

b. VHF/FM transceiver

Type	portable type VHF/FM transceiver
Frequency	CH1: 154.05 MHz CH2: 157.50 MHz
RF output	5 W
Antenna	whip antenna
Power supply	re-chargeable nickel-cadmium battery

4.10 Implementation Plan

4.10.1 Organization of Implementation

Organization chart for implementation of the Project is shown in Fig. 5.13. As the Implementation Agency of the Project, Ministry of Energy has been designated in the meeting of signing for the Minutes of discussion held on 27th November, 1992.

VRA and ECG are charged of actual work of the Project for 69 kV facilities and for 33 kV facilities respectively, under the Ministry of Energy (ME).

Japanese consultant will support Ghanaian Organs concerned to make implementation of the Project proceed smoothly.

4.10.2 Method of Implementation

In case that the Project is taken up by the Japan's Grant Aid program, it will proceed following manner:

(1) E/N

Exchange of Note (E/N) will be made between a representative of Ghanaian Government and Ambassador of Japan, soon after the Japan's Cabinet Meeting decides to extend a Grant Aid for this Project.

Formally, this Project starts upon the conclusion of E/N.

(2) Contract with Consultant

After E/N, a contract will be made between MEn and Japanese consultant which JICA recommends to.

Consultant will make a series of definite design and prepare tender documents.

(3) Contract with Contractors

Tender for the construction of facilities and for supply of equipment/materials will be made. Tender Open and evaluation of them will be done upon attendance of Ghanaian representative. Contract with contractors will be concluded soon after the evaluation by representative of MEn, in Tokyo.

(4) Verification by the Government of Japan

All the contracts must be verified by the Government of Japan (Ministry of Foreign Affairs) to make effect.

(5) Works

Works allotted by Ghana and Japan will be done.

MEn and Consultant will manage the works, VRA/ECG will supervise the construction works. ECG will do construction work of low voltage portion, using the materials supplied by Contractors.

Consultant issues taking-over certificates upon acceptance of MEn to the contractors who fulfilled their obligation.

(6) Payment

Advance, interim and final payment for the Japanese contractors will be paid in accordance with the Contracts by means of "Authorization to Pay" issued by Ghanaian Ministry of Finance, as per "Banking Arrangement".

4.10.3 Allotment of Scope of Work by both Countries

The scope of work to be carried out by Ghana and Japan in this Project is described in 4.1.1.

4.10.4 Two Staged Implementation

Project will be proceeded in two stages due to project scale and construction period.

The Table Fig. 5-14 shows contents of work of each stage.

4.10.5 Procurement Plan

- (a) Following items which Japanese contractors need for the Project are procured in Ghana.

Wooden poles

Cement

Foundation materials (sand and gravel)

- (b) All items other than the above are procured in Japan.

4.10.6 Construction Schedule

Facilities of first stage will be completed in 12 months after the contract signing for contractors of first stage.

Facilities of second stage will be completed in 10 months after the contract signing for contractors of second stage.

4.10.7 Estimation of the Cost to be incurred to Ghanaian Side

Table Fig.5-15 shows the cost which Ghanaian side will bear for this project.

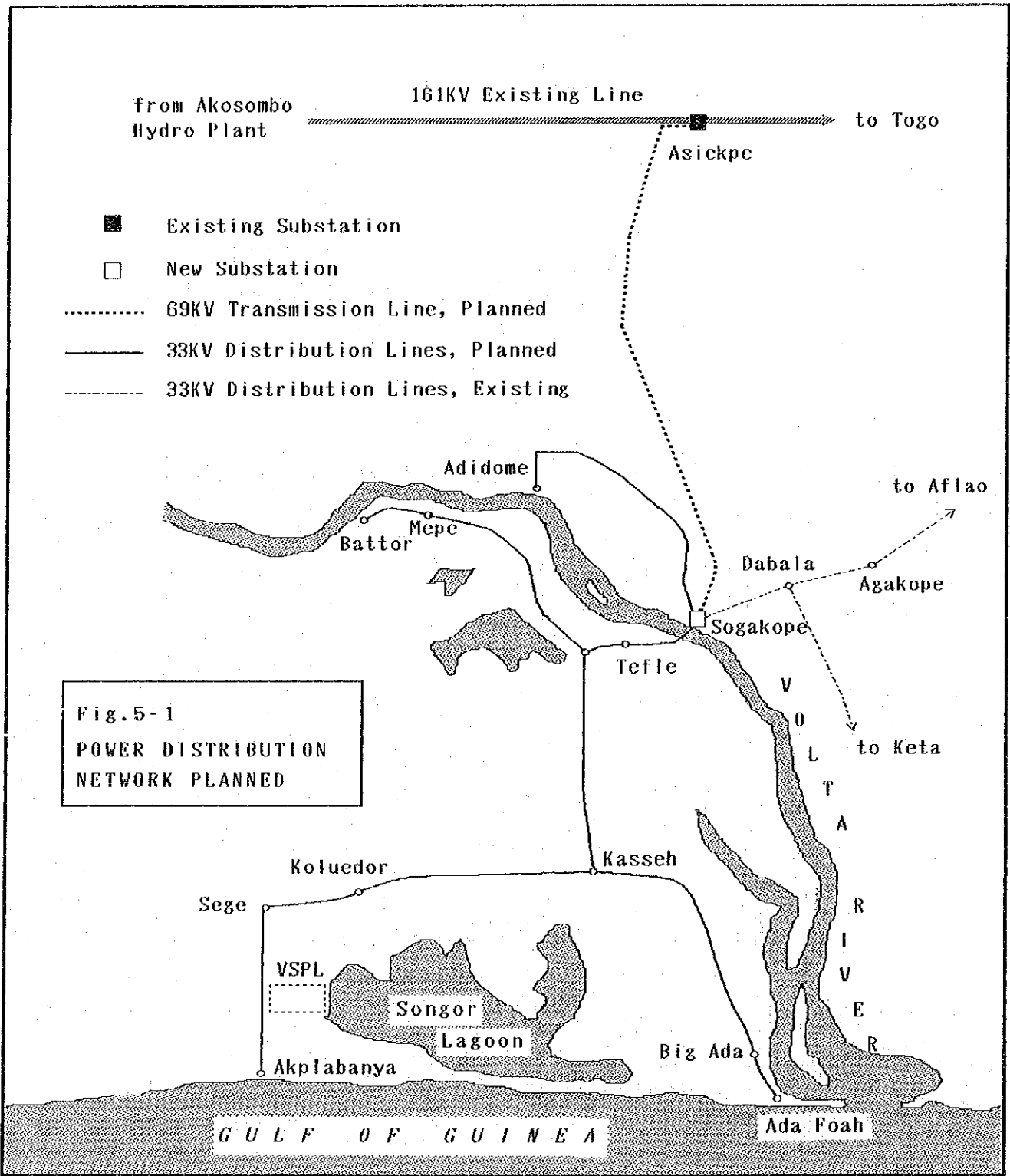
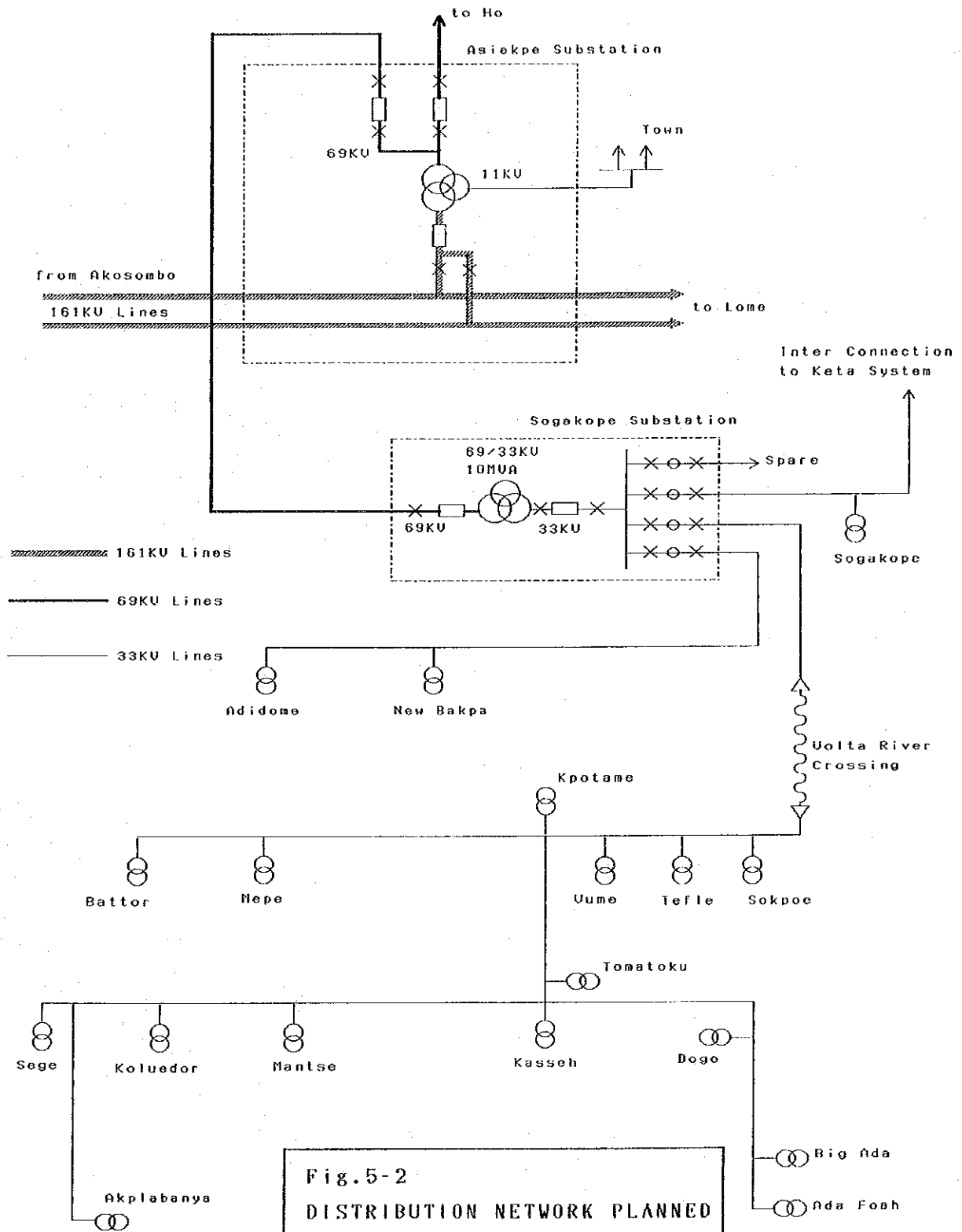


