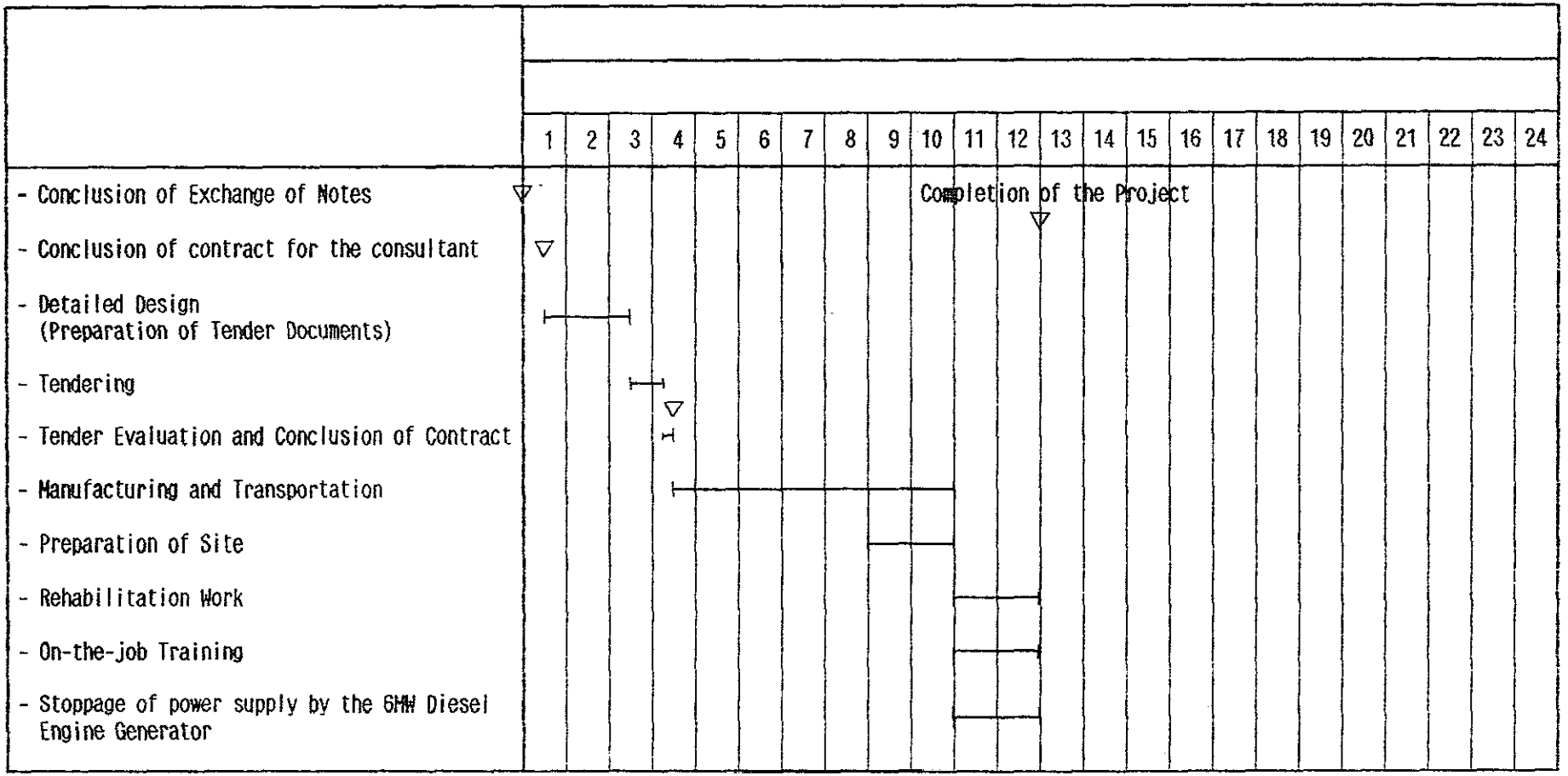
Electrical Equipment List for 6MW Diesel Engine Generator Set

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

Basic Design study on the Project for
Rehabilitation on Kotu Power supply station

Tentative Implementation Schedule

Attachment - 3



資料－VI　フィールドレポートに対する「ガ」国の承認レター

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 difficult, 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

資料－VII　カントリーデータ

1. 基礎指標

① ガンビア共和国　　首都：バンジュル（1973年バサーストを改称）。

② 国土・人口　　面　　積：11,295km2
人　　口：687,817人　（1983年国勢調査）
人口密度：60.9 人/km2（　〃　）
人口増加率：3.4%/ 年　（　〃　）

③ 政　　体　　大統領制（1965年4 月18日英保護領より独立し立憲君主国となる。）
複数政党による議会民主制
憲法：1970年4 月制定。
国会：一院制（定員49、うち選出議員35。任期5 年）
政党：人民進歩党、国民議会党、など。
大統領：アウダ・ジャワラ（1970年就任）
会計年度：7 月1 日～翌年6 月30日

④ 宗　　教　　イスラム教（約90%）、キリスト教、伝統的宗教。

⑤ 言　　語　　英語（公用語）。ウォロフ語、マンディカ語、フラ語。

⑥ 民　　族　　マンディンゴ族が主。他にはフラ族、ウォロフ族、ジョラ族、セラフリ族、アク族。

⑦ 教　　育　　文盲率（15才以上）80%、小学校進学率56%（1982年世銀資料）

⑧ 通　　貨　　1 ダラシ＝ 100ブツ。1 ドル＝ 7.0ダラシ（1988年9 月現在）

⑨ 地理・気候　　ガンビア川に沿った細長い形の国でサバンナ地帯。
11～4 月が冬（乾期）で平均気温は27℃。
5 ～10月が夏（雨期）で平均気温は29℃。

⑩ 地　　勢　　アフリカ大陸の西端に位置し、南東方向に位置するギニア国に源を発し、大西洋に流れるガンビア川に沿って東西に長く広がっている細長い国でセネガルに3 方向を囲まれている。

⑪ 緯度・経度　北緯13～13度7 分、西経13度45分～16度45分

⑫ 小　　史　1455年にポルトガル人が来航。1783年よりイギリスの植民地となり、1889年にセネガル（当時フランス領）の内部にくさびを打ち込む形の国境が定められた。1963年から自治が始まり、1965年に独立。1970年に共和国となり、ジャワラ国民進歩党総裁が初代大統領となった。

2．　社会・経済指標

① 国内総生産　ＧＤＰ約1 億 5,600万ドル（1984/ 85年度、Development Issues and Prospects レポート、世銀）

② 一人当たりのＧＮＰ　約 260ドル（同上）

③ 産業構成　主要輸出品：落花生。相手国はＥＣ諸国、特にイギリス。
農業：主作物は落花生。他にソルガム、雑穀、米、綿。
工業：落花生の収穫の大半が粗製油にされる。そのほとんどが輸出向け。

生産高、労働者及び生産力（1984年）

項　　目	付加価値		労働人口		労働者一人当たりの付加価値	
	百万ドル	%	千　人	%	ドル	%
農　　業	54	28	232	70	233	39
工　　業	25	13	30	9	833	141
サービス業、その他	117	59	69	21	1,696	286
計	196	100	331	100	596(平均)	100

（出所：1984/ 85年 Development Issues and Prospects レポート、世銀）

④ インフレ率

物価上昇率の推移

（単位：%）

項　　目	1978	1979	1980	1984	1982	1983	1984	1985
消費者物価指数(1977:100)	110	118	124	135	146	160	185	225
消費者物価指数の前年比	10.4	7.2	5.0	9.0	8.2	9.3	5.6	21.7

（出所：1984/ 85年 Development Issues and Prospects レポート、世銀）

⑤ 財政収支

中央政府財政収支

項　　目	百万ダラシ	G D P の 割 合	
	1984年度	1984年度	1979年度
歳　　入	128	21	23
歳　　出	141	23	21
財政収支	-13	-2	2
資本支出	70	12	12
総合収支	-83	-14	-10

（出所：同上）

⑥ 国際収支

「ガ」国の貿易収支と外国援助

（単位：10^3 ドル）

項　　目	1982/83	1983/84	1984/85	1985/86	1986/87
〈外国援助〉					
資本援助					
ローン	22,691	19,038	11,255	15,685	15,560
無償援助	11,607	9,519	34,666	54,884	53,370
食糧・物資供与	3,295	2,876	3,604	3,607	8,280
小　　計	41,955	31,433	49,525	74,176	77,210
技術援助					
ローン	—	—	—	—	—
無償援助	16,015	15,593	27,929	22,274	26,051
食糧・物資供与	14	—	—	14	—
小　　計	16,029	15,593	27,929	22,288	26,051
構造調整援助					
ローン	—	—	—	17,500	23,584
無償援助	—	—	—	8,608	12,933
小　　計	—	—	—	26,108	36,517
人道的救済援助					
食糧・物資供与	4,899	11,803	7,215	2,134	1,040
無償援助	42	122	1,856	14	—
小　　計	4,914	11,925	9,071	2,148	1,040
総　　計	69,925	58,951	86,525	124,720	140,818
〈援助以外〉					
「ガ」国の貿易収支					
総輸入額（FOB）(A)	△91,735	△97,812	△80,246	△86,557	△91,438
総輸出額（FOB）(B)（再輸出を含む）	86,965	87,650	66,510	73,996	65,591
輸送・保険費 (C)	△15,307	△16,318	△13,377	△15,142	△18,069
観光者の外貨交換額 (D)	15,850	18,692	19,780	24,717	34,473
貿易収支 {(B)+(D)}－{(A)+(C)}（観光を含む）	△ 4,227	△ 7,788	△ 7,333	△ 2,986	△ 9,443

（出所：UNDP, Development Co-operation 1987年報告書）

外貨交換額

貿易収支 {(B)+(D)}－{(A)+(C)}	△ 4,227	△ 7,788	△ 7,333	△ 2,986	△ 9,443

（観光を含む）

（出所：UNDP, Development Co-operation 1987年報告書）

3. その他

① 国民の休日（1988年）

New Year Day	1月1日
Independense day	2月18日
Good Friday	4月1日
Easter Monday	4月4日
Labour day	5月1日
Koriteh	5月18日
Tobask	7月25日
Assumption	8月15日
Gamo	10月23日
Christmas	12月25日

② オフィスタイム　8：00～16：00
昼食12:00 ～13:00
土・日曜は休日、金曜は午前中のみ。

資料－Ⅷ　気象データ

1. 降 雨 量

(単位：mm)

年	1月	2月	3月	4月	5月	6月	7月	8月	9月	10月	11月	12月	年 間
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
平均	1.1	0.5	0	0	0.8	77.0	182.8	271.6	202.2	65.3	4.4	1.5	807.3

(出所：ＧＵＣ提供資料，ヨンドム飛行場での記録)

2. 気　温

2-1 最高気温

(単位：℃)

年	1月	2月	3月	4月	5月	6月	7月	8月	9月	10月	11月	12月
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

(出所：ＧＵＣ提供資料，ヨンドム飛行場での記録)

2-2 最低気温

(単位：℃)

年	1月	2月	3月	4月	5月	6月	7月	8月	9月	10月	11月	12月
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

(出所：ＧＵＣ提供資料，ヨンドム飛行場での記録)

2-3 平均気温

(単位：℃)

年	1月	2月	3月	4月	5月	6月	7月	8月	9月	10月	11月	12月
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

(出所：ＧＵＣ提供資料，ヨンドム飛行場での記録)

3. 最大風速

(単位：km/h)

年	1月	2月	3月	4月	5月	6月	7月	8月	9月	10月	11月	12月
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

(出所：ＧＵＣ提供資料，ヨンドム飛行場での記録)

資料－ＩＸ　当該発電設備の運転記録と故障記録

1．当該発電設備の運転実績

年	月	商用運転時間(Hr)	燃料(千ℓ)	電力量(GWh)	燃料消費量(ℓ/kWh)	停止日数 一時的	停止日数 終日	運転率(%)	備考
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		点検
	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		点検
	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		点検
	11	718	839	3.0	0.277	6	0		
	12	536	644	2.3	0.277	2	0		
小計		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		点検
	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		
小計		7,781	8,788	31.3	0.281	55	28	89	
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		点検
	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		点検
	12	734	880	3.2	0.278	4	0		
小計		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		
	9	543	670	2.3	0.288	6	6		9/24停止
小計		6,329	7,755	27.4	0.283	36	6	96	
合計		28,109	33,356	119.5	0.280	282	125	86	