Fig.5-1
POWER DISTRIBUTION
NETWORK PLANNED



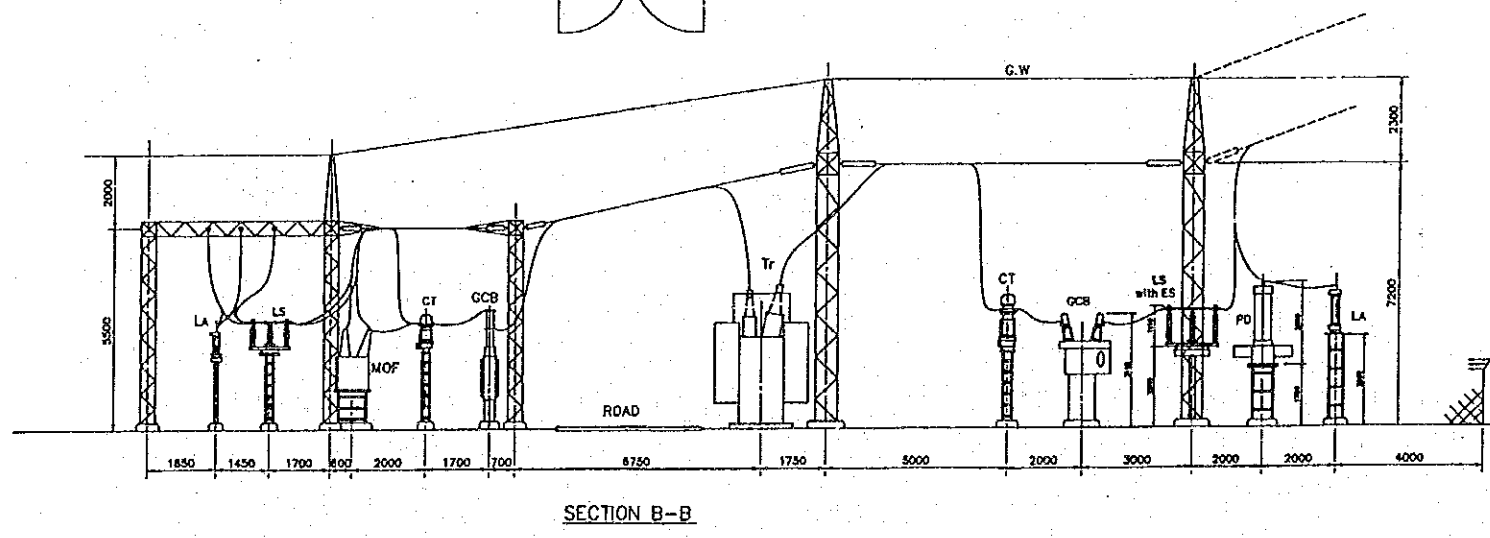
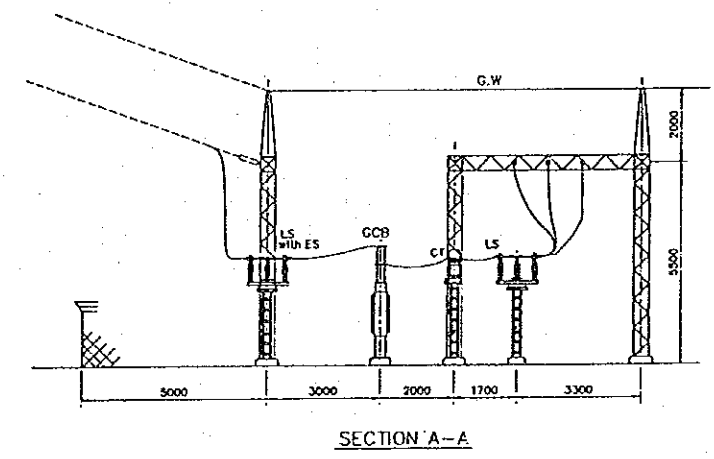
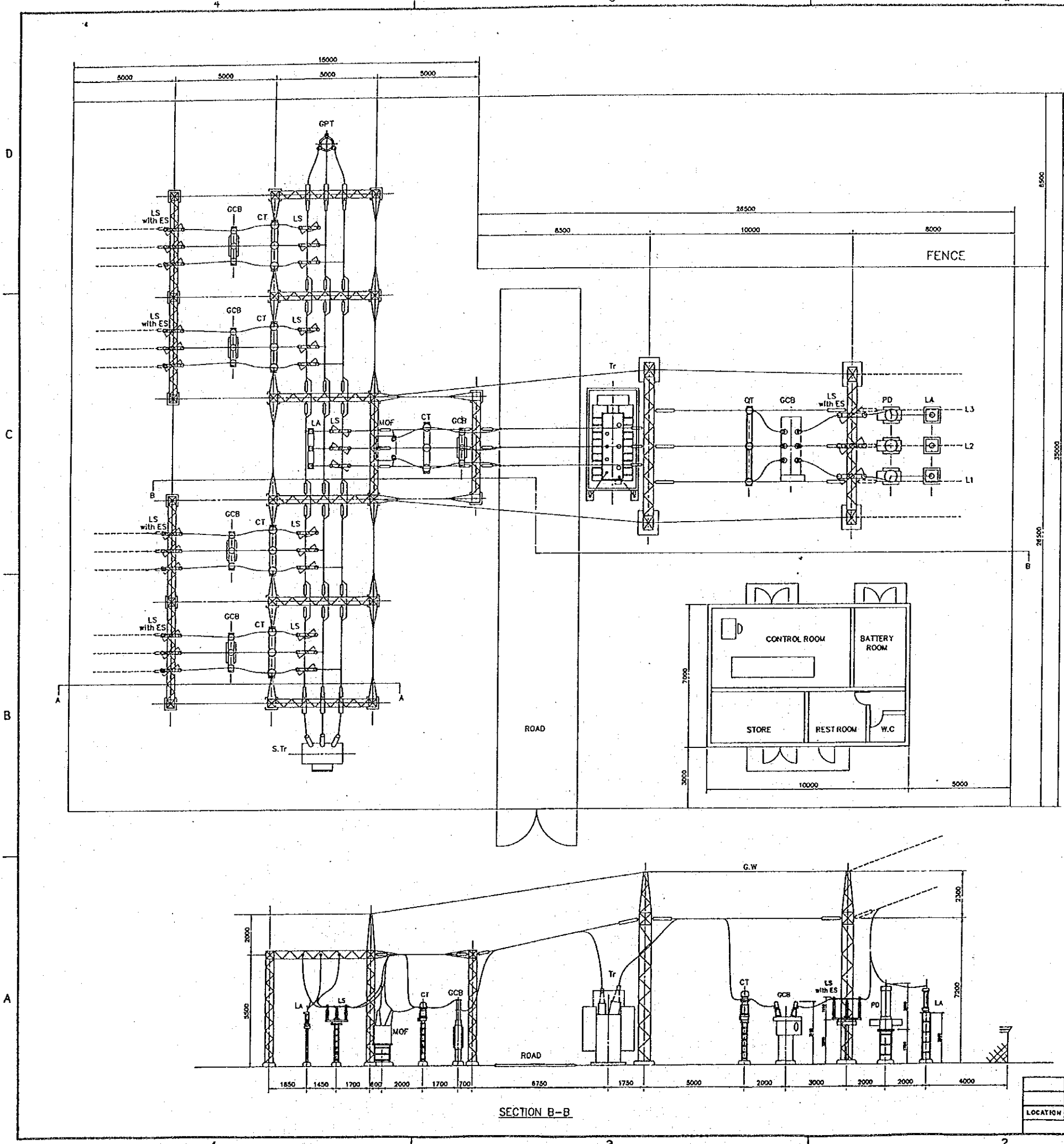


Fig. 5-4
LAYOUT OF SOGAKOPE SUBSTATION

EPDC International Ltd. TOKYO JAPAN			
D.R.:	SUBMITTED:		
T.R.:	RECOMMENDED:		
C.R.:	APPROVED:		
-			
LOCATION	DATE	DESCRIPTION	BY
REVISION			

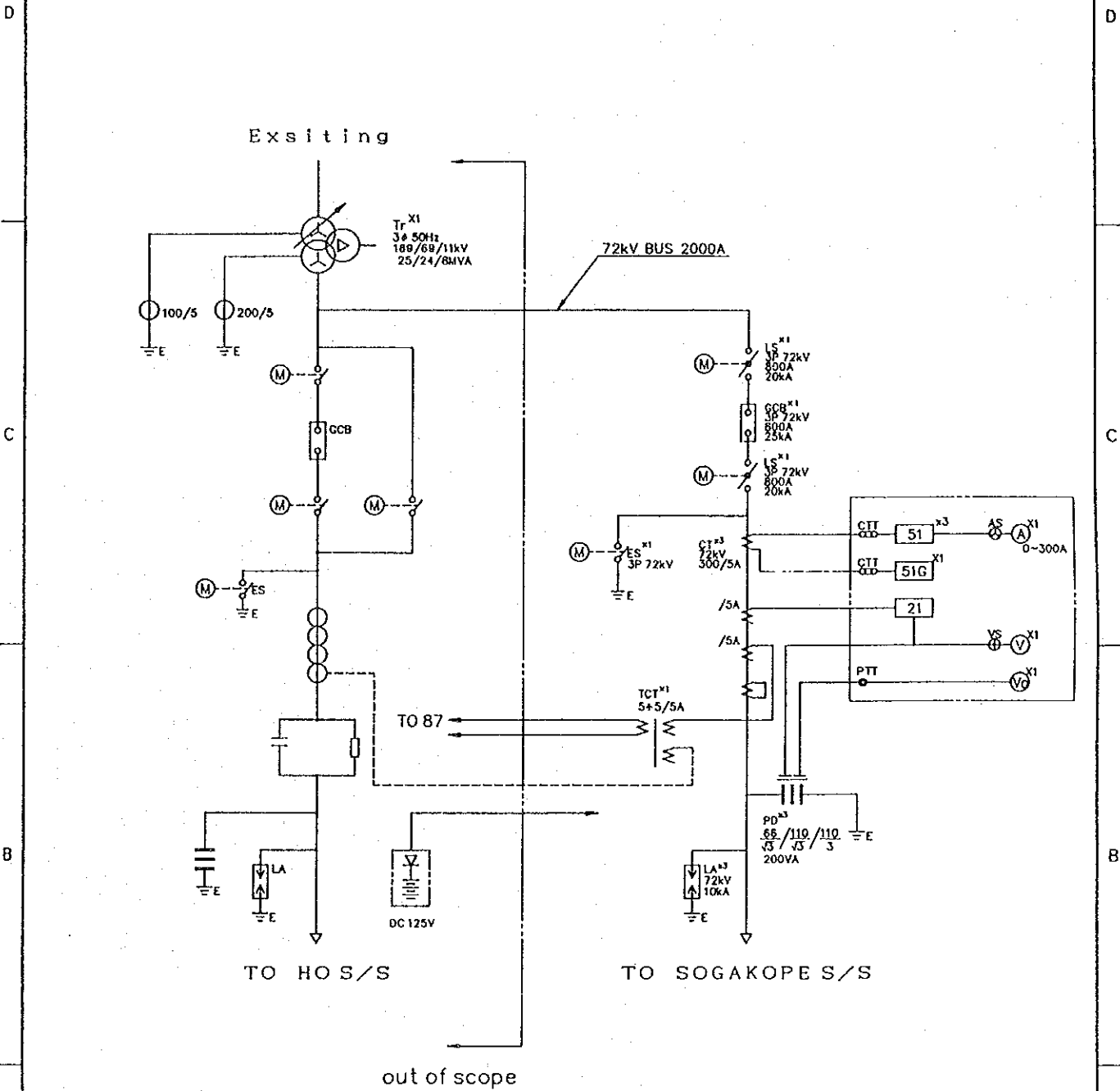


Fig. 5-5
SINGLE LINE DIAGRAM OF ASIEKPE SUBSTATION

ELECTRIC POWER DEVELOPMENT CO., LTD.
 TOKYO JAPAN

D.R.: SUBMITTED;
 F.R.: RECOMMENDED;
 C.K.: APPROVED;

LOCATION	DATE	DESCRIPTION	BY
REVISION			

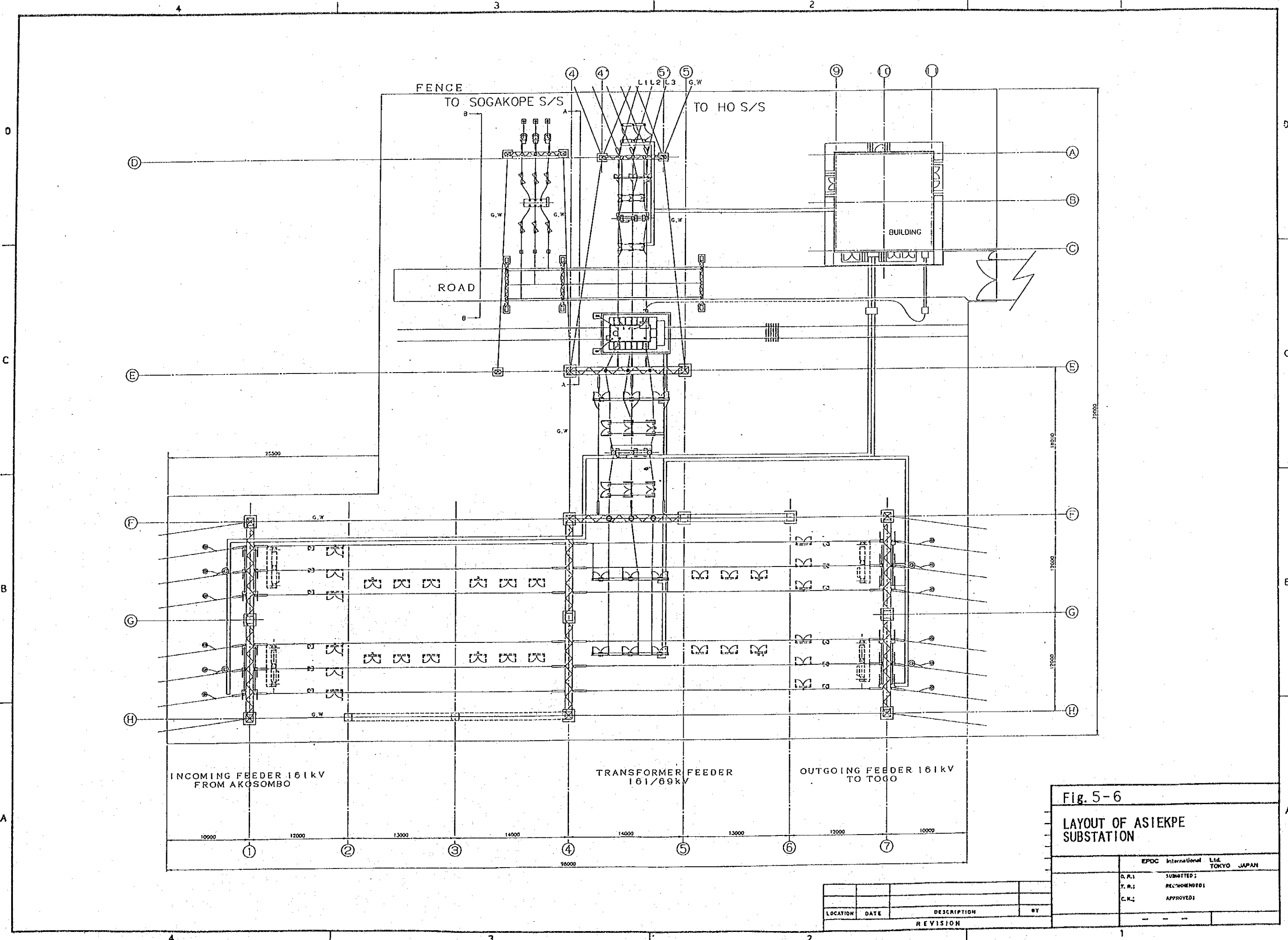


Fig. 5-6
LAYOUT OF ASIEKPE SUBSTATION

EPOC International Ltd. TOKYO JAPAN	
D.P.:	SUBMITTED:
T.R.:	RECOMMENDED:
C.K.:	APPROVED:
-	