（出所：ＧＵＣ／コツ発電所提供資料）

2．当該発電設備の故障記録

2.1　トリップ記録

日　付	原　　因	対　　策
84-12-12	冷却媒体温度高	調査と再起動
84-12-13	オイルミスト高	調査と再起動
84-12-16	オイルミスト高	調査と再起動
84-12-17	オイルミスト高	調査と再起動
84-12-23	オイルミスト高	調査と再起動
84-12-27	冷却媒体温度高	調査と再起動
85-01-14	オイルミスト高	調査と再起動
85-02-04	不明	再起動
85-02-07	不明	再起動
85-02-19	過負荷（No.1トリップ）	再起動
85-02-25	不明	再起動
85-03-04	制御空気欠乏	調査と再起動
85-03-21	不明	再起動
85-03-24	燃料圧力低	フィルターの清掃
85-04-30	不明	再起動
85-05-22	インターコネクター	再起動
85-05-28	インターコネクター	再起動
85-07-09	不明	再起動
85-07-25	不明	再起動
85-07-26	インターコネクター	再起動
85-08-03	インターコネクター	再起動
85-08-15	嵐	再起動
85-08-19	オイルミスト高	調査と再起動
85-09-12	不明	再起動
85-09-14	インターコネクター	再起動
85-09-14	不明	再起動
85-09-02	インターコネクター	再起動
85-09-05	不明	再起動
85-09-07	インターコネクター	再起動
85-09-08	不明	再起動
85-09-15	不明	再起動
85-09-15	不明	再起動
85-09-15	不明	再起動

日　付	原　　因	対　　策
85-09-19	インターコネクター	再起動
85-09-19	インターコネクター	再起動
85-09-20	不明	再起動
86-03-06	ジャケット冷却水温度高	再起動
86-04-02	シリンダー用潤滑油不足	調査と再起動
86-04-03	シリンダー用潤滑油不足	調査と再起動
86-04-04	シリンダー用潤滑油不足	交換
86-04-04	シリンダー用潤滑油不足	調査と再起動
86-04-05	シリンダー用潤滑油不足	調査と再起動
86-04-05	シリンダー用潤滑油不足	バイパスを設けた（スペアが無いため）
86-04-11	インターコネクター	再起動
86-04-21	シリンダー用潤滑油不足	再起動
86-04-21	オイルミスト高	調査と再起動
86-04-21	オイルミスト高	調査と再起動
86-04-21	オイルミスト高	調査と再起動
86-06-11	シリンダー冷却水温度高	調査と再起動
86-06-23	インターコネクター	再起動
86-07-07	不明	再起動
86-07-10	不明	再起動
86-07-22	燃料圧力低	フィルターの清掃
86-07-26	不明	再起動
86-07-26	インターコネクター	再起動
86-08-01	インターコネクター	再起動
86-08-11	不明	再起動
86-08-30	発電機巻線温度高	再起動
86-08-30	発電機巻線温度高	再起動
86-09-03	不明	再起動
86-09-03	冷却水圧力低	調査と再起動
86-09-03	インターコネクター	再起動
86-10-11	インターコネクター	再起動
86-11-01	インターコネクター	再起動
86-12-06	オイルミスト高	調査と再起動
87-01-09	不明	再起動
87-01-09	不明	再起動
87-02-25	不明	再起動

日　付	原　　因	対　　策
87-06-09	フィーダー	再起動
84-06-10	インターコネクター	再起動
87-06-17	過負荷（No.2トリップ）	再起動
87-06-18	不明	再起動
87-08-06	過負荷（No.2トリップ）	再起動
87-08-17	フィーダー 1	再起動
87-08-19	インターコネクター	再起動
87-08-28	フィーダー 1	再起動
87-08-28	フィーダー 1	再起動
87-08-29	不明	再起動
87-09-01	不明	再起動
87-10-08	インターコネクター	再起動
87-10-15	過負荷（No.2トリップ）	再起動
87-11-28	過負荷（No.1トリップ）	再起動
88-03-02	インターコネクター	再起動
88-03-02	不明	再起動
88-03-16	インターコネクター	再起動
88-03-27	過負荷（No.1トリップ）	再起動
88-04-10	インターコネクター	再起動
88-04-30	不明	再起動
88-05-02	インターコネクター	再起動
88-05-06	過負荷（No.2トリップ）	再起動
88-05-19	インターコネクター	再起動
88-05-21	過負荷（No.2トリップ）	再起動
88-05-22	過負荷（No.2トリップ）	再起動
88-05-28	過負荷（No.2トリップ）	再起動
88-06-30	不明	再起動
88-06-30	不明	再起動
88-07-08	過負荷（No.1トリップ）	再起動
88-07-23	嵐（インターコネクター）	再起動
88-07-23	インターコネクター	再起動
88-08-15	インターコネクター	再起動
88-08-20	ＡＣヒューズ断	再起動

2.2　障害記録

日　付	障害の内容	対　策
84-12-12	ジャケット冷却水温度高	温度の低下
84-12-16	カムケース	検知器の調査
84-12-17	オイルミスト高	配管の増締めとレンズの清掃
84-12-24	オイルミスト高	零点調整
84-12-27	オイルミスト高	
85-01-12	油清浄機故障	調査
85-01-13	油清浄機故障	調査
85-01-14	油清浄機故障	調査
85-01-16	潤滑油漏れ	潤滑油系統配管の自在継ぎ手の交換
85-02-06	ジャケット冷却水温度高	ラジエーターの清掃
85-02-07	ジャケット冷却水温度高	ラジエーターの清掃
85-02-25	オイルミスト検出器動作	配管の清掃
85-03-02	圧縮機故障	
85-03-19	サンプタンクとフィルター間の潤滑油漏れ	修理
85-03-21	油清浄機故障	
85-03-24	第 1回定検	
85-04-01	過給器の潤滑油漏れ	シールの交換
85-04-03	フローメーター故障	バイパス設置
85-04-11	油清浄機故障	ルーチン点検の実施
85-04-30	ジャケット冷却水温度高	負荷の削減
85-04-30	オイルミスト検出器動作	ヒューズ断
85-05-03	オイルミスト検出器動作	
85-05-15	油清浄機故障	
85-05-18	ジャケット冷却水温度高	負荷の削減
85-05-29	燃料漏れ	シールの交換
85-05-30	油清浄機故障	エアーロックブレッドの保修
85-07-15	第 2回定検	
85-07-26	燃料漏れ	シールの交換
85-09-13	燃料漏れ	シールの交換
85-10-03	ジャケット冷却水温度高	ラジエーターの清掃
85-10-08	温度高	
85-11-08	潤滑油圧低	フィルターの交換

日　付	障害の内容	対　策
85-11-11	燃料漏れ	シールの交換
85-12-01	ジャケット冷却水温度高	負荷の削減
85-12-22	空気圧縮機故障	
86-01-13	始動渋滞	詳査
86-01-30	空気漏れ	配管修復
86-01-31	潤滑油漏れ	O-リングの交換
86-01-14	燃料漏れ	シールの交換
86-04-03	シリンダー用潤滑油不足	交換
86-05-29	油清浄機故障	修復したが正常に動作しない
86-08-01	油清浄機故障	
86-08-04	燃料漏れ	シールの交換
86-09-29	燃料漏れ	シールの交換
86-10-01	空気圧縮機故障	修復
86-11-02	ルーチン点検	全フィルターの清掃
86-11-07	燃料漏れ	シールの交換
86-11-15	冷却媒体温度高	ラジエーターの清掃
86-12-05	オイルミスト高	検出器の点検
87-01-10	潤滑油漏れ	古いO-リングの再使用
87-01-15	ターボチャージャー	オイル交換
87-01-31	冷却媒体温度高	ラジエーターの清掃
87-03-04	冷却媒体温度高	負荷の削減
87-03-05	冷却媒体温度高	ラジエーターの清掃
87-03-09	油清浄機故障	
87-03-09	保護装置	潤滑油系統用温調弁の再調整
87-03-11	シリンダー油用タンクのレベル低	油の充填
87-06-04	油清浄機故障	修復
87-06-11	シリンダー油流量不足	バイパスの設置
87-07-11	燃料漏れ	シールの交換
87-07-24	燃料漏れ	シールの交換
87-07-25	潤滑油圧低	フィルターの交換
87-08-06	ターボチャージャー	オイルの交換
87-08-08	燃料漏れ	シールの交換
87-08-30	電磁弁故障による緊急停止	主回路から切り離し
87-09-03	過給器からの潤滑油漏れ	配管の溶接

日　付	障害の内容	対　策
87-09-12	燃料漏れ	燃料ポンプのO-リング交換
87-09-16	冷却媒体温度高	ラジエーターの清掃
87-09-19	燃料漏れ	シールの交換
87-09-20	潤滑油漏れ	配管の溶接
87-09-29	燃料漏れ	シールの交換
87-10-10	燃料漏れ	シールの交換
	冷却水漏れ	配管の溶接
87-10-24	燃料油圧低	フィルターの清掃
87-11-07	ベアリング・キャブ	ベアリング・キャブの交換
87-11-17	潤滑油漏れ	O-リングの交換
87-11-28	燃料漏れ	燃料ポンプ用O-リングの交換
87-12-05	潤滑油圧低	フィルターの交換
87-12-17	燃料漏れ	シールの交換
88-01-21	燃料漏れ	シールの交換
88-01-26	冷却水漏れ	配管の交換
88-01-27	オイルミスト	調査
88-01-30	燃料漏れ	シールの交換
88-03-12	燃料漏れ	シールの交換
88-03-21	潤滑油圧低	フィルターの交換
88-03-31	燃料漏れ	シールの交換
88-04-09	冷却媒体温度高	ラジエーターの清掃
88-04-16	潤滑油圧低	シールの交換
88-06-01	燃料漏れ	シールの交換
88-06-11	ジャケット冷却水温度高	負荷の削減
88-06-16	冷却水漏れ	配管の交換
88-07-16	潤滑油圧低	フィルターの交換
88-07-23	燃料漏れ	シールの交換
88-07-25	燃料漏れ	シールの交換
88-07-30	潤滑油圧低	フィルターの交換
88-08-20	潤滑油用電磁弁の故障	修復
88-08-27	過給器冷却水漏れ	ガスケットの交換
88-09-03	エンジンの停止動作不良	電磁弁不動作の調査
88-09-17	ガバナーモーター故障	モーター調査とレギュレーターの修復
	潤滑油圧力低下	フィルターの交換
	燃料漏れ	ポンプのO-リング交換

資料－X　ガンビア公共事業公社の第16年次報告書

Gambia Utilities Corporation

Sixteenth Annual Report

&

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	8,809,078	(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	17,619,524
TOTAL EMPLOYMENT OF CAPITAL (=1+2+5)	111,032,733	80,910,176	28,122,557
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	1.78	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	49,894	(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)	3,330	3,387	(143)
8-9-10. Net Profit before interest	2,064	2,409	(45)	5,952	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)	3,157	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	47,511,216	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 Z

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)	30,695,357	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	1,536,047	1,548,093	12,046	4,714,608	6,192,372	1,477,764
WATER DIVISION	850,796	779,545	(71,251)	2,332,966	3,118,181	785,215
SEWERAGE DIVISION	67,170	72,869	15,699	311,147	291,478	(19,669)
GAS SECTION						
TOTAL	2,453,983	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 (Dalasis)			
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 1	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	37,962,071	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	3,112	(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		82,000	1,283,414	684,000	2,338,761
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)	3,112	(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 (Balasis)	38,690,173	8,520,833	297,715	12,495	47,511,216	38,438,686
EXPENSES						
Generation / Production	29,448,151	4,825,855			34,274,006	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	141,242	148,735			289,977	306,105
Depreciation	2,569,829	849,822	109,854		3,529,505	3,279,357
	34,086,834	6,914,909	306,647	9,083	37,317,473	29,617,774
Less: Labour Capitalised	303,988	318,128			622,116	423,763
	27,782,846	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	9,244,675
HEAD OFFICE					0	38,340
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			1,765,881	2,167,193
General Administration	1,036,616	929,265			512,652	857,587
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	2,332,968	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

	1988	1987
TURNOVER (Salesis)	47,519,216	38,439,686
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	1,909,800	1,535,153
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	8,520,833	7,149,236	1,371,597	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	29,782,846	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	36,695,357	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	2,390,642	71,305		13,026,622	13,014,469
EXPENSES						
Generation / Production	5,907,211	1,188,284			7,095,595	7,531,276
Transmission / Distribution	211,178	268,043			479,221	331,763
Direct Labour	258,196	113,312	44,281		415,789	468,005
Management	22,316	33,619			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	71,758	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	333,589
Accounts	88,270	88,269			176,539	141,582
General Administration	251,029	225,034			476,063	430,755
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	1,260,682
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	1,350,284
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
BIAM	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
	156,969	1,054,647