LOCATION	DATE	DESCRIPTION	BY
REVISION			

TYPE A TOWER

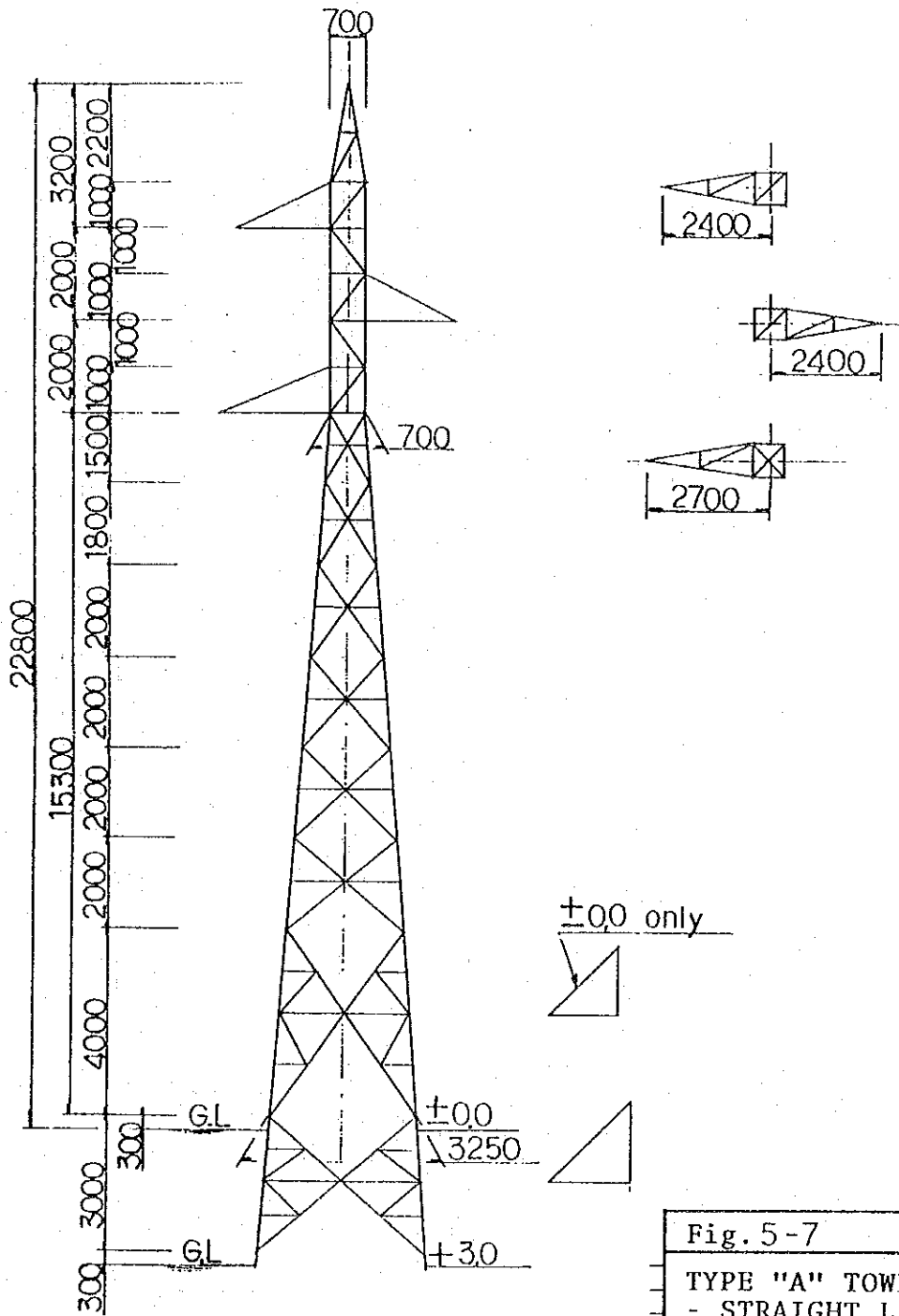


Fig. 5-7

TYPE "A" TOWER
- STRAIGHT LINE -

EPDC INTERNATIONAL LTD TOKYO JAPAN	
D.R.:	SUBMITTED;
T.R.:	RECOMMENDED;
C.K.:	APPROVED;
- - -	

LOCATION	DATE	DESCRIPTION	BY
REVISION			

TYPE B TOWER

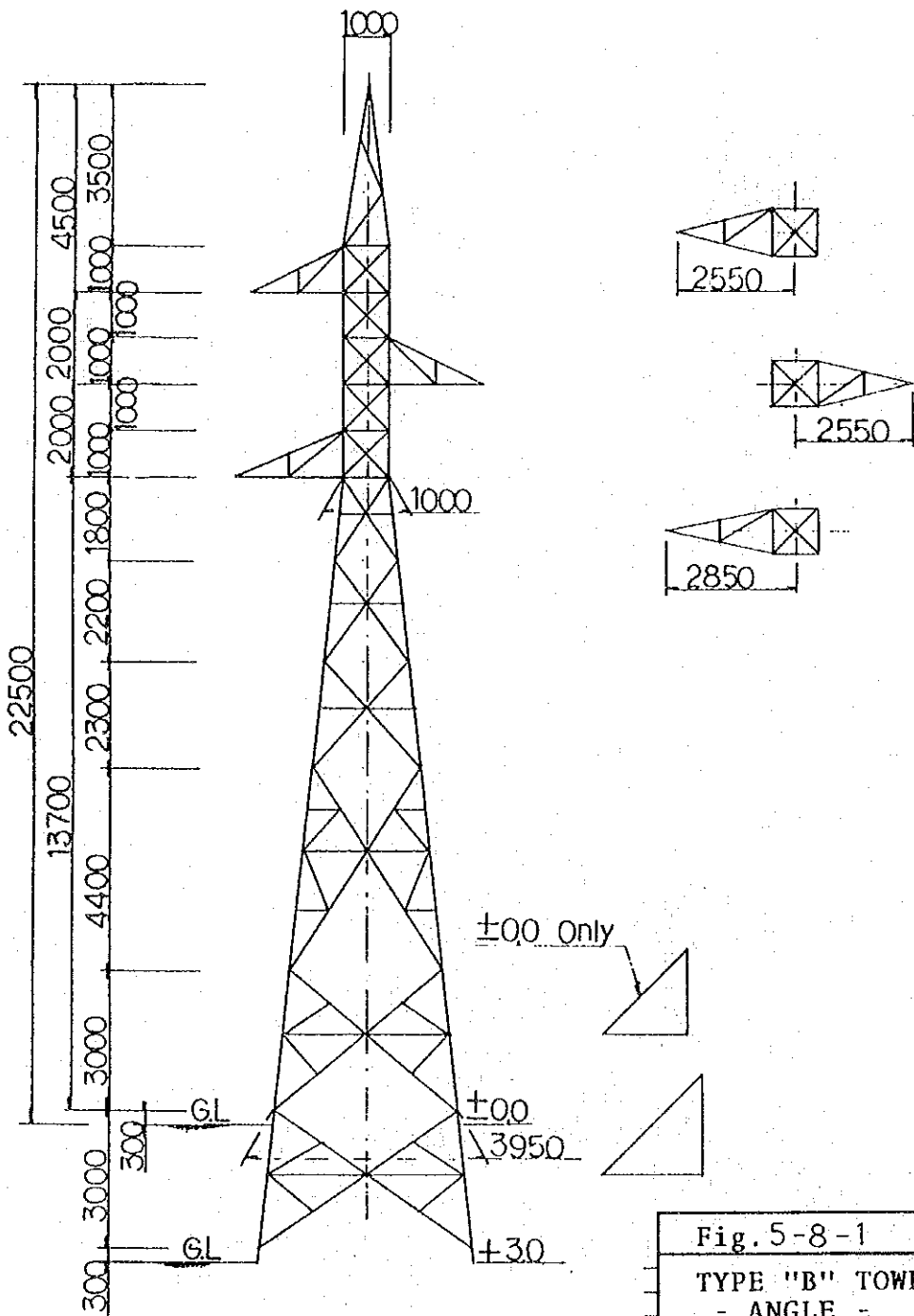


Fig. 5-8-1

TYPE "B" TOWER
- ANGLE -

EPDC INTERNATIONAL LTD
TOKYO JAPAN

D.R.: SUBMITTED;
T.R.: RECOMMENDED;
C.K.: APPROVED;

LOCATION	DATE	DESCRIPTION	BY
REVISION			

TYPE E TOWER

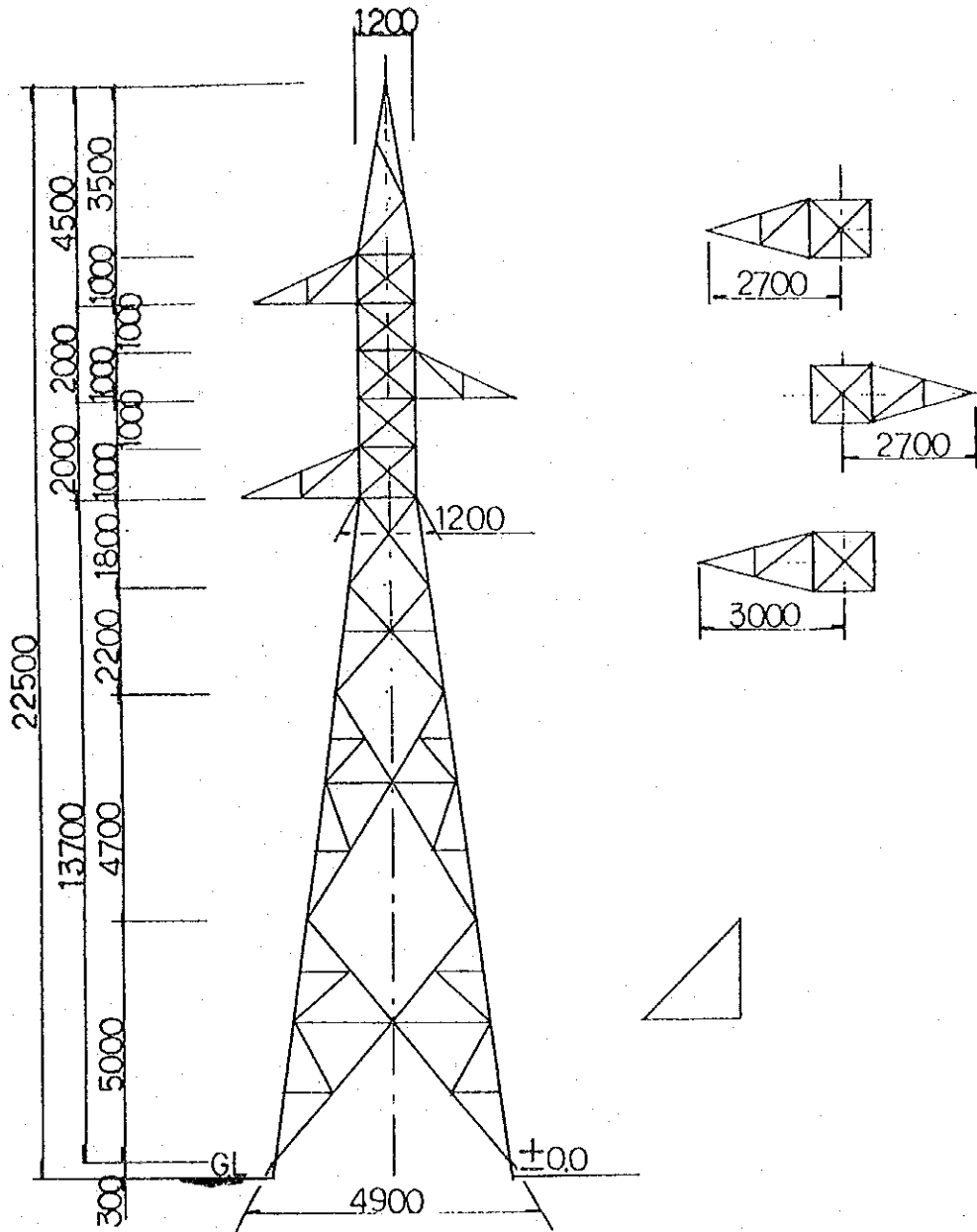


Fig. 5-8-2

TYPE "E" TOWER
- ANGLE/TERMINAL -

EPDC INTERNATIONAL LTD
TOKYO JAPAN

D.R.: SUBMITTED;
T.R.: RECOMMENDED;
C.K.: APPROVED;

LOCATION	DATE	DESCRIPTION	BY
REVISION			

-	-	-
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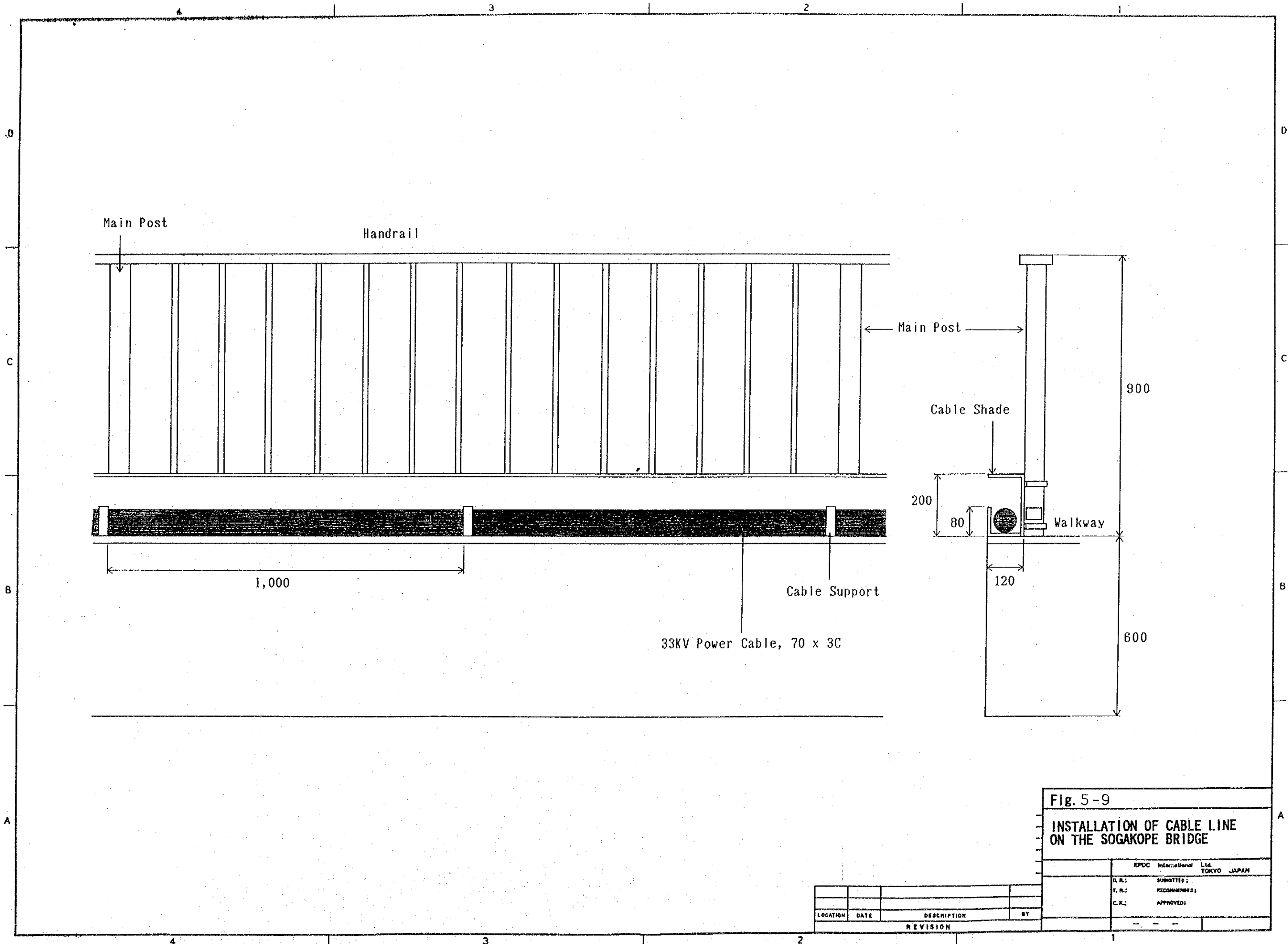


Fig. 5-9
INSTALLATION OF CABLE LINE
ON THE SOGAKOPE BRIDGE

LOCATION	DATE	DESCRIPTION	BY
REVISION			

EPOC International Ltd. TOKYO JAPAN	
D. R.:	SUBMITTED:
T. R.:	RECOMMENDED:
C. K.:	APPROVED:

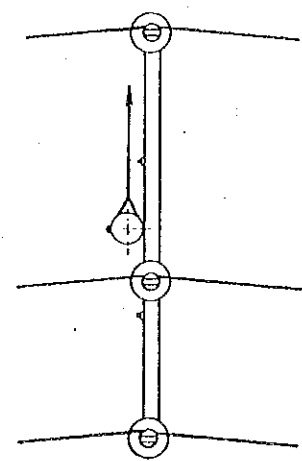
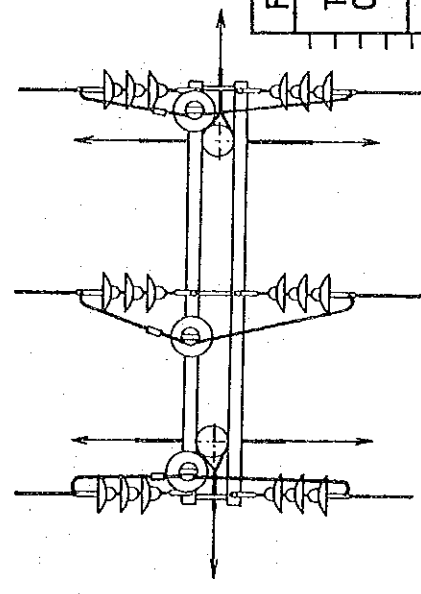
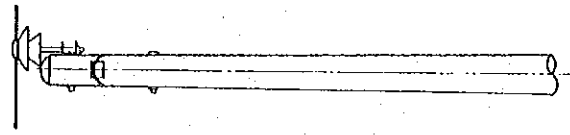
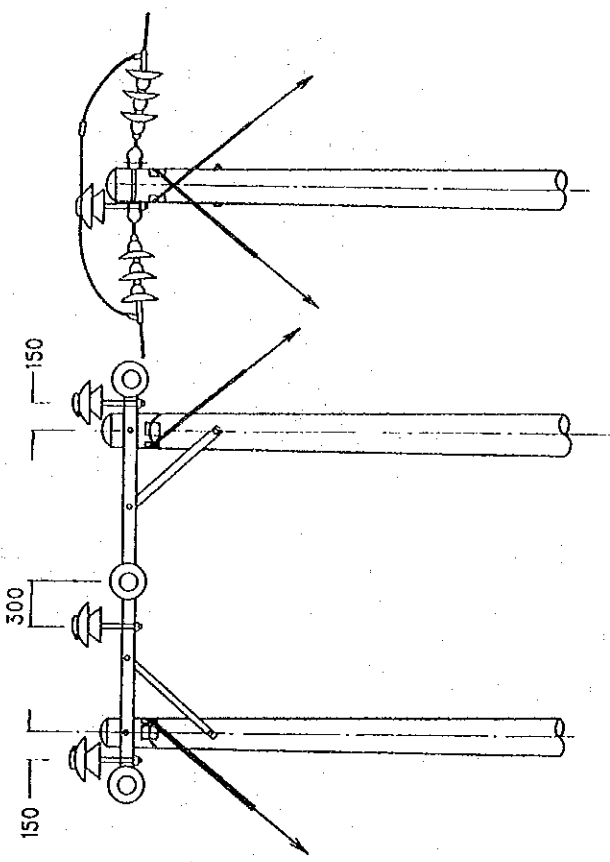
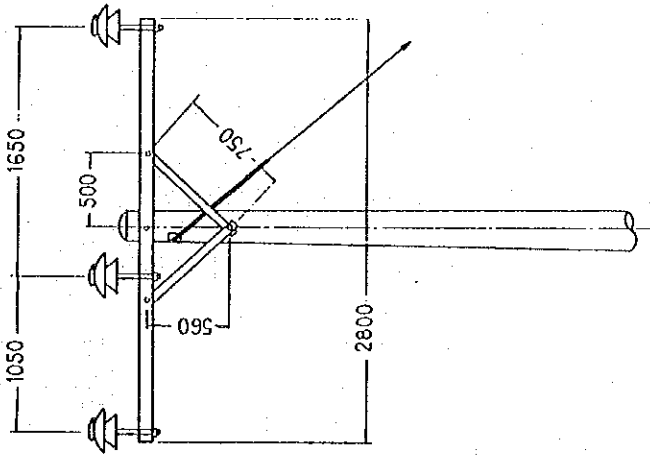
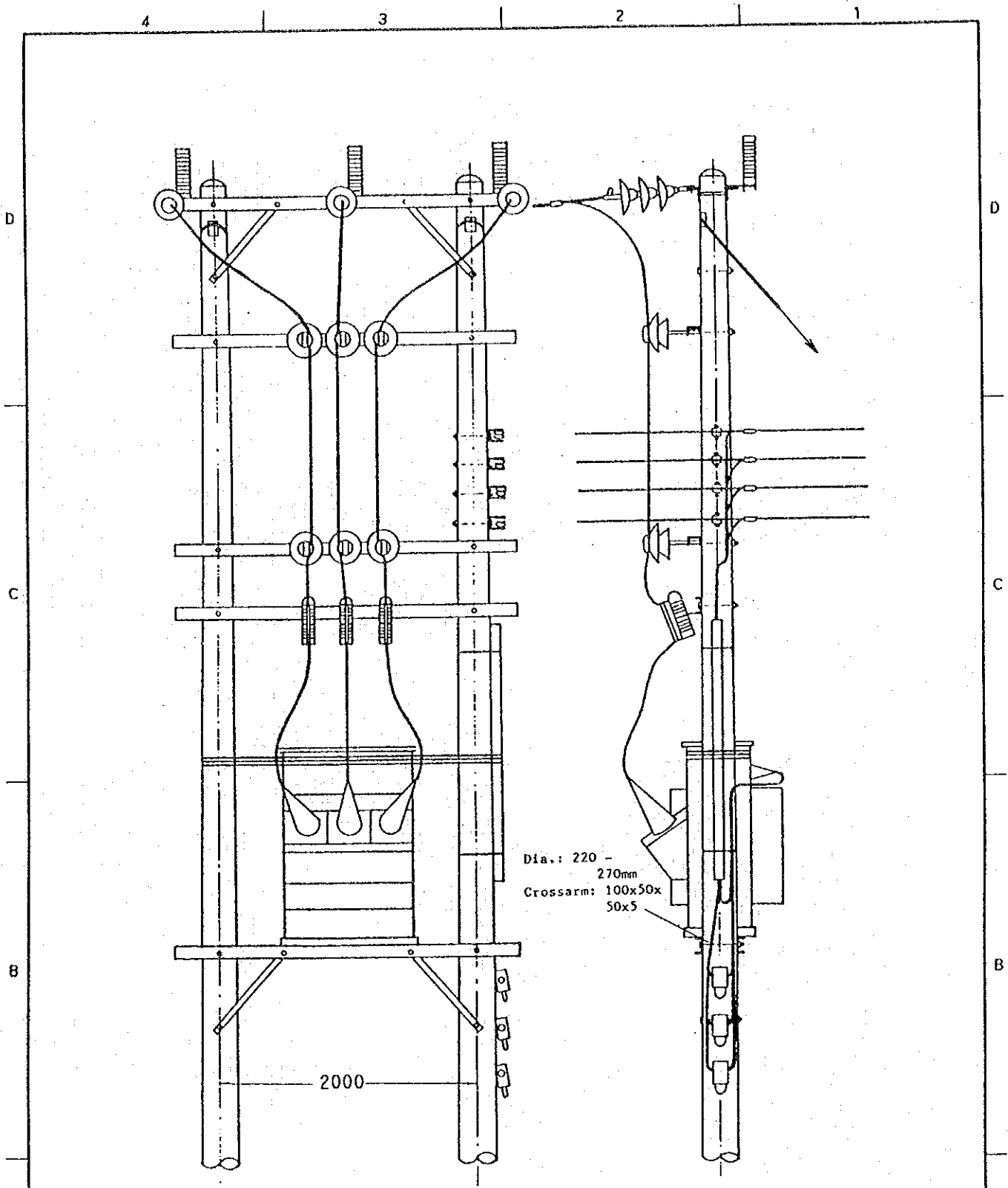