SALES AND PRODUCTION ANALYSIS - ELECTRICITY DIVISION FOR THE PERIOD OF APRIL - JUNE 1989

	TOTAL	BANJUL	PROVINCES	BRIKAMA	MANSAKONKO	FARAFENNI	GEORGETOWN	BANSANG	BASSE
GENERATED (Units)	15,713,942	15,176,772	537,170		122,640	105,760	54,970	110,180	143,420
Domestic	4,556,083	4,256,149	335,934	132,033	49,224	43,468	12,519	35,273	67,577
Commercial	1,402,313	1,243,599	158,724	43,451	13,939	26,987	1,593	26,692	45,756
Maximum Demand	3,744,404	3,744,404	0						
Government	753,603	700,103	53,500	4,098	16,702	7,522	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	263	1,862
Total Recorded	12,465,574	11,878,178	587,376	188,450	86,807	87,076	23,088	71,732	130,243
System losses									
Percentage lost									
DOMESTIC SALES (Dalasis)	3,464,745	3,205,103	259,642	96,524	37,360	34,219	12,251	28,112	50,436
Commercial	1,332,378	1,181,540	150,788	41,279	13,147	25,637	1,594	25,353	43,455
Maximum demand	4,081,401	4,081,401	0						
Government	727,640	673,813	53,827	3,893	15,267	7,145	6,353	7,204	12,164
Local authorities	34,132	29,175	4,957	151	2,857	761		959	229
TOTAL SALES	9,640,246	9,171,032	469,214	141,946	69,231	67,792	20,406	62,709	106,229
Own consumption	595,634	577,262	18,372	6,532	3,139	6,387	791	749	1,765
TOTAL	10,326,880	9,848,294	488,586	148,478	72,370	74,199	21,402	63,658	108,093

SALES AND PRODUCTION ANALYSIS - WATER DIVISION FOR THE PERIOD OF APRIL - JUNE 1989 12-Sep-89

	TOTAL	BANJUL	PROVINCES	BRIKAMA	MANSAKONKO	FARAFENNI	GEORGETOWN	BANSANG	BASSE	KEREWAN	[illegible]
GALLONS PRODUCED		397,422,543									
Domestic	130,512,142	118,102,910	12,409,232	3,762,146	747,770	3,165,052	191,000	1,046,245	1,917,517	340,544	1,222,527
Commercial	18,022,569	16,368,723	1,653,846	363,000	50,216	769,737	13,333	191,788	205,326		
Maximum Demand	42,989,258	42,889,258									
Government	30,566,457	26,452,208	4,114,249	969,634	1,063,000	235,904	337,500	293,863	673,000	180,251	337,057
Local Authorities	51,518,938	39,625,234	11,893,664	5,546,509	235,505	3,228,502	160,000	5,000	500,000	691,095	1,322,973
TOTAL SOLD	273,509,365	243,438,353	30,071,012	10,641,291	2,137,385	7,418,225	702,085	1,535,876	3,302,443	1,114,930	3,217,557
GUC own consumption	1,307,190	866,553	442,637	43,000	20,000	189,774	20,000	47,000	65,000	57,863	
Total Recorded	274,816,555	244,304,906	30,511,649	10,684,291	2,157,385	7,607,999	722,085	1,581,876	3,367,443	1,172,793	3,217,557
System losses											
Percentage lost											
DOMESTIC SALES (Dalasis)	912,285	826,529	85,755	28,124	4,460	21,786	2,619	7,783	10,982	1,695	8,316
Commercial	155,793	140,096	15,697	3,449	555	7,477	133	1,825	1,956		
Maximum demand	578,948	578,948	0								
Government	292,985	254,033	38,952	9,063	10,099	2,223	3,211	2,793	6,451	1,720	3,392
Local authorities	314,560	241,881	72,679	33,837	1,446	19,691	976	29	3,152	4,240	5,208
Total Sales	2,254,571	2,041,487	213,084	74,473	16,860	51,177	6,939	12,430	22,543	7,655	21,016
Own consumption	6,967	4,659	2,308	131	108	1,022	103	277	350	312	
TOTAL	2,261,538	2,046,146	215,392	74,604	16,968	52,199	7,038	12,707	22,893	7,967	21,016

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	93,839.86	8,973.19	46,173.00	19,171.13	37,464.92
4	69,111.05	1,439.14	41,328.81	4,908.87	24,512.79
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	76,651.77	4,154.97	50,442.87	8,417.17	21,996.70
8	63,835.11	2,179.62	52,745.22	5,804.95	27,762.56
9	45,857.02	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	60,597.50
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	732,057.09	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	179,057.95	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	189,205.50	5,216.76	112,305.85	38,463.05	40,651.18
19 BRIKAMA	228,013.15	9,037.46	130,828.87	15,692.77	90,328.97
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	155,594.99	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	93,877.36	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	38,569.93	29,060.64
BASSE	329,271.35	3,624.24	197,627.89	74,015.93	61,251.77
F/FENNI	153,868.22	3,223.25	113,238.16	18,059.33	25,823.98
KEREWAN	10,592.91	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 1969

NAME	OUTSTANDING BALANCES	LESS THAN 3 MONTHS	3 - 6 MONTHS	6 - 12 MONTHS	OVER 12 MONTHS
CENTRAL GOVERNMENT	831,089.46	1,020,621.74	(189,532.28)		
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	81,572.01	4,302.35	8,866.05	16,037.10	52,386.51
G/TOWN AREA COUNCIL	42,703.46	1,954.50	3,079.75	21,344.10	16,325.11
BASSE AREA COUNCIL	41,269.83	4,390.45	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 to 16 MONTHS	6 to 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	
KOMBO 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 EUROS	BUDGET EUROS
	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	3,140,632	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	123.38			GUC	
2. VW 10-11 SECTION VEHICLES	157,500.00	200,000.00			GUC	
3. ELEVATION FOR RADIATOR OF UNIT NO.1	80,000.00	52,415.20			GUC	
4. SPARES FOR K.P.S.						
TURBO CHARGER	120,000.00	14,798.66			GUC	
MIRRLEES SPARES	535,000.00	1,085,150.89			GUC	
5. BEARING CAP K.P.S.	320,000.00	81,701.10			GUC	
B. TRANSMISSION AND AND DISTRIBUTION						
1. BAKOTEH ELECT. SUPPLY	200,000.00	4,520.72				GLF
2. OLD JESHWANG EXT.	200,000.00	63,311.64				GLF
3. FEEDER 4	400,000.00	135,129.10			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	178,000.00					
	2,612,500.00	1,638,180.77				

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	1,638,180.77				
7. REINFORCEMENT HV CABLE RING BANJUL	176,000.00					
8. LV CIRCUIT BREAKER 1200A SPARE	14,064.00	1,815.75			GUC	
9. HV UNDERGROUND CABLE & ACCESSORIES FOR K.P.S.	92,000.00					
10. UNGRADING & EXT. OF LV NETWORK	420,000.00	471,681.74			GUC	
11. 4 MOS 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 TIME TABLE	FORECAST TOTAL 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	8,314.03				GUC	
4. 1 DIESEL PICK UP	150,000.00	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.	150,000.00	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 TIME TABLE	FORECAST TOTAL 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/KOMKO (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	
	32,103,064.00	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	32,403,084.00	3,161,062.83					
2. THREE PHASE METER 100 NO.	82,000.00	31,120.97				GUC	
3. CONCRETE CABLES 20 DRUMS OF 500 M	350,000.00						
M/KONIKO GENERATING SET						GUC	
SEAGULL COLD STORE SUB-STATION BALANCE OUTSTANDING		82,058.88				GUC	
TOTAL	32,835,084.00	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
II. WATER DIVISION BANJUL PRODUCTION							
1. SPARES FOR B/HOLES	116,000.00	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 11A AND 17	75,000.00	64,515.00					
6. BOREHOLE 1A DRILLING & EQUIPPING	31,000.00						
7. LINE DOSING PLANT AT FAJARA	51,000.00	50,075.64				GUC	
8. DRILLING & EQUIP. B/HOLE 4,18,19,7 & 8	1,178,200.00	1,849,367.38				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	2,081,223.66					

PROJECT	TOTAL EXPENDED COST	EXPENDITURE TO DATE	ACTUAL EXPENDED/ PHY. PROGRESS	BUDGET FORECAST TOTAL TIME TABLE 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	56,500.00					
13. WATER METER FOR TANK OUTLETS	28,100.00					
14. FLOW METER KANIF.	36,000.00					
15. BOOSTER PUMP FOR CHLORINATION AT FAJARA	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 'N' SECTION	19,000.00					
2. OLD JESHWANG WATER SUPPLY PHASE 2	110,000.00	39,891.24				GLF
	5,823,885.00	2,238,131.13				

PROJECT	TOTAL EXPENDED COST	EXPENDITURE TO DATE	ACTUAL EXPENDED/ PHY. PROGRESS	BUDGET FORECAST TOTAL TIME TABLE YEAR. EXPEND.	SOURCE	REMAINING FINANCE
B/F	5,823,885.00	2,238,131.13				
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	16,900.00					
	7,198,785.00	3,198,514.17				

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. 2NO.UNDER PRESSURE TAPPING MACHINES	18,900.00	84,801.82			GUC	
4. CHAIRS AND TABLES FOR P/ATTENDANTS	9,800.00					
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	19,219.71			GUC	
2. Workshop For Treatment Plant	5,000.00					
	69,000.00	19,219.71				
L. 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 TIME TABLE	FORECAST TOTAL YEAR. EXPEND.	SOURCE	REMAINING FINANCE
TRANSPORT							
1.		220,497.56					
HEADOFFICE							
1.		248,453.65					

GENERAL

PROJECT	TOTAL EXPENDED COST	EXPENDITURE TO DATE	ACTUAL EXPENDED/ PHY. PROGRESS	BUDGET TIME TABLE	FORECAST TOTAL 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 BCMU	155,300.00	102,500.00				GUC	
8. OFFICE FURNITURE FOR MO's OFFICE	100,000.00	122,600.00				GUC	
9. PABX TEL. EQUIP. FOR H/QTR 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	
	2,052,810.00	525,813.35					

PROJECT	TOTAL EXPENDED COST	EXPENDITURE TO DATE	ACTUAL EXPENDED/ PHY. PROGRESS	BUDGET FORECAST TOTAL TIME TABLE YEAR. EXPEND.	SOURCE	REMAINING FINANCE
B/F	2,052,810.00	525,813.35				
11, OFFICE FURNITURE FOR COMMERCIAL SECT.	38,210.00					
12. AIR CONDITIONER FOR COMMERCIAL SECT.	61,000.00					
13. TYPEWRITER NO.4 AT 06,000	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	921,266.78				

(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	2,456	2,514	2,290	2,313	2,988	3,100	2,428	3,203	5,037	1,882	4,466	3,785	36,414
GOVT.	-	-	447	-	-	895	1,049	-.	-	-	-	1,061	3,452
SEWERAGE	12	-	-	8	43	5	32	179	-	39	-	41	369
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	3,761	5,477	2,384	4,601	5,792	45,266
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	760	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	-	39	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	130
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	25	27	26	296
HIRED TRANSPORT	49	83	50	58	21	83	33	32	45	32	60	121	675
INSURANCE	138	-	41	-	-	16	-	-	-	-	56	3	254
AUDIT	-	-	84	-	-	-	-	-	-	-	-	-	84
LEGAL	4	-	-	-	-	4	-	-	-	-	-	1	9
OTHER	807	367	617	474	740	199	138	358	553	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	1,567	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	4,412	5,804	
CLOSING CASH BALANCE	9,241	9,871	10,155	7,960	6,567	6,128	7,031	6,998	4,910	4,412	5,804	4,953	