Fig. 5-10

TYPICAL POLE ASSEMBLING
OF 33KV LINE

EPOC International Ltd. TOKYO JAPAN	
D.R.:	SUBMITTED:
T.R.:	RECOMMENDED:
C.K.:	APPROVED:

LOCATION	DATE	DESCRIPTION	BY



Dia.: 220 -
270mm
Crossarm: 100x50x
50x5

2000

Fig. 5-11

33KV TRANSFORMER PLATFORM

ELECTRIC POWER DEVELOPMENT CO., LTD.
TOKYO JAPAN

D. R.: SUBMITTED;
T. R.: RECOMMENDED;
C. K.: APPROVED;

LOCATION	DATE	DESCRIPTION	BY
REVISION			

4

3

2

1

D

D

C

C

B

B

A

A

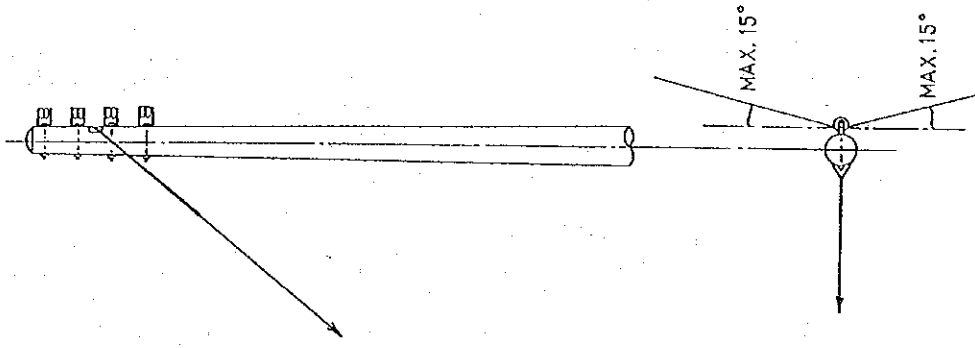
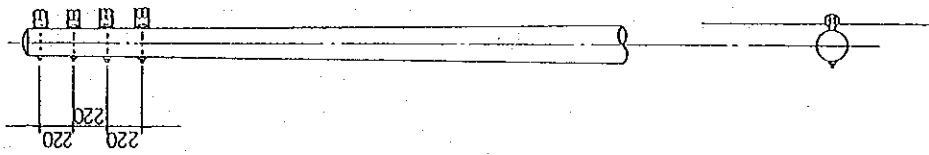