資料－ＸＩ

当該発電設備の修復計画と
機材供与計画における「ガ」国の
要請内容と計画内容の詳細内訳

1. 「ガ」国要請数量と供給資機材数量比較リスト

No.1

項目	部品コード	「ガ」国要請数量	供給数量 リハビリ用	予備品	合計	備考
- Engine Casing -						
1 Stud for cylinder cover	K11122	8	-	-	-	
2 O-ring for ring K1116	K11126	14	12	6	18	
3 O-ring for nut K1117	K11127	14	12	6	18	
4 Upper bearing half shell for crank shaft bearing	K12001	7	7	1	8	
5 Lower bearing half shell for crank shaft bearing	K12010	7	7	1	8	
- Oill Sump -						
1 O-ring for flange K11815	K11827	2	2	2	4	
2 O-ring for flange K11815	K11828	2	2	2	4	
- Crank Shaft Locating Bearing -						
1 Locating bearing	K12051	2	2	1	3	
2 Thrust bearing ring halves	K12061	4	4	1	5	
- Engine Frame -						
1 Tublar sealing for H16101	H16104	12	12	12	24	
2 Packing for H16102	H16105	-	12	12	24	
3 Sealing	H16113	-	2	2	4	
- Casing Cover -						
1 Tublar sealing for K16221	H16226	12	1	1	2	
2 Tublar sealing for K16220	H16227	-	11	11	22	
3 Tublar sealing for K11222	H16228	-	2	2	4	
- End Cover (Engine with built-on pumps) -						
1 Joint for cover K16505	K16507	-	1	1	2	
- Cylinder Liner -						
1 Clamping piece, complete for cylinder liner	K21001	-	4	-	4	
2 Bolt for clamping piece	K21002	-	8	-	8	
3 Conical disc for clamping piece	K21005	-	8	-	8	
4 Conical cap for clamping piece	K21006	-	8	-	8	
5 Cylinder liner	K21401	-	-	1	1	
6 O-ring for cylinder liner	K21404	24	24	24	48	
7 O-ring for cylinder liner	K21405	36	36	36	72	
8 O-ring for cylinder liner	K21406	24	24	24	48	
9 Sealing ring for cylinder liner	K21407	12	12	12	24	
- Cylinder Head -						
1 Cooling water guide for cylinder head	K27004	-	-	1	1	
2 Indicator valve, complete	K27016	-	6		6	
3 Nut for stud K11122(ZV) and K21112(ZL)	K27039	8	-	8	8	
4 Sleeve for nut K27038	K27040	-	8	-	8	
5 Nut for stud K27038	K27045	72	8	-	8	
6 Tubular sealing for cover K27007 and bearing casing K28000	K27046	-	24	24	48	
7 O-ring for cylinder head	K27051	24	12	12	24	
8 O-ring for ring K27010	K27055	24	24	-	24	
9 O-ring for nut K27039	K27056	24	8	-	8	

備考：上記部品コードは、当該発電設備納入メーカーの取扱い説明書に記載されている番号を示す。

項　　目	部品コード	「ガ」国要請数量	供給数量 リハビリ用	予備品	合計	備考
- Cylinder Head - 続き						
10 Cylinder head complete with insert bush K27107, valve seat K27108 and valve K27109 with O-ring K27122 and valve guide K27112 with O-ring K27113	K27100	-	-	1	1	
11 Insert bush for fuel injector valve	K27107	4	4	8	12	
12 Valve seat for inlet valve	K27108	24	12	12	24	
13 Valve seat for outlet valve	K27109	24	12	12	24	
14 Valve guide	K27112	48	-	48	48	
15 O-ring for valve guide K27112	K27113	96	96	96	192	
16 O-ring for valve seat K27108	K27122	144	192	192	384	
- Fuel Injection Valve -						
1 Fuel injection valve complete, but without flange	K27200	-	12	-	12	
2 Washer for flange K27026	K27028	6	12	-	12	
3 Cyl. pin for nozzle holder	K27202	12	6	-	6	
4 Spring plate for fuel injection valve	K27205	6	3	-	3	
5 Spring for fuel injection valve	K27210	-	3	-	3	
6 Rubber ring for nozzle holder	K27211	36	36	72	108	
7 Rubber ring for nut K27209	K27212	12	12	24	36	
8 Nozzle with needle and cooling jacket complete, for fuel injection valve	K27240	12	-	12	12	
- High Pressure Pipe -						
1 High pressure pipe complete	K27250	-	12	-	12	
2 High pressure pipe	K27251	2	-	-	-	
3 Valve body for fuel press. valve	K27254	2	-	-	-	
4 Valve hous. for fuel press valve	K27255	2	-	-	-	
5 Spring for fuel pressure valve	K27257	12	-	-	-	
6 Clamp ring for high press pipe	K27261	12	-	-	-	
7 Sealing for housing K27259	K27262	12	12	-	12	
8 Metal tube for high press pipe	K27264	2	-	-	-	
9 O-ring for hous. K27259 & K27263	K27275	-	24	24	48	
- Starting Valve -						
1 Staring valve complete	K27400	-	12	-	12	
2 Piston ring for K27404	K27409	24	-	-	-	
3 Piston ring for K27404	K27410	24	-	-	-	
4 O-ring for K27402 and K27403	K27411	36/48	-	-	-	
5 Spring for strating valve	K27414	-	-	-	-	
6 Spring plate for strating valve	K27415	6	-	-	-	
7 Self-loacking nut for K27401	K27417	12	-	-	-	
8 Sealing ring for start. valve	K27419	12	-	-	-	

項　　目	部品コード	「ガ」国要請数量	供給数量 リハビリ用	予備品	合計	備考
- Inlet and Outlet Valve -						
1 Inlet and outlet valve, complete	K27500	-	24/24		24/24	
2 Conical clamping ring, two-part, for inlet and outlet valve	K27503	24	-	24	24	
3 Outer valve spring for inlet and outlet valve	K27504	-	-	-	-	
4 Inner valve spring for inlet and outlet valve	K27505	-	-	-	-	
5 Valve spindle for inlet valve	K27511	24	-	-	-	
6 Valve spindle for outlet valve	K27512	24	-	24	24	
- Releif Valve -						
1 Releif valve, complete	K27700	-	12	-	12	
2 Spacer foe releif valve	K27704	12	-	-	-	
3 Spring foe releif valve	K27705	-	-	-	-	
4 Packing ring	H27707	-	12	12	24	
- Bearing Casing for Cylinder Head -						
1 Bearing casing, complete	K28000	-	-	1	1	
2 Bush for main rocker arm K28005	K28008	20	24	-	24	
3 Spherical headed pin for K28005 and K28015	K28009	10	48	-	48	
4 Bush for auxiliary rocker arm K28015	K28018	20	12	6	18	
5 Pin for auxiliary rocker arm K28015	K28020	24	24	-	24	
6 Special bolt for main rocker arm K28005	K28034	4	24	-	24	
7 Special bolt for main rocker arm K28005	K28035	4	24	-	24	
8 Lock nut for K28034	K28037	4	24	-	24	
9 Ball-shaped cup for rocker arm	K28041	72	36	36	72	
10 Spring cage for K28041	K28042	72	36	36	72	
11 O-ring for flange K28029	K28044	24	24	12	36	
12 O-ring for flange K28030	K28045	24	24	12	36	
- Crank Shaft -						
1 Vibration damper, complete	K31510	1	-	-	-	
- Connecting Rod -						
1 Upper bearing half	K33210	12	12	1	13	
2 Lower bearing half	K33220	12	12	1	13	
3 Bolt for bearing half	K33400	-	4	24	28	
4 Bolt for bearing half	K33410	-	4	24	28	
5 Serrated bolt-locking device for bolt K33410	K33420	10	8	48	56	
6 Screw	K33421	20	24	24	48	
7 Locking plate	K33422	48	24	24	48	

	項　　目	部　品 コード	「ガ」国 要請数量	供給数量 リハビリ用	予備品	合　計	備　考
	- Piston -						
1	Operating piston, complete	K34000	-	-	1	1	
2	Ex. bolt for upp. part of piston	K34127	-	60	-	60	
3	Ex. bolt for piston skirt	K34129	-	36	-	36	
4	Stopper plate	K34138	-	12	-	12	
5	Spring for pawl	K34139	-	3	-	3	
6	O-ring for cooling insert	K34144	24	12	24	36	
7	Piston ring, (top)	K34401	12	12	12	24	
8	Piston ring(2nd,3rd)	K34402	24	24	24	48	
9	Grooved piston ring for operating piston	K34410	12	12	12	24	
	- Camshaft -						
1	Fuel cam for camshaft	K42150	-	-	-	-	
2	Valve cam for camshaft	K42160	-	-	-	-	
3	Camshaft bearing shell halves	K42601	-	2	16	18	
4	Lapped bearing ring halves for camshaft lapped bearing	K42611	-	2	4	6	
	- Starting Air Distributor -						
1	Starting air distributor	K43100	-	-	-	-	
2	Thrust washer for starting air distributor K43161	K43162	2	1	1	2	
3	Bush for housing K43161	K43170	2	1	1	2	
4	Thrust washer for distributing disc K43169	K43170	2	1	1	2	
	- Automatic Starting-Air Stop Valve, complete -						
1	Automatic starting-air stop valve, complete	K43500	-	-	-	-	
2	Plunger ring for plunger K43513	K43521	3	3	3	6	
3	Spring for non-return valve K43515	K43510	-	1	-	1	
4	Spring for plunger K43516	K43520	-	1	-	1	
5	Sealing for starting-air stop valve	K43528	-	1	1	2	
	- Valve Actuating Gear -						
1	Valve actuating gear, complete	K44100	-	1	-	1	
2	Guid piston for valve sctuating gear	K44102	-	2		2	
3	Roller for valve actuating gear	K44104	-	2	-	2	
4	Bush for rollers K44103 and K44104	K44107	24	24	-	24	
5	Thrust washer for roller K44104	K44108	48	24	-	24	
6	Spring for valve actuating gear	K44111	-	2	-	2	
7	Spherical pin for valve actuating gear	K44112	4	4	8	12	
8	Valve actuating rod, complete	K44114	-	-	6	6	
9	Sealing for K44115	K44116	24	12	12	24	
10	Sealing for K44117 & K44129	K44125	-	24	-	24	
11	O-ring for K44117 and K44129	K44125	-	48	-	48	
12	O-ring for boushing K44101	K44126	-	12	-	12	

項目	部品コード	「が」国要請数量	供給数量 リハビリ用	予備品	合計	備考
- Regulating Linkage -						
1 Bush for levers K45025, K45027 and support K45029	K45026	4	4	4	8	
2 Self-locking nut for lever K45025	K45042	24	24	24	48	
3 Pin for lever K45025	K45073	12	12	12	24	
- Spring Rod -						
1 Articulat. piece for spring rod	K45103	2	2	2	4	
- Regulating Shaft -						
1 Articulation piece for rod K45051 and K45052	K45054	4	4	4	8	
2 Treaded pin for K45001, K45051 and K45052	K45063	6	6	6	12	
3 Self-locking nut for stud K45070	K45065	1	6	6	12	
4 Self-locking bolt for threaded ping K45063 and K45064	K45067	6	6	6	12	
5 Bush for lever K45057	K45069	1	2	-	2	
- Overspeed Safety Cut-out Device Complete -						
1 Cover for housing K46101	K46140	1	1	-	1	
2 Fel ring for cylinder K46159 and cover K46182	K46160	2	2	2	4	
3 Sealing for cover K46161	K46162	1	1	1	2	
4 Piston ring for piston K46163	K46164	2	2	2	4	
5 Sealing for cover K46178	K46179	1	1	1	2	
- Overspeed Safety Cut-out Device -						
1 Sealing for locking screw K46192	K46206	2	2	-	2	
- Control Elements -						
1 3/2-way valve, complete	K47209	-	1	-	1	
2 3/2-way valve, complete	K47210	-	2	-	2	
3 Limit switch	K47211	-	1	-	1	
- Transmitter for Remote Tachometer -						
1 Sensor for remote tachometer	H49601	-	1	1	2	
- Load Control -						
1 Limiting sensor for load control	H49905	-	1	1	2	
- Governor Device -						
1 Woodward governor	K51101	-	1	-	1	
2 Bush for housing K51123	K51123	6	6	-	6	
3 Sealing for housing K51138	K51139	1	2	-	2	
- Fuel Injection Pump -						
1 Fuel injection pump, complete	K55000	-	-	1	1	
2 Pin for fuel injection pump	K55012	6	-	6	6	
3 Bush for roller K55028	K55016	12	6	12	18	
4 Spring forfuel injection pump	K55018	-	1	-	1	
5 Thrust plate for roller K55028	K55030	24	12	12	24	
6 Packing for retain. screw K55033	K55033	-	6	-	6	
7 Grooved packing for screw K55021	K55034	-	6	-	6	
8 O-ring foR housing K55001	K55035	24	12	24	36	
9 O-ring for pump cover K55004	K55036	12	6	24	30	
10 O-ring for K55050	K55037	24	6	24	30	
11 Retaining ring for pin K55015	K55040	12	6	6	12	
12 Piston and cylinder for fuel injection pump	K55050	12	-	6	6	

	項　　目	部　品 コード	「ガ」国 要請数量	供給数量 リハビリ用	予備品	合　計	備　考
	- Arrangement of Turbocharger -						
1	Compensator	H66128	-	2	2	4	
2	Sealing for H66128	H66129	-	2	2	4	
3	Sealing for H66115	H66130	-	2	2	4	
4	Sealing for K66106	H66131	-	2	2	4	
	- Air Delivery Pipe -						
1	Hose sealing for the air delivery pipe	K67029	12	12	12	24	
2	Spiral-asbestose packing for flange K67004	K67030	24	12	12	24	
3	Spiral-asbestose packing for flange K67004	K67031	-	1	1	2	
4	Sealing for ring K67012	K67032	-	1	1	2	
	- Cylinder Lubricating Pump Device -						
1	Articulation piece for flexible	K72142	2	2	-	2	
	- Cylinder Lubricating Oil Fine Filter -						
1	Fine filter for cylinder lubricating	K72301	-	1	-	1	
	- Exhaust Piping -						
1	Exhaust pipe for cylinder 2L	K81105	-	1	-	1	
2	Spiral-asbestos gasket for flange K81127	K81130	12	12	12	24	
3	Compensator for exhaust pipe	K81137	-	8	4	12	
4	Compensator for exhaust pipe	K81138	-	4	2	6	
	- Instrument Panel -						
1	Instrument panel, complete	H92100	-	1		1	
	- Exhaust Turbocharger -						
1	Rotor complete	20000	-	1	-	1	
2	Nozzle	56000	-	1	-	1	
3	Bearing complete(B/T)	32100/34100	-	1	2	3	
4	Diffuser	79000	-	1	-	1	
	- L.O. Pump -						
1	Driving shaft complete set		-	1		1	
	- Maker's Standard Spare set for -						
1	A/C		-	1	-	1	
2	Exhaust gas turbocharger		-	1	-	1	
3	oil mist detector		-	1	-	1	
4	Exhaust gas temperature		-	1	-	1	
5	Tachometer		-	1	-	1	
6	Thermostat		-	1	-	1	
7	L.O. pump		-	1	-	1	
8	Standard bolts/nuts/washers		-	1	-	1	
9	Standard packings for pipe		-	1	-	1	
10	Woodward governor		-	1	-	1	

項目	部品コード	「が」国要請数量	供給数量 リハビリ用	予備品	合計	備考
- Purifier Trap(DRG.No.39216B) -						
1 Dirty oil connection pipe	3051017	-	1	-	1	
2 Purified oil connection pipe	3051017	-	1	-	1	
3 Sheet packing	3051002	-	9	9	18	
4 Thermometer	3051013	-	1	1	2	
5 O-ring	3024012	-	3	3	6	
6 O-ring	3024018	-	1	2	3	
7 Flow indicator	4051004	2	1	2	3	
8 Pressure gauge	3051015	2	1	1	2	
9 Sheet packing	3051003	-	4	4	8	
10 O-ring	4011001	4	1	3	4	
11 Diety oil inlet pipe	4051001	2	1	1	2	
12 Purified oil outlet pipe	4051006	2	1	1	2	
13 water outlet pipe	4051003	2	1	1	2	
14 Orifice	4051002	2	1	1	2	
15 Sealing water inlet flange	3024007	2	1	1	2	
16 O-ring	3024016	-	1	1	2	
- Purifier Frame(DRG.No.302160D) -						
1 Oil gauge glass	521111	-	1	2	3	
2 Sheet packing	521112	-	2	4	6	
3 O-ring 602¢	4011008	2	1	2	3	
4 O-ring	2011026	-	1	2	3	
5 Sheet packing	4011012	-	1	1	2	
6 Sheet packing	4011004	-	1	1	2	
- Bowl Assembly(DRG.No.392159D) -						
1 O-ring for gravity disc	4081003	5	1	5	6	
2 Top disc	4081022	2	1	-	1	
3 Disc (1)	4081023	2	106	4	110	
4 Disc (2)	4081024	2	6	-	6	
5 O-ring	4081021	5	1	5	6	
6 Socket cap screw(M14 x 25)		48	6	32	38	
7 Main seal ring	4081036	5	1	5	6	
8 O-ring 325¢	4081031	9	1	5	6	
9 O-ring 345¢	4081021	15	3	15	18	
10 O-ring 336¢	4081033	5	1	5	6	
11 O-ring	4081033	-	1	2	3	
12 O-ring	4081019	5	1	5	6	
13 Plug screw with nozzle	2081031	6	2	4	6	
14 Sheet packing	4016011	3	1	5	6	
15 O-ring	4016005	2	1	5	6	
16 O-ring 115¢	4016016	5	1	5	6	
17 Bolt M5 x 8		-	6	12	18	
18 Tongued washer	4016002	-	6	12	18	
- Vertical Shaft(DRG.No.392163A) -						
1 Sheet packing	4013004	-	1	1	2	
2 O-ring	4013001	-	1	2	3	
3 Washer	4013014	-	1	2	3	
4 Spring for upper bearing	4013010	-	6	12	18	
5 Ball bearing	#6310	-	1	2	3	
6 U-type packing	4013005	-	1	2	3	
7 Sheet packing	4014009	-	1	1	2	
8 Sheet packing	4014010	-	1	1	2	
9 Ball bearing	#6306C3	-	1	2	3	
10 Angulau contact ball bearing	#7306A	-	1	2	3	
11 Spring for lower bearing	4014006	-	1	2	3	
12 Washer	0713016	-	1	2	3	

項目	部品コード	「カ」国要請数量	供給数量 リハビリ用	予備品	合計	備考
- Horizontal Shaft(DRG.No.392164C) -						
1 Sheet packing	4015006	-	1	1	2	
2 Oil seal	SB254511	4	2	4	6	
3 Sheet packing	2015006	-	1	1	2	
4 Oil seal	SB456812	2	1	2	3	
5 Ball bearing	#6307	2	2	4	6	
6 Washer	0715012	-	2	4	6	
7 50Hz spiral gear	4036002	-	1	1	2	
8 Washer	3013013	-	1	2	3	
9 Friction block	3015002	-	6	12	18	
10 Brack lining	3012004	2	1	2	3	
11 Counter sunk head screw M5 x 12		8	4	8	12	
12 Brake spring	4012001	-	1	2	3	
- Gear Pump(DRG.No.403817A) -						
1 Bush	3041041	2	2	4	6	
2 Bush	3041042	2	2	4	6	
3 Packing	4041001	-	1	1	2	
4 Sheet packing	3041016	2	2	2	4	
5 Spring for releif vale	3041014	-	1	2	3	
6 Oil seal	SC203508	4	2	4	6	
7 Safety joint	4041018	-	1	2	3	
8 Sheet packing	4052003	-	2	2	4	
9 Sheet packing	3052002	-	2	2	4	
- Auto. Control Panel -						
1 Bulb for signal lamp	E12.1BV.2W	-	36	36	72	
2 Grobe for signal lamp		-	3	3	6	
3 Aux. relay	SRC50-2F	2	1	1	2	
4 Aux. relay	HH54P	10	7	7	14	
5 Mag. contact	SPC3631-5-1	2	1	1	2	
6 Timing relay	H3BA	6	2	4	6	
7 Timing relay	H2A 12H	1	1	1	2	
- Electric Heater for L.O.purifier(DRG.No.NH-69551) -						
1 Heater element (2.67kW)	No.5	-	1	-	1	
2 Thermometer	No.12	4	2	4	6	
3 Pressure gauge	No.15	-	1	1	2	
4 Packing	No.16	-	1	1	2	
- L.O. Strainer - (150-2PU-W30LE-PGW-X/QT)						
1 Packing	A- 9	-	2	2	4	
2 O-ring	A-10	-	2	4	6	
3 Packing	A-24	16	8	40	48	
4 Coil spring	A-29	-	4	4	8	
5 Packing	A-31	-	4	8	12	
6 Packing	A-33	-	12	12	24	
7 Packing	A-36	-	4	4	8	
8 Packing	A-60	-	4	4	8	
9 Packing	A-64	-	2	2	4	
10 Notch wire element's assembly set	B-1～3 C-1～9	4	4	-	4	
11 Packing	B-3	8	4	20	24	
12 Packing	C-9	8	4	20	24	

	項目	部品コード	「カ」国要請数量	供給数量 リハビリ用	予備品	合計	備考
	- F.O. Strainer - (65-PGA/R5-W30LE/1-PG/W-X/PQT)						
1	O-ring	A- 7	-	1	2	3	
2	Packing	A- 8	-	1	1	2	
3	Packing	A-20	8	4	20	24	
4	Spring	A-23	-	2	2	4	
5	O-ring	A-24	-	2	4	6	
6	Packing	A-27	-	2	2	4	
7	Packing	A-29	-	4	4	8	
8	Packing	A-30	-	2	2	4	
9	Packing	A-34	-	1	1	2	
10	Packing	A-37	-	2	2	4	
11	Notch wire element's assembly	B-1～7	2	2	-	2	
12	Packing	B-7	4	4	10	14	
	- Cylinder Oil Strainer - (50-P-6269E/SC-N20L-X/DT)						
1	Packing	A- 2	2	1	5	6	
2	Packing	A- 7	2	1	2	3	
3	Spring	A-13		1	1	2	
4	Notch wire element's assembly set	B-1～4 C-1～6	2	1	1	2	
5	Packing	B-4	2	1	5	6	
6	Packing	C-6	2	1	5	6	
	- SAV-30 Air Compressor(DRG.No. 05-0011) -						
1	Air compressor complete		1	1	-	1	
2	Oil seal	5	-	-	4	4	
3	Low pressure piston ring	11	-	-	12	12	
4	High pressure piston ring	12	-	-	16	16	
5	piston pin metal	14	-	-	2	2	
6	Crank pin metal	16	-	-	2	2	
7	Bolt for connecting rod	17	-	-	4	4	
8	Low pressure valve complete	18	-	-	2	2	
9	Low pressure suction valve	18-1	-	-	2	2	
10	Spring for above	18-2	-	-	24	24	
11	Low pressure delivery valve	18-5	-	-	2	2	
12	Spring for above	18-6	-	-	2	2	
13	High pressure suction valve	19	-	-	2	2	
14	Spring for above	20	-	-	2	2	
15	High pressure delivery valve	23	-	-	2	2	
16	Spring for above	24	-	-	2	2	
17	V-belt for fan drive	29	-	-	2	2	
18	Safety valve for low pressurer	37	-	-	2	2	
19	Safety valve for high pressurer	38	-	-	2	2	
20	Air filter	39	-	4	4	8	
	- Starting Air Receiver -						
1	305x405 Manhole packing	H-23754 5	-	1	3	4	
2	Safety valve spring	SLR-1540 16	-	1	1	2	
	- CYL.C.W.Pump/Air C.W. Pump(DRG.No. DS-1153) -						
1	O-ring	050	2	2	2	4	
2	Gasket	128	-	2	2	4	
3	Flinger	170	-	2	2	4	
4	Ball bearing #6309	201	2	4	8	12	
5	Ball bearing #6409	202	2	2	4	6	
6	Coupling ring	304	-	2	4	6	
7	Grand packing	501	2	2	4	6	
8	Packing ring	510	-	2	2	4	
9	Packing ring	511	-	2	2	4	

項　　目	部品コード	「ガ」国要請数量	供給数量 リハビリ用	予備品	合計	備考
- Fuel vale C.W. Pump (DRG.No. DS-1385) -						
1 O-ring	050	2	1	1	2	
2 Flinger	170	-	1	1	2	
3 Ball bearing #630622	201,202	4	2	4	6	
4 Grand packing	501	2	1	2	3	
5 Coupling ring	304	-	1	2	3	
- Fresh Water Make-up Pump (DRG.No. DS-1108) -						
1 O-ring	050	2	1	1	2	
2 Flinger	170	-	1	1	2	
3 Ball bearing #630622	201,202	4	2	4	6	
4 Grand packing	501	2	1	2	3	
5 Coupling ring	304	-	1	2	3	
6 Sleeve gasket	128	-	1	1	2	
- F.O. Supply Pump (DRG.No. DG-10262) -						
1 Bearing metal	201	2	4	8	12	
2 Grand packing	501	-	1	2	3	
3 Side plate	005	2	4	4	8	
4 Coupling ring	304	-	1	2	3	
- F.O. Drain Pump (DRG.No.) -						
1 O-ring	050	-	2	2	4	
2 Ball bearing #6301	201	2	1	2	3	
3 Ball bearing #6202	202	2	1	2	3	
4 Oil seal	531	2	2	4	6	
5 Packing ring	858	-	1	1	2	
6 Coupling ring	304	-	1	2	3	
- L.O. Priming Pump (DRG.No. DS-1100) -						
1 Ball bearing #5207	201	4	4	8	12	
2 Grand packing	501	2	1	2	3	
3 Side plate	852	-	4	4	8	
4 Coupling ring	304	-	1	2	3	
- L.O. Sludge Pump(DRG.No. DS-1342) -						
1 Stator	11	1	1	2	3	
2 Cover sleeve	19	-	2	2	4	
3 Ball bearing #3305	23	2	1	2	3	
4 Ball bearing #6205	24	2	1	2	3	
5 O-ring	31	-	1	1	2	
6 O-ring	32	-	1	1	2	
7 Grand seal	34	2	1	2	3	
8 Oil seal	47	-	1	2	3	
9 Flinger ring	48	-	1	1	2	
10 V-belt	-	4	1	3	4	
- CRD Radiator Cooler -						
1 CYL/C.AIR cooling panel		-	3	1	4	
2 Oil cooling panel		-	-	1	1	
- Air Intake Filter -						
1 Filter elements		-	2	-	2	
- 2FC-1, Fuel Valve C.W. Cooler(DRG.No. OC-3314-3)						
1 O-ring	6	-	1	2	3	
2 Gasket	12	-	1	2	3	
3 Gasket	13	-	1	2	3	