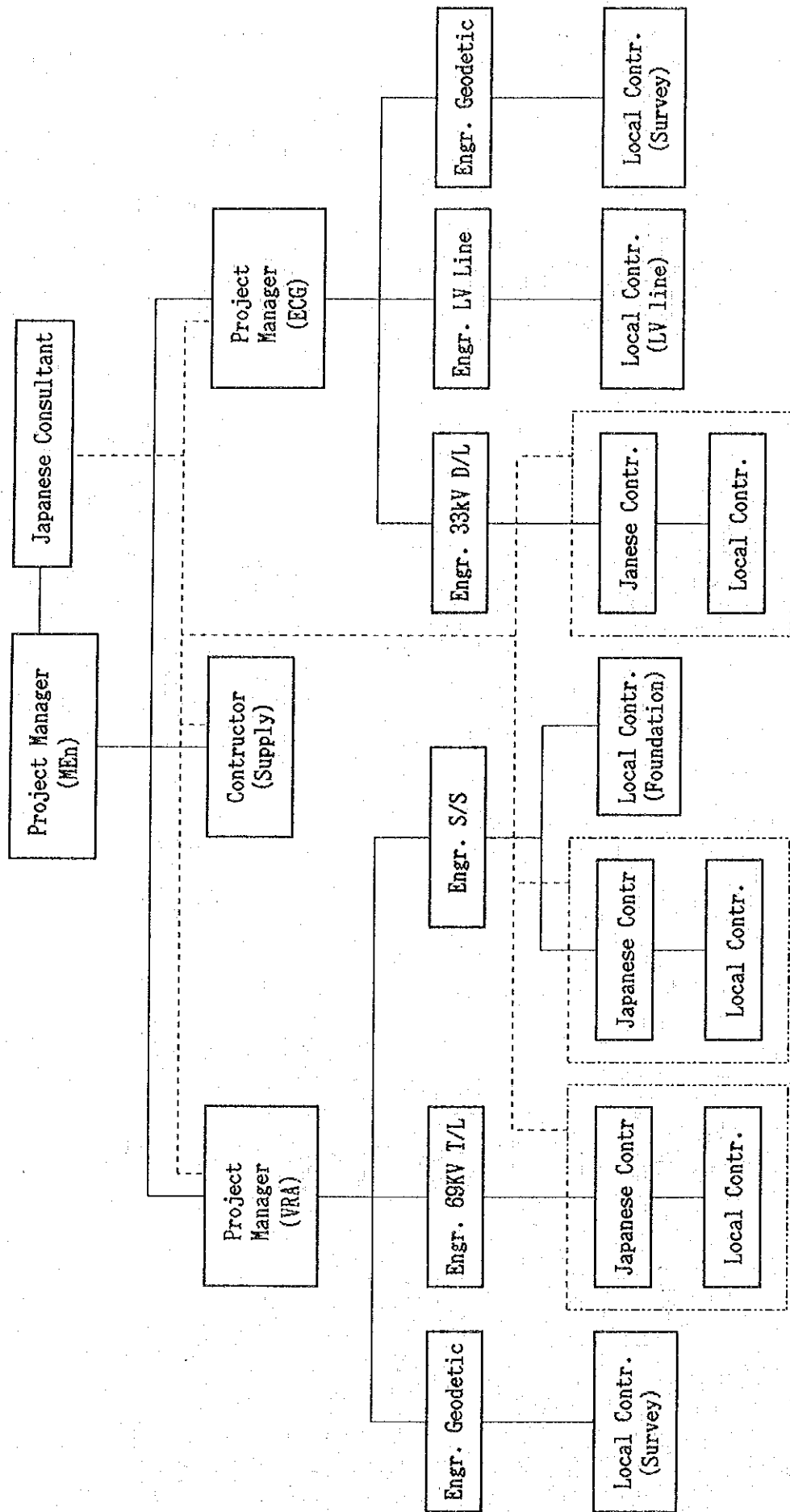
Fig. 5-12

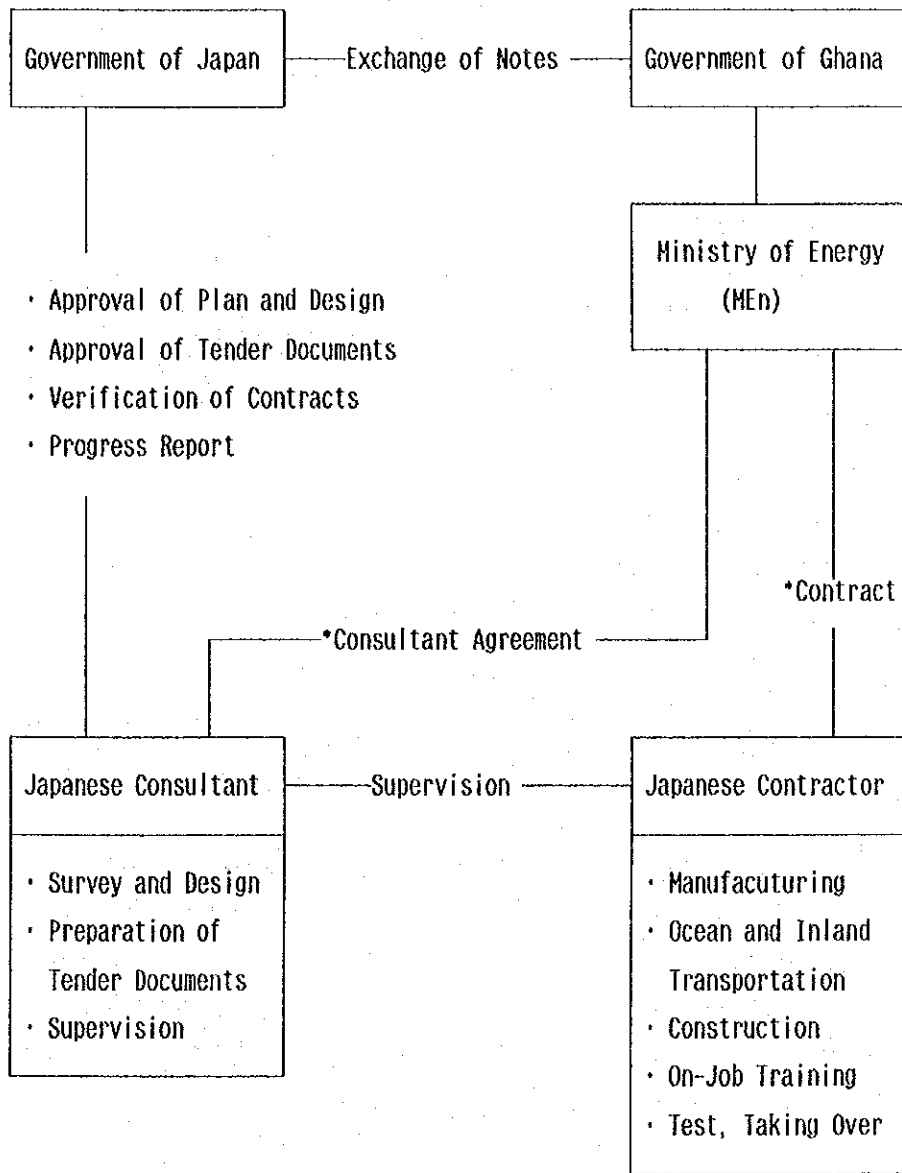
TYPICAL POLE ASSEMBLING
OF LOW VOLTAGE LINE

EPOC International Ltd. TOKYO JAPAN	
Q.R.L.:	SUBMITTED:
T.R.A.:	RECOMMENDED:
C.A.:	APPROVED:

REVISION		DESCRIPTION	BY

Fig. 5-13 PROJECT IMPLEMENTING ORGANIZATION





* Note : Subject to the verificatin of contracts by the Government of Japan

Works by Each Stage

First Stage

Expansion of Asiekpe Substation
Construction of 69 kV Transmission Line
Construction of Sogakope Substation
Inter-connection W. Keta System
Supply of Vehicles
Supply of Approximately 2/3 Quantity of Tools

Second Stage

Laying of 33 kV Power Cable on the Bridge
Construction of Distribution Lines btw.
 Sogakope - Adidome
 Sogakope - Ada Foah
 Vume - Battor
 Kasse - Sege - Akplabanya

Construction of 42 Locations of Distribution Substations
Supply of Low Voltage Materials
Supply of Approximately 1/3 Quantity of Tools

Fig. 5-15

Estimated Cost of Ghanaian Side

(million ₵)

<u>Items</u>	<u>1st Phase</u>	<u>2nd Phase</u>	<u>Total</u>
Survey & Clearing	31,128	26,240	57,368
Land	20,600	6,180	26,780
Foundation	33,332	-	33,332
Low Voltage Lines	6,319	32,936	39,252
Total	91,376	65,356	156,732

CHAPTER 5
PROJECT EVALUATION AND CONCLUSION

Chapter 5 Project Evaluation and Conclusion

5.1 Effect of the Project

(1) Benefiting Effect to the Local Residents

This project is to electrify the area which is yet to be electrified, and is to establish a basic infrastructure which has been longed for by all the local residents. Those who will benefit from the completion of this project are of all classes, i.e. ranging from public organs such as governmental administrative bodies, hospitals and schools, merchants and industrialists, to the general residents.

(a) Population of Beneficiaries

The population of beneficiaries is 104,600 residing in roughly 5 areas. While the lighting at private home is currently dependent on the kerosene lamp the introduction of electric power has been awaited for economic reasons as well.

(b) Governmental Organs

Three district capitals of Ada Foah, Sogakope and Adidome which are the direct objectives of this electrification project are all within the project area, which have branch offices of local governmental organ and are the center of the local administration.

(c) Public Organs

Not to mention the three district capitals, every town has schools. And, although a hospital having more than 100 beds is only in Battor, major towns have dispensaries which expect a lot on electrification.

(2) Effect on Industrial Development

(a) Commercial Demands

In every town along national highways are many gas stations, hotels and restaurants which have high demands for lighting, refrigerators and air conditioners etc. for which electrification has a major effect.

(b) Industrial Demands

Even today small-scale handicraft exists which is waiting for electric power, such as the manufacturing of leather articles, pots, woodwork, and agricultural processing and storage etc. While all of these have a potential to increase their production by utilizing electric power once electrification is realized, its effect on the development of local industry is anticipated.

(c) Effect on the Salt Industry

There is a salt plant (owned by the government) in the vicinity of Sege, which is the largest in Ghana producing 50,000 tons of salt a year and provides large employment opportunities for the local communities.

Running pumps by an independent power plant of a small capacity to manufacture salt, they say that increase of production is possible by installing additional pumps only if stable and inexpensive power source is available, and show a strong expectation on the electrification to be realized by distribution lines.

Furthermore, there is a national plan to develop the entire Songor Lagoon in the said area in order to start a large-scale salt industry with a production capacity of 1 million tons a year. Although this is still in the stage of a master plan, the Ghanaian Government expects that the introduction of electric power is to contribute to the preparation of infrastructure which supports this scheme and will enable this plan to make a big progress.

(3) Merit of this Project as Electric Utilities

(a) Improvement of the Situation to Receive Power Reversely from Togo

Although the eastern area of the Volta Region has already been electrified, electric power is supplied there by importing the once-exported power from Togo. After the completion of this project it becomes possible to supply all of the area through the power distribution system to be constructed, which improves the present absurdity greatly.

(b) Rational Utilization of the Existing Facilities

Since Asiekpe Substation, the starting point of the transmission system to be constructed in this project, has got a large capacity of 25 MW x 2 which has been being utilized only up to approximately 3,000 kW maximum, it has been expected to utilize this excessively large facility more effectively at an earliest possible stage. By this project future new demand created in the project site is to be supplied by this Substation enabling the rational utilization of its facility.

5.2 Adequacy of the Project

(1) As for Facility

The planned facility, consisting of 69 kV transmission line, a 69/33 kV Substation, 33 kV distribution lines and low-voltage system, is deemed relatively of a large scale as a local electrification project. However, in view of the conditions of the existing power system as well as the projected power demand of more than 10 MVA after ten years, the facility is thought to be adequate and reasonable.

(2) As for Benefiting Effect

As aforementioned, the effect of benefiting more than 100,000 of residents is large enough.

(3) As for Maintenance

The planned facility is to be maintained by VRA and ECG, public corporations of electric power of the Ghanaian Government, as a part of the existing facilities, and there will be no problem as for its operation and maintenance after completion.

5.3 Conclusion

It is deemed adequate to carry out this project by means of Grant Aid Program as it will contribute to the development of Ghana and to the improvement of people's life while a lot of side effects can be expected as has been mentioned above.

Furthermore, it is thought that the counterpart country is well prepared for the execution and management of this project both in terms of human resources and finances.

Additionally, the Ghanaian Government has a strong desire to promote and realize electrification of local areas as well as all of the district capitals at an earliest possible stage, and has shown a strong expectation for the materialization of this project by means of Japan's Grant Aid Program.

With the above-mentioned points taken into consideration, it is concluded that the significance is very deep for the Japanese Government to carry out this project by the Grant Aid Program, and its adequacy is extremely high.

APPENDIXES

APPENDIX - 1

MEMBER LIST OF BASIC DESIGN STUDY TEAM, JICA

1) Basic Design/Survey Team

Name	Assignment	Original Organization
Hisatoshi Ohkubo	Leader	1st Basic Study/Design Division, Grant Aid Study/Design Department, JICA
Masashi Koike	Planner Power System	EPDC International Ltd.
Minoru Noda	Design of Substations	EPDC International Ltd.
Hisaya Noguchi	Design of Line facilities	EPDC International Ltd.

2) Team of Draft Report Explanation

Hidetoshi Ishioka	Leader	1st Basic Study/Design Division, Grant Aid Study/Design Department, JICA
Masashi Koike	Planner Power System	EPDC International Ltd.
Hisaya Noguchi	Designer Power Facilities	EPDC International Ltd.