項　　目	部品コード	「ガ」国要請数量	供給数量 リハビリ用	予備品	合計	備考
- Air Pressure Reducing Valve -						
1 Spring 84D-329D DF000614	16	-	-	1	1	
2 Diaphram	19	-	-	1	1	
3 Gasket	23	-	-	1	1	
4 Spring	24	-	-	1	1	
5 Gasket	26	-	-	1	1	
6 Valve seat	31	-	-	1	1	
7 Gasket	35	-	-	1	1	
8 Screen for Y-filter KD016790	3	-	-	1	1	
9 Gasket	4	-	-	1	1	
10 Packing for drain valve KD016791	5	-	-	1	1	
11 O-ring for drain valve	6	-	-	1	1	
12 Spring for safety releif valve FTLPZ101	16	-	-	1	1	
- Float Valves & Joints -						
1 Valve disc BT-GG-03232-S	19,20	-	-	2	2	
2 Gasket	22	-	-	1	1	
3 O-ring ET-GG-05034-S	4	-	-	2	2	
4 Valve disc BT-GG-05034-S	19,20	-	-	2	2	
5 Gasket	22	-	-	1	1	
6 O-ring ET-1467	4	-	-	2	2	
- Singular Oil Strainers (DRG.No.453251) -						
1 Strainer Cylinder complete MOS-125R	5～10	-	-	1	1	
2 O-ring	14	-	1	1	2	
3 Strainer Cylinder complete MOS-125R	5～10,16	-	-	1	1	
4 O-ring	15	-	1	1	2	
5 Strainer Cylinder complete MOS-40S	5～10,16	-	-	3	3	
6 O-ring	15	-	3	3	6	
7 Strainer Cylinder complete MOS-40R	5～10,16	-	-	1	1	
8 O-ring	15	-	1	1	2	
- Duplex oil Strainer(DRG.No. MHOS-7208A～(1)) -						
1 Stariner basket complete	14～16,19	-	-	2	2	
2 O-ring	24	-	2	2	4	
3 O-ring	25	-	1	1	2	
4 O-ring	26	-	1	1	2	
5 Gasket	27	-	1	2	3	
6 Gasket	28	-	2	2	4	
7 Gasket	29	-	2	-	2	
- Scetru Gauge -						
1 O-ring		-	-	-	-	
2 Packing		-	-	-	-	
- Sight glass(水野strainer) -						
1 80A Sight glass(アクリル)		-	-	-	-	
2 Gasket		-	-	-	-	

項目	部品コード	「ガ」国要請数量	供給数量 リハビリ用	供給数量 予備品	供給数量 合計	備考
- E.I.P. -						
1 Aux. relay (FRL 233 DC110V)		10	-	10	10	
2 Aux. relay (MM 4XP DC110V)		10	-	10	10	
3 Aux. relay (FRL 233 AC110V)		10	-	10	10	
4 Time lag relay (ST3PA-A DC110V)		4	-	4	4	
5 Time lag relay (ST3PA-A DC110V)		4	-	4	4	
6 Pilot lamp (YBN30-AIBR)		4	-	4	4	
7 Lamp (Bulb LPS-800)		4	-	4	4	
8 Lamp (Bulb BA9S 30V 1W)		3	-	3	3	
9 Fuse (Element NC1 3A)		6	-	6	6	
10 Elluminated Lamp (SL48-1002RW)		6	-	6	6	
11 Elluminated Lamp (SL48-1122 18V 2W)		10	-	10	10	
12 Elluminated Lamp(SL48-1002 110V 18V 2W)		10	-	10	10	
13 Printed ciecuit board for temperature monitor(F2E-KR 724MS)		6	-	6	6	
14 Printed circuit board for revolution counter		1	-	1	1	
15 Rectifier for power source panel		1	-	1	1	
16 Printed circuit board for power source panel(U1-0-250°C/W2-0-100°C)		2	-	2	2	
17			-			
550V 5KA 50A MCB AC		1	-	1	1	
250V 5KA 10A MCB AC		1	-	1	1	
250V 5KA 5A MCB AC		1	-	1	1	
185V 5KA 15A MCB DC		1	-	1	1	
Thermal Relay (TH-K20 9-13A)		1	-	1	1	
- Switch Board -						
1 Change-over switch (CSSID3 3-Position)		1	-	1	1	
2 V.meter change-over switch (AB)		1	-	1	1	
3 Anmeter meter change-over switch(AD)		1	-	1	1	
4 Lamp (FML - R11)		5	-	5	5	
5 Lamp (FML - G11)		5	-	5	5	
6 Push buttom switch with lamp (M25 BQ-R)		1	-	1	1	
7 Push buttom switch with lamp (M25 BQ-G)		1	-	1	1	
8 Lamp SL (18V, 2W)		20	-	20	20	
- Exciter and Control Panel -						
1 Synchronising and switch (AD-H4003)		1	-	1	1	
2 Resistors (40HS 40W, 950)		5	-	5	5	
3 Lamp globe for synchronising(FML-11C)		1	-	1	1	
4 Lamp globe for synchronising(FML-C)		1	-	1	1	
5 Thyristor (80PL25)		2	-	2	2	
6 Silicon diode (51H-31-12)		4	-	4	4	
7 Thyristor exciting contoproller(GECL4LOX)		1	-	1	1	
8 Silicon rectifier diode (A32-07173 G1)		3	-	3	3	
9 Silicon rectifier diode (A32-07173 G2)		3	-	3	3	
10 Thermometer with contact		1	-	1	1	

	項　　目	部品コード	「ガ」国要請数量	供給数量 リハビリ用	予備品	合計	備考
	- Miscellanious -						
1	Fuse element (ELA003 3A)		6	-	6	6	
2	Fuse element (ELA005 5A)		6	-	6	6	
3	Fuse element (ELA010 10A)		6	-	6	6	
4	Fuse element (ELA015 15A)		6	-	6	6	
5	Fuse element (ELA030 30A)		4	-	4	4	
6	Fuse element (ELA045 45A)		2	-	2	2	
7	Over load trip (10-13A) LRI-D12316		2	-	2	2	
8	Over load trip (18-25A) LRI-D25322		2	-	2	2	
9	Over load trip (23-32A) LRI-D40353		2	-	2	2	
	- E.I.P. & Engine mounted Panel -						
1	Pressure gauge		18	9	9	18	
2	Pressure switch		20	10	10	20	
	- Thermometer(100°C /150°C) -		26	13	13	26	
	- Pressure gauge for Auxiliaies -		52	26	26	52	
	- Motors -						
1	L.O. Radiator fan Motor (27.5kW x 975 rpm x 415V x 50Hz)		1	-	1	1	
2	CA/JW Radiator fan Motor (22 kW x 1480rpm x 415V x 50Hz)		1	-	1	1	
3	CA/JW Pump Motor (22 kW x 1480rpm x 415V x 50Hz)		1	-	1	1	
4	F.O. Supply Pump Motor (5.5kW x 950 rpm x 415V x 50Hz)		1	-	1	1	
5	L.O. Priming Pump Motor (11 kW x 950 rpm x 415V x 50Hz)		1	-	1	1	
6	L.O. Purifier Motor (7.5kW x 1450rpm x 415V x 50Hz)		1	-	1	1	
7	Turning Gear Motor (5.5kW x 1450rpm x 415V x 50Hz)		1	-	1	1	
	- Turning Gear Limit Switch (K93251)-		-		2	2	
	-Oil Mist detector-						
1	Exciter bulb 12V 100W (B0391-00020Z)		-	-	4	4	
2	Fuse 2A (B0391-00020Z)		-	-	10	10	
	- Pneumatic System -						
1	Solenoid valve 117 (No.74Y49452-11)		3	-	3	3	
2	GBCH-K 3-way valve (No. 74Y49503-10)		1	-	1	1	
3	GHC-38 3-way valve (No. 74Y49201-10)		1	-	1	1	
4	GFH-35 3-way valve (No. 74Y49017-10)		1	-	1	1	
5	GRAH-314M 3-way valve (No.6547-4Y49331-10)		1	-	1	1	
6	Magnetic coil (24Z5/IP55)		3	-	3	3	
	- Others -						
1	Resistance bulb (PTR-LN7(L-180))		2	-	2	2	
2	Thermo couple (MCA-RN(L-120))		5	-	5	5	
3	Thermo couple (MCA-RN(L-200))		5	-	5	5	
4	Thermo couple (MCA-RN(L-220))		5	-	5	5	
5	Rational non-flow Alarm (Model MLCB)		2	-	2	2	
6	Limit switch (ZE-N-2)		2	-	2	2	
7	Limit switch (ZE-N22-2)		2	-	2	2	
8	Limit switch (ZE-N21-2)		1	-	1	1	

2. 資機材供与リスト： 工 具

No.1

No.	項 目 ／ 仕 様		標準数量	Oct.'88在庫数量	供与数量	備 考
	- Special Tolls for Engine -					
G202	Peak pressure gauge	2SYG202 4124737	1	-	1	
G204	Feeler gauge	1SYG204 5105804	1	1	-	
G206	Depth gaoge	1SYG206 5158518	1	1	-	
G301	Hydraulic hand pump complete	1SYG302 489962	1	1	-	
G302	Hydraulic cylinder	1SYG302 5100341	2	-	2	
	Hexagon wrench keys set	1SYG420 5323125		-	-	
		1SYG401 5319285	1	-	1	
G401	B = 4, L = 72		2	-	2	
G402	B = 5, L = 80		2	-	2	
G403	B = 6, L = 90		2	-	2	
G404	B = 8, L = 110		2	1	1	
G405	B = 10, L = 112		2	-	2	
G406	B = 14, L = 140		2	-	2	
G407	B = 17, L = 160		2	-	2	
G408	B = 22, L = 200		2	-	2	
	Clip screw	1SYG502 5103403		-	-	
G502-1	M = M 6, L = 170		2	2	-	
G502-2	M = M 8, L = 175		2	2	-	
G502-3	M = M10, L = 185		2	2	-	
	Eye bolt	1SYG501 5319286		-	-	
G501-1	M = M10		5	1	4	
G501-2	M = M12		5	-	5	
G501-3	M = M16		5	-	5	
G501-4	M = M20		5	1	4	
G501-5	M = M24		5	-	5	
G501-6	M = M30		5	-	5	
	Bolt	1SYG503 5319287		-	-	
G503-1	M8 X 80		5	-	5	
G503-2	M10 X 100		5	-	5	
G503-3	M12 X 100		5	-	5	
G503-4	M16 X 130		5	-	5	
G503-5	M20 X 150		5	-	5	
	Double end & open Ended spanner	1SYG601 5319288		-	-	
G601-1	S = 10, S2 = 14, L = 140		2	-	2	
G601-2	S = 13, S2 = 17, L = 165		2	1	1	
G601-3	S = 17, S2 = 19, L = 180		2	-	2	
G601-4	S = 19, S2 = 22, L = 205		2	1	1	
G601-5	S = 24, S2 = 27, L = 245		2	-	2	
G601-6	S = 27, S2 = 30, L = 270		2	2	-	
G601-7	S = 30, S2 = 32, L = 285		2	2	-	
G601-8	S = 36, S2 = 41, L = 360		2	-	2	
G601-9	S = 46, S2 = 50, L = 430		2	-	2	
G601-10	S = 55, S2 = 60, L = 475		2	-	2	
	Open ended spanner	1SYG602 5319289		-	-	
G602-1	S = 12, L = 135		2	1	1	
G602-2	S = 14, L = 165		2	1	1	
G602-3	S = 19, L = 180		2	-	2	
G602-4	S = 24, L = 220		2	1	1	
G602-5	S = 27, L = 245		2	2	-	
G602-6	S = 30, L = 270		2	2	-	
G602-7	S = 32, L = 285		2	-	2	
G602-8	S = 36, L = 320		2	-	2	
G602-9	S = 65, L = 550		2	1	1	

備考：上記No.は、当該発電設備納入メーカーの取扱い説明書に記載されている番号を示す。

No.	項　目 ／ 仕　様	標準数量	Oct.'88在庫数量	供与数量	備　考
	45° Double offset spanner 1SYG603 5319290				
G603-1	S1 = 11, S2 = 13, L = 180	2	-	2	
G603-2	S1 = 13, S2 = 17, L = 200	2	-	2	
G603-3	S1 = 17, S2 = 19, L = 245	2	-	2	
G603-4	S1 = 19, S2 = 22, L = 255	2	-	2	
G603-5	S1 = 24, S2 = 27, L = 310	2	-	2	
G603-6	S1 = 30, S2 = 32, L = 350	2	1	1	
G603-7	S1 = 36, S2 = 41, L = 458	2	-	2	
G603-8	S1 = 46, S2 = 50, L = 536	2	1	1	
G604-1	Box spanner(1=17,S=13,L=150) 1SYG604 5103417	2	-	2	
G604-2	Box spanner(1=22,S=19,L=160) 1SYG604 5103417	2	1	1	
G605	Pin spanner(S = 102, L = 280) 1SYG605 5103418	1	-	1	
G701-1	Torque wrench(12.7□X 400)(2-9Kg.m) 1SYG701 5323126	1	1	-	
G701-2	Torque wrench(19 □X 700)(6-28Kg.m) 1SYG701 5323126	1	1	-	
G701-3	Torque wrench(25.4□X1400)(25-85Kg.m)1SYG701 5323126	1	1	-	
G702	Ratchet handle (19□) 1SYG7,2 5103405	1	-	1	
G703	Power wrench(12.7□ x 267) 1SYG703 5175014	1	1	-	
G704	Spinner handle(9□ x 230) 1SYG704 5103407	1	-	1	
	Socket 1SYG706 5103408				
G706-1	S = 17,□ = 12.7	1	-	1	
G706-2	S = 19, = 12.7	1	-	1	
G706-3	S = 22, = 12.7	1	1	-	
G706-4	S = 30, = 12.7	1	1	-	
G706-5	S = 24, = 12.7	1	-	1	
G708-1	S = 46, = 25.4 1SYG708 5103409	1	1	-	
G708-2	S = 60, = 25.4 1SYG708 5103409	1	-	1	
	Socket 1SYG709 5103410				
G709-1	S = 6,□ = 25.4	1	-	1	
G709-2	S = 8, = 12.7	1	-	1	
G709-3	S = 10, = 12.7	1	-	1	
G709-4	S = 17, = 12.7	1	-	1	
G701-1	S = 17, = 19 1SYG710 5103411	1	-	1	
G711	Ring spanner(□ =9.5,D=19) 1SYG711 5103412	1	-	1	
G712	Extension bar(NV=19□,L=200) 2SYG712 5210561	2	-	-	
	(NV=12.7□,L=250) 2SYG712 5210561	2	2	-	
G713-1	Socket adapter(□=19, 25.4) 1SYG713 5103414	1	1	-	
G713-2	Socket adapter(= 25.4, 19) 1SYG713 5103414	1	-	1	
G713-3	Socket adapter(=12.7, 19) 1SYG713 5103414	1	-	1	
G715	Stop ring Plier(Hole) 1SYG715 5323123 (L= 170, 230, 270) Each	1	-	1	
	Stop ring Plier(Shaft) 1SYG715 5323123 (l= 170, 230,) Each	1	-	1	
G716	Combination Plier(L=200) 1SYG716 5103415	1	-	1	
G718	Screw driver 1SYG718 5319291	2	-	2	
	B = 4.5, L = 50				
	B = 5.5, L = 70				
	B = 7, L = 125				
	B = 9, L = 200				
	B = 10, L = 250				
0201	Hydraulic tightening jack for main bearing 2SY0201-1 3125872	2	2	-	
	Paraliel pin for Do. (¢ 8 x C.D = 120)	1	-	1	
0203	Lifting and lowering device for bearing cover 1SY0203 156407	2	-	1	

No.	項　目 ／ 仕　様		標準数量	Oct.'88在庫数量	供与数量	備　考
0204	Assembling & dismantling tool for upp. bearing shell	1SY0204 489965	1	-	1	
0205	Assembling & removal tool for lower bearing shell	1SY0205 156408	1	-	1	
0501	Regrinding device for cylinder liner and cover	1SY0501 393281	1	1	-	
0503	Measuring rail	1SY0503 393323	1	1	-	
0503-1	Inside micrometor	2SY0503-1 5222396 1SY0503-4 416223	1	1	-	
0502-1	Removing device for cylinder liner	2SY0502-1 2349848	1	1	-	
502-5	Suspension bracket for cylinder liner	2SY0502-5 2149085	1	1	-	
0601	Suspension bracket and bolt for cylinder cover	2SY0601 3166097	1	-	1	
0602-1	Hydraulic tightening lack for cylinder cover	2SY0602-1 4124711	8	8	-	
	Parallel pin for Do.	(φ8, C.D=120)	1	-	1	
0602-6	Rubber hose with coupler	2SY0602-6 5158561	7	-	7	
0602-7	Handle	1SY0602-7 4124740	1	-	1	
0602-8	D. gauge with magnetic base	1SY0602-8 5234928	8	-	8	
0603	Jack screw for lifting up cylinder cover	1SY0603 393235 (M20, L = 600)	2	-	2	
0604	Pressure testing device for cylinder cover	1SY0604 393236	1	-	1	
0606	Fitting and extracting too; for fuel valve liner	1SY0606 393237	1	-	1	
0607-1	Regrinding tool for fuel valve seat	1SY0607 393238 (φ90, L=750)	1	1	-	
0607-2	Cleaning tool for fuel valve seat	1SY0607 393238 (B=100 , L=500)	1	1	-	
0608	Extracting tool for fuel valve & stating valve	2SY0608 3125522 (B=243, L=425)	1	1	-	
0610	Fitting and extracting tool for valve seat (φ96)	2SY0610 3125866	1	1	-	
0612	Regrind. tool for valve seat	1SY0612 393242	1	1	-	
0614	Spanner for pre-tightening CYLINDER COVER	1SY0614 4123836	1	1	-	
0615	Socket spanner for safety valve	1SY0615 4123837	1	1	-	
0617	Suspension bracket for bearing casing on cyl. cover	1SY0617 2175501	1	1	-	
0620	Grinding tool for valve seat	(LUDWIG HUNGER) (TYPE VSMR 3)	1	1	-	
0619	Spanner for handle of cover	1SY0619 5319272	1	1	-	
0618	Maintenance stand for cylinder cover	2SY0618 3166095 (B =970, H=900)	1	1	-	
0703-1	Special wrench for coupling bolt	1SY0703-1 393312	1	1	-	
0704	Deflection gauge	1SY0704 5210492	1	1	-	
0702	Hydraric tightening jack for counter weight	1SY0702 397529 (D=φ140, H=95)	2	2	-	
0702-5	Handle(B = 300, H = 330)	1SY0702-5 4124708	1	-	1	
0801-1	Hydraulic cylinder	1SY0801-1489929	2	1	1	
0801-4	Special ring spanner(l=270)	1SY0801-4 489969	2	2	-	
0801-5	Extention sleeve(L=200±1)	1SY0801-5 489970	1	1	-	
0801-6	Tightening gauge(φ3, D= 60)	2SY0801-6 5152560	4	1	3	

No.	項　目 ／ 仕　様		標準数量	Oct.'88在庫数量	供与数量	備　考
0802-1	Support with 3 bolts and underlay	1SY0802-1 2149101	1	-	1	
0803	Suspension bracket for connecting rod	1SY0803 4169608 (B=396, H=130)	1	-	1	
1001-50	Suspension bracket for piston	2SY1001-50 234985	1	1	-	
1001-60	Handle for piston	1SY1001-60 412472	1	1	-	
1001-7	Guide shoe for connection rod	2SY1001-7 3125528	1	1	-	
1001-62	GAuide ring(D=550, H=86)	2SY10001-62 234985	1	1	-	
1001-64	Woodenblock	1SY1001-64 312553	1	1	-	
1001-13	Handle for upper part of connecting rod (L=1000)	1SY1001-13 492335	1	1	-	
1002	Clamping bolt(M16, L=240)	1SY1002 489941	4	4	-	
1003	Eye bolt(M12, L=211)	1SY1003 5100316	2	2	-	
1004	Jack bolt(M22, L=480)	1SY1004 489945	4	-	4	
1005	Centerring ring,D=248, t=70	1SY1005 393321	1	2	-	
1007	Lift-off device for upper part of piston	1SY1007 492309	2	-	2	
1008	Hexagon bar(C=22,L=80)	1SY1008 5100306	1	1	-	
1010	Piston ring tentioner	1SY1010 393322	1		1	
1201	Fitting and removal of	3SY1201 2366814	1	1	-	
1202	Ink-marking gauge for valve spindle(D=140,L=220)	1SY1202 492216	1	-	1	
1203	Hand grip for clamping of valve spindle	1SY1203 393354	1	1	-	
1701	Spray resting device	2SY1701 2366816	1	-	1	
1702	Socket wrench for fuel injecting valve nut	1SY1702 489949	1	1	-	
1703	Regringding ring for valve seat	1SY1703 5100313	1	-	1	
1704	Tool set	1SY1704 492240	1	-	1	
	1.Lappind disk					
	1.Steei wire					
	1.Ink-marking disk					
	1,Copper mandrel					
	1.Case with 5 drills and 1 plug gauge					
1705	Lapping plate(40x200x300)	1SY1705 5158516	1	1	-	
1706	Lapping powder	1SY1706 5158560	1	-	1	
1901	Guide for regrinding of spindle (D=65¢,H=60)	3SY1901 4169653	1	-	1	
1902	Socket wrench	1SY1902 5175039	1	-	1	
2501	Socket wrench	1SY2501 489948	1	1	-	
2502	Removing tool for guide piston	2SY2502 3213043	1	1	-	
2502-4	Grip screw for Do.	1SY2502-4 5110516	1	1	-	
2503	Bolt for guide piston	1SY2503 489933	1	1	-	
2901-1	Fiting and removing tool for camshaft (L=923)	1SY2901-1 2149052	2	1	1	
2901-8	Support for DO.	1SY2901-8 2149054	2	1	1	
2903	Gauge for setting of cam	2SY2903 4204505	1	-	1	
2904	Hydraulic punp	1SY2904 5174999	1	1	-	
2904-1	High-pressure hose (L=3m)	1SY2904-1 5174993	1	1	-	
2904-3	Hose joint (L=100)	1SY2904-3 4124724	1	1	-	
3601	Adjusting tool	2SY3601 2366878	1	1	-	
3601-11	Dial gauge for Do.	1SY3601-11 492252	1	1	-	

No.	項　目 ／ 仕　様		標準数量	Oct.'88在庫数量	供与数量	備　考
3601-17	Rubber hose with coupler	1SY3601-17 4169600	1	1	-	
3602	Bracket for fitt. of cover	3SY3602 3125875	1	-	1	
3603	Gauge for adjusting	1SY3603 5100303	1	1	-	
3604-1	Distance piece for cut-off	1SY3604-1 5100304	3	-	3	
3701	Fitting tool for fuel delivery valve	1SY3701 489985	1	-	1	
3702	Spanner for unions	2SY3702 5319273	1	1	-	
4602	Device for tension springs	1SY4602 2171194	1	-	1	
6810	Rubber hose for cleaning of turbocharger(L=5000)	SSY6810 5319276	1	-	1	
VTR-1	Rotor fixing tool (With special bolts)	NN317501 90030 (D=120,L=200,t=20)	1	1	-	
VTR-2	Box spanner special	NN317503 90050	1	1	-	
VTR-3	Extractior	NN317504 90070	1	1	-	
VTR-4	Guide plate (biower side)	NN317513 90160	1	1	-	
VTR-5	Guard case	NN317512 90140	1	1	-	
VRT-6	Guide plate(turbine side)	NN317515 90170	1	1	-	
VTR-7	Drawing device	NN317521 90190	1	1	-	
VTR-8	Holding device	NN317520 90180	1	1	-	
VTR-9	Induction pipe	NN317524 90200	1	1	-	
VTR-10	Handle (14 x 160)	NN447693 90220	1	1	-	
VTR-11	Extension pipe	NN317528 90210	1	-	1	
VTR-12	Eyenuts	NN317558 90230	1	1		
VTR-13	Handle (12 X 250)	NN507564 90260	1	-	1	
VTR-14	Hexagon wrench key(4x72)	NN637537 90270	1	1	-	
VTR-15	Locking device (turb. side)	NN317577 93000	1	1	-	
VTR-16	Handle	NN447585 93101	1	-	1	
VTR-17	Bar	NN447585 93102	1	1	-	
VTR-18	Socket	NN317587 93103	1	1	-	
VTR-19	Socket	NN447587 93104	1	-	1	
VTR-20	Wire rope(6 x 1022)	NN317552 90350	1	1	-	
VTR-21	Hexagon head bolt	NN327573 90900	3	-	3	
VTR-22	Box for tools(370x615x330)	NN317596 90010	1	1	-	
SOP-1	Plug(¢17x¢21x30)	-	50	50	-	
SOP-2	Pipe cleaner (L=1300)	-	1	1	-	
SOP-3	Spare parts & tool box	(550x1210x250)	1	1	-	
SOP-4	Spanner (14x140)	-	1	1	-	
D110-1	Shock wrench(M24X36mm)	-	1	1	-	
D110-2	Spanner(M14,M16,19MM,22MM)	A85131922	1	1	-	
D110-3	Tools box	-	1	1	-	
WGST-1	Wrench	PART No, 011968	1	-	1	
WGST-2	Wrench serration	030943	1	-	1	
WGST-3	Driver	030950	1	-	1	
WGST-4	Inserter oil seal	030954	1	-	1	
WGST-5	Driver dial pointer	031727	1	-	1	
WGST-6	Inserter oil seal	031732	1	-	1	
WGST-7	Driver	031734	1	-	1	
WGST-8	Wrench	032042	1	-	1	
WGST-9	Key(.188" Hex short series)	188418	1	-	1	
WGST-10	Wrench 7/16 Socket	189792	1	-	1	
WGST-11	Hook straight scriber	189792	1	-	1	
WGST-12	Pliers snap ring	190497	1	-	1	
WGST-13	Kry(.078" Hex short series)	190522	1	-	1	
WGST-14	Screw driver NO.2 phillips	8995-049	1	-	1	
MSDC-1	Hexagon wrench(B=5,6,8,)	- Each	1	-	1	
MSDC-2	Spanner (B=14,L=141)	-	1	-	1	

No.	項　目 ／ 仕　様		標準数量	Oct.'88 在庫数量	供与数量	備　考
MSDC-3	Priming handle	-	1	1	-	
MD-9-1	Hex. bar wrench(B=2,4,5)	B0391 00310Z SET	1	-	1	
MD-9-2	Filter ND 0.1(t=4,40 x 40)	B0391 00360Z	1	-	1	
	- Tools for auxiliaries -					
SJ4-1	Spanner for disc nut	PART No. 4071025	1	1	-	
SJ4-2	Sanner for oil outlet co.	4071026	1	1	-	
SJ4-3	Spanner for bowl nut	4071001	1	1	-	
SJ4-4	Spanner for cap nut	3071011	1	1	-	
SJ4-5	Lifting tool for bowl	4071023	1	1	-	
SJ4-6	Dismantling stand	4071020	1	1	-	
SJ4-7	Covering plate	3071037	1	1	-	
SJ4-8	Push bolt	3071025	1	1	-	
SJ4-9	Handle bar(¢16x200)	0771020	1	1	-	
SJ4-10	Jack	3071034	1	1	-	
SJ4-11	Bolt(M10X175)	3071008	2	1	1	
SJ4-12	Bolt(M12X125)	3071009	2	1	1	
SJ4-13	Jack for valve cylinder (Push bolt M14X90 3pcs)	2071035 2071046	1	1	-	
SJ4-14	Push plate for jack	4071029	1	1	-	
SJ4-15	Pin spanner(35¢x50¢)	4071024	1	1	-	
SJ4-16	Lift tool fo vertical shaft	4071010	1	1	-	
SJ4-17	Jack for lower bearing	4071006	1	1	-	
SJ4-18	Square head set screw	2071042	1	1	-	
SJ4-19	Box driver (M5)	4071021	1	1	-	
SJ4-20	Hex. key (M14)		1	1	-	
SJ4-21	Hex. key (M10)		1	-	1	
SJ4-22	Hex. key (M8)		1	-	1	
SJ4-23	Hook spanner(HW -105)		1	-	1	
SJ4-24	Push plate	4071017	1	1	-	
SJ4-25	Bolt(M10X100)	0771011	1	-	1	
SJ4-26	Spare box(400x400x300)		1	-	1	
SAV-1	Piston puller		1	1	-	
SAV-2	Driver(-)		1	-	1	
SAV-3	Double ended spanner		1	1	-	
SAV-4	Piston pin puller		1	1	1	
SAV-5	Monkey Wrench(sizu 200mm)		1	-	1	
SAV-6	Tool box		1	1	-	
ZFC-1	Tube expander		1	-	1	
ZFC-2	Tube expander handle		1	-	1	
ZFC-3	Tube cleaning blash		1	-	1	
ZFC-4	Tube drawing ponch		1	-	1	
ZFC-5	Plug		10	-	1	
ZFC-6	Tool box		1	-	1	
AIF-1	Scraper		2	1	1	
SJ4-51	Gravity disc	PART No. 4081009	1	-	1	
SJ4-52	Gravity disc	PART No. 4081008	1	-	1	
SJ4-53	Gravity disc		1	-	1	
	- Tool for generator -					
STAG-1	Temporary shaft	A32-16508	1	-	1	
STAG-2	Washer	A32-16508-9	12	-	12	
STAG-3	Bolts	A32-16508-6	16	-	16	
STAG-4	Nuts(M36)	A32-16508-7	16	-	16	
STAG-5	Jack Bolts(M24X150)	A32-16508-8	2	-	2	
STAG-6	Thickness gauge for air gap	A42-14749 No.14	1	-	1	

No.	項　目 / 仕　様		標準数量	Oct.'88在庫数量	供与数量	備　考
STAG-7	Thickness gauge for air gap	A42-14749 No.6	1	-	1	
STAG-8	Thickness gauge(No.150)		1	-	1	
STAG-10	Spscer	A42-20461	1	-	1	
STAG-11	Steel rope(33.5¢x12000)	A42-13667 No.20	1	-	1	
STAG-12	Steel rope(25¢x4700)	A42-13667 No.21	2	-	2	
STAG-13	Steel rope(25¢x2500)	A42-13667 No.31	2	-	2	
	- General equipments/tools for maitainance -					
K- 1	High press. cleaninp pump				1	
K- 2	Tool panel				1	
K- 3	Standard thermometer				1	
K- 4	Spare Rack / Palet				1	
K- 5	Examinee for press. gauge				1	
K- 6	Cleaning tank	(3m3)			2	
K- 7	Oil jack	(5ton)			4	
K- 8	Chain block	(5ton)			3	
K- 9	Chain block	(2ton)			2	
K-10	Lever hoist	(3ton)			2	
K-11	Wire rope	(¢12 x 200m)			1	
K-12	Sling wire	(¢20 x 10m)			4	
K-13	Sling wire	(¢12 x 4m)			10	
K-14	Sling wire	(¢ 8 x 4m)			20	
K-15	Shackle	(1 1/2 B)			20	
K-16	Shackle	(1B)			40	
K-17	Wire clip	(20¢)			10	
K-18	Wire clip	(12¢)			25	
K-19	Wire clip	(8¢)			25	
K-20	Wooden block	(300x150x1000)			10	
K-21	Wooden sleeper	(100 x 300 x 2m)			10	
K-22	Cleaning tank	(2600x1500x1000)			1	
K-23	Pipe wrench	(600mm)			1	
K-24	Pipe wrench	(300mm)			1	
K-25	Oster type die stock	(1/4～1 1/4 B)			1	
K-26	Oster type die stock	(1/2～2B)			1	
K-27	Pipe vise				1	
K-28	Disc grinder	(150¢)			1	
K-29	Disc grinder	(100¢)			1	
K-30	Electric handy grinder				1	
K-31	Hammer drill	(25mm)			1	
K-34	High speed cutter				1	
K-35	Pipe bender	(Hydraulic 2B)				
K-36	A.C. Arc welder	(400A)				
K-37	Cabyre cable	(¢38 x 20m)				
K-38	Gas cutter (Torch)	(Incl.regulators)				
K-39	Gas Hose	(20m)				
K-40	Welding mask				2	
K-41	Transformer					
K-42	Transformer	(3KVA 240V-100V)			1	
K-43	Transformer	(60KVA 414V-200V)			1	
K-44	Temporary distribution box	(700mm x 900mm)			1	
K-45	Projector				5	
K-46	Bulb for projector	(300W)			20	
K-47	Pickling Tank					
K-48	Neutralization Tank					
K-49	Hand pump				2	
K-56	Baroment				1	

No.	項　目 ／ 仕　様		標準数量	Oct.'88在庫数量	供与数量	備　考
K-50	Flushing pump unit	SET			1	
K-51	Stainless gauze wire	(10m)			1	
K-52	Vinyl hose	(¢50mm x 100m)			1	
K-53	Rubber hose	(¢20mm x 100m)			1	
K-54	Pressure gauge	(0-20kg/cm2)			10	
K-55	Thermometer	(0～100℃)			10	
K-57	Stop watch				2	
K-58	Inside miccrometer				1	
K-59	Electric touch				5	
K-60	Oiler	(600cc)			3	
K-61	Oil tray	(50 lit)			5	
K-62	Hemper rope	(¢18mm x 100m)			1	
K-63	Flashlight				4	
K-64	Water level				1	
K-65	Driver set				1	
K-66	Driver				1	
K-67	Socket wrench set				1	
K-68	Hexagon wrench				6	
K-69	Monkey wrench				3	
K-70	Flat cold chisel	(10 x 140)			2	
K-71	Flat cold chisel	(16 x 180)			2	
K-72	Flat cold chisel	(22 x 200)			2	
K-73	Water punp pliere				2	
K-74	Tip saw				2	
K-75	Scissor				2	
K-76	Saw set	(20 pcs / set)			2	
K-77	Grease gun				1	
K-78	Copper hammer				1	
K-79	File set	(4 pcs / set)			1	
K-80	Tap	(M6)			1	
K-81	Tap	(M10)			1	
K-82	Tap	(M12)			1	
k-83	Tap	(M16)			1	
K-84	Tap	(M20)			1	
K-85	Steel files	(L = 300mm)			4	
K-86	Vinyl co ver	(10m x 10m)			10	
K-87	Vinyl hose	(200m)			1	
K-88	Drill stand				1	
K-89	Drill edge set	(8 - 25mm)			1	
K-90	Drill edge drill	(2 - 18mm)			1	
K-91	(Concrete drill)	(¢18mm)			1	
K-92	(Concrete drill)	(¢22mm)			1	
K-93	Eye bolt (M10/M12/M16/M20/M24/M30)	Each			6	
K-94	Valve for pressure measurement	(1/2 BXJIS 10k)			20	
K-95	Nipple	(1/2 B x 200L)			40	
K-96	Tee	(1/2 B)			20	
K-97	Elbow	(1/2 B)			20	

資料－XII　入手資料リスト

No.	資　　料　　名	備　考
1	Single line diagram of Banjul power system	図　面
2	11kV undergraound cable network & transformer in Banjul	〃
3	Map of Gambia (1/250,000)	地　図
4	Map of Banjul (1/50,000)	〃
5	Map of Kombo peninsula (1/10,000)	〃
6	Map of Costal strip (1/10,000)	〃
7	Map of Banjul street plan & public building (1/50,000)	〃
8	Electoral constituency map	〃
9	Staff apprisal report The Gambia, Urban management and development project (WB)	報告書
10	GUC Twelfth Anuual report	〃
11	GUC Thirteenth Annual report	〃
12	GUC Fourteenth Annual report	〃
13	GUC Fifteenth Annual Report	〃
14	GUC Sixteenth Annual Report	〃
15	Population and housing census 1983 (MEPID)	〃
16	Development co-operation The Gambia, 1987 report (UNDP)	〃
17	The Gambia development issues and prospects (WB)	〃
18	Second five years plan (MEPID)	〃
19	Midterm review of the second five years plan (MEPID)	〃
20	Report and recommendation for Structual adjustment program, Aug. 1986 (WB)	〃
21	The economic recovery program (MEPID)	〃
22	Survey of employment, earnings and hours of work, Dec. 1986 (MEPID)	〃
23	A naturalist's guide to The Gambia	〃
24	DANIDA project, Vol 1, General conditions	〃
25	DANIDA project, Vol 2, Power station	〃
26	DANIDA project, Vol 3, Interconnector	〃
27	DANIDA project, Vol 4, Fuel depot	〃
28	DANIDA project, Vol 5, Schedules	〃
29	Construction schedule of DANIDA project	図　面
30	Check list of spare parts and tools(in KOTU P/S)	報告書