1) Basic Design Team (Nov.12 - Dec.11, 1992)

Date	Contents
Nov. 12(Th)	Lv. Tokyo to AMS
13(Fr)	Ar. Accra from AMS
14(Sa)	Inner Meeting
15(Su)	Discuss w. Embassy officials
16(Mo)	Courtesy call to EOJ, JICA, MOF, MEn, ECG
17(Tu)	Discuss w. ECG
18(We)	Site survey. Sege, Lekpoguno, Kasse, Ada Foah, Battor, Lower Volta Bridge
19(Th)	Site survey. Sogakope, New Bakpa, Adidome, Asiekpe, Mantsekope, Koluedor
20(Fr)	Discussion w. ECG, GHA. Meeting w. Embassy.
21(Sa)	Inner Meeting
22(Su)	Inner Meeting
23(Mo)	Visit EOJ
24(Tu)	Site survey. Data acquisition
25(We)	Meeting w. ECG, VRA, MEn
26(Th)	Discussion on the contents of "Minute"
27(Fr)	Data acquisition in Control Center of VRA (Tema)
28(Sa)	Study of data acquired
29(Su)	Preparation of "Technical Note"
30(Mo)	Discussion w. VRA on technical matter
Dec. 1(Tu)	Discussion w. ECG on technical matter
2(We)	Discussion w. ECG on distribution substation
3(Th)	Visit to VSPL
4(Fr)	Investigation of data acquired
5(Sa)	Visit to the former project sites
6(Su)	Data acquisition
7(Mo)	Receive answer of additional questionnaire
8(Tu)	Lv. Accra to AMS
9(We)	Stay AMS
10(Th)	Lv. AMS
11(Fr)	Ar. Tokyo

2) Team for Explanation of Draft Report

(Mar.8 - 18, 1993)

Date	Contents
Mar. 8(Mo)	Lv. Tokyo to AMS
9(Tu)	Ar. Accra from AMS
10(We)	Courtesy call to EOJ, MOF, MEn, ECG, VRA, GHA
11(Th)	Meeting for discussion on the contents of Draft Report
12(Fr)	Discussion on the contents of "Minutes"
13(Sa)	Site visit
14(Su)	Visit to the former project sites
15(Mo)	Signing "Minutes". Report to EOJ, JICA. Lv. Accra
16(Tu)	Stay LON
17(We)	Lv. LON
18(Th)	Ar. Tokyo

APPENDIX - 3

KEY PERSONNEL WHOM THE TEAM MET

Organization	Name	Post
Embassy of Japan (EOJ)	Mr. T. Kojima Mr. F. Motai Mr. T. Teraoka Mr. K. Takagi	Ambassador Councillor 1st Secretary Secretary
JICA (Ghana Office)	Mr. A. Hirasawa Mr. K. Ohta	Representative Vice Representative
Ministry of Finance & Economic Planning (MOF)	Mr. C. Abakah Mrs. A. Batsa Mr. M. Baddoo Mr. K. Opoku	Director International Economic Relations Div. Head, Bilaterals International Economic Ref. Div. Senior Economic Officer
Ministry of Energy (MEn)	Mr. S. A. Abingya Mr. J. K. Owusu Dr. C. Y. W. Brobby Mr. Y. N. Opong Mr. J. O. Adjey Mr. O. Frimpong Mr. F. Gbeddy Mr. G. Quain	PNDC Deputy Secretary for Energy Ag. Chief Director Energy Policy Adviser Director for Power Deputy Director Power Program Officer, Electricity Planning Program Officer, Utilities Associate Program Officer
Electricity Corpo- ration of Ghana (ECG)	Mr. J. K. Hagan Mr. S. T. Accuh-Addo Mr. C. Adom Mr. B. K. Dapatem Mr. Gakpo	Managing Director Director of Administration Director of Engineering Div. Manager, Project Division Manager

	<p>Mr.A.Ackah</p> <p>Mr.A.Sowah</p> <p>Mr.E.N.Denkyi</p>	<p>Senior Technical Engineer, Geodetic</p> <p>Senior Electrical Engineer</p> <p>Assistant Electrical Engineer</p>
<p>Volta River Authority (VRA)</p>	<p>Mr.E.A.K.Kalitsi</p> <p>Mr.G.O.Dokyi</p> <p>Mr.E.A.Boye</p> <p>Mr.R.O.Ankrah</p> <p>Mr.E.T.Apperkon</p> <p>Mr.V.N.K.Okine</p> <p>Mr.Norbert Anku</p> <p>Mr.T.K.G.Sakey</p> <p>Mr.Dale McMaster</p>	<p>Chief Executive</p> <p>Deputy Chief Executive</p> <p>Deputy Chief Executive</p> <p>Director of Engineering Design & Construction</p> <p>Principal Engineer, Design</p> <p>Principal Engineer, Projects</p> <p>Engineer, System Planning</p> <p>System Planning</p> <p>Head System Planning (ACRES)</p>

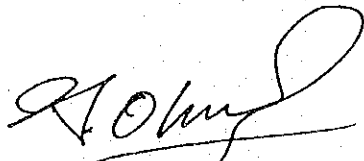
MINUTES OF DISCUSSIONS
THE BASIC DESIGN STUDY ON THE PROJECT FOR
ELECTRIFICATION OF ADA FOAH, CAPITAL OF DANGBE EAST DISTRICT
IN THE REPUBLIC OF GHANA.

Based on the result of the Preliminary Study, the Japan International Cooperation Agency (JICA) decided to conduct a Basic Design study on the Project for Electrification of Ada Foah, Capital of Dangbe East District (hereinafter referred to as "the Project").

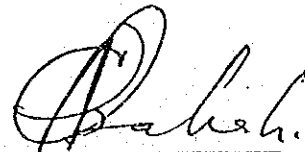
JICA sent to the Republic of Ghana a study team headed by Mr. Hisatoshi Okubo, staff, 1st Basic Design Study Division, Grant Aid Study and Design Department of JICA, from 13th November to 8th December, 1992.

The team held a series of discussions and conducted field surveys. In the course of discussions and field surveys, both parties have confirmed the main items described on the attached sheets. The team will proceed to further work and prepare the Basic Design Report.

Accra, 27th November, 1992



Mr. Hisatoshi Okubo
Leader
Basic Design Study Team



Mr. Charles Abakah
Director
International Economic
Division, Ministry of
Finance & Economic
Planning

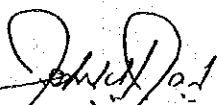
W I T N E S S E S



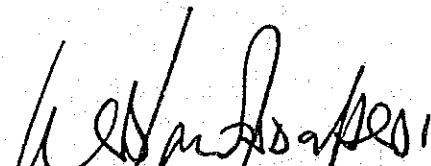
Mr. J. K. Owusu
Ag. Chief Director
Ministry of Energy



Mr. E. A. K. Kalitsi
Chief Executive
Volta River Authority



Mr. John K. Hagan
Managing Director
Electricity Corporation
of Ghana



Dr. F. Y. Addo-Abedi
Deputy Chief Executive
Ghana Highway Authority

A T T A C H M E N T

1. PROJECT OBJECTIVE

The objective of the Project is to provide electricity to three district capitals and their surrounding towns in the project area by connection to the national grid system and thus contributing to improved living standards of the people and increased productivity in the project area.

2. PROJECT AREA

The project area covers Tongu North, Tongu South and Dangbe East Districts (Project Area Map attached as Annex-I).

3. RESPONSIBLE AND EXECUTING AGENCIES

- (1) The Ministry of Energy (M.En) is solely responsible for the administration and execution of the Project and internal arrangements between the authorities concerned.
- (2) The Electricity Corporation of Ghana (ECG) and Volta River Authority (VRA) are the implementing agencies under the Ministry of Energy.
- (3) ECG shall be responsible for the operations and maintenance of the 33kV lines and the low voltage distribution network of the Project.
- (4) VRA shall be responsible for the operations and maintenance of the 69kV line from Asiekpe to Sogakope and the 69/33kV substation at Sogakope.

4. OTHER PARTICIPATING AGENCY

The Ghana Highway Authority (GHA) is required to cooperate with ECG in connection with the proposed crossing of 33kV electric power cable over the Volta River, using the Lower

Volta Bridge at Sogakope.

5. NECESSARY ITEMS FOR THE IMPLEMENTATION OF THE PROJECT REQUESTED BY THE GOVERNMENT OF THE REPUBLIC OF GHANA

After discussions, the following items have been requested by the Ghanaian side as necessary components for the realization of the Project.

- (1) Expansion of the VRA 161/69kV substation at Asiekpe;
- (2) Supply and installation of about 40km of 69kV line from Asiekpe to Sogakope;
- (3) Supply and installation of a 69/33kV substation and associated switch gear and protection at Sogakope;
- (4) Supply and installation of about 120km of 33kV lines along:

Priority

- Sogakope to Adidome	1
- Sogakope to Kasseh	1
- Kasseh to Ada Foah	1
- Kasseh to Sege	2
- Tefle to Battor	3
- Sege to Akplabanya	4

- (5) Supply of low voltage distribution network materials in the project area.
- (6) Supply of vehicles, tools, measuring and test instruments

However, the final component of the items, both type and quantity, will be decided after a further study in Japan.

6. CROSSING POINT OF VOLTA RIVER

GHA, M.En and ECG have reached an agreement that the Lower Volta Bridge at Sogakope would be used for the crossing of the 33kV electric power cable over the Volta River.

7. BUDGETARY ALLOCATION

The Government of the Republic of Ghana will allocate necessary budget to implement the Project other than those to be borne by the grant aid and take necessary measures to maintain proper operation of the electrical facilities after the completion of the Project.

8. JAPAN'S GRANT AID PROGRAM

- (1) The Ghanaian side has understood the system of Japanese Grant Aid explained by the Team.
- (2) The Government of Ghana will take necessary measures, described in Annex-II for the smooth implementation of the Project, on condition that the Grant Aid Assistance by the Government of Japan is extended to the Project.

9. SCHEDULE OF STUDY

- (1) JICA will prepare the draft report in English and dispatch a mission to explain the contents of the report to the Government of Ghana around March 1993.
- (2) When the contents of the report are accepted in principle by the Ghanaian side, JICA will complete the Final Report and send it to the Government of Ghana by May 1993.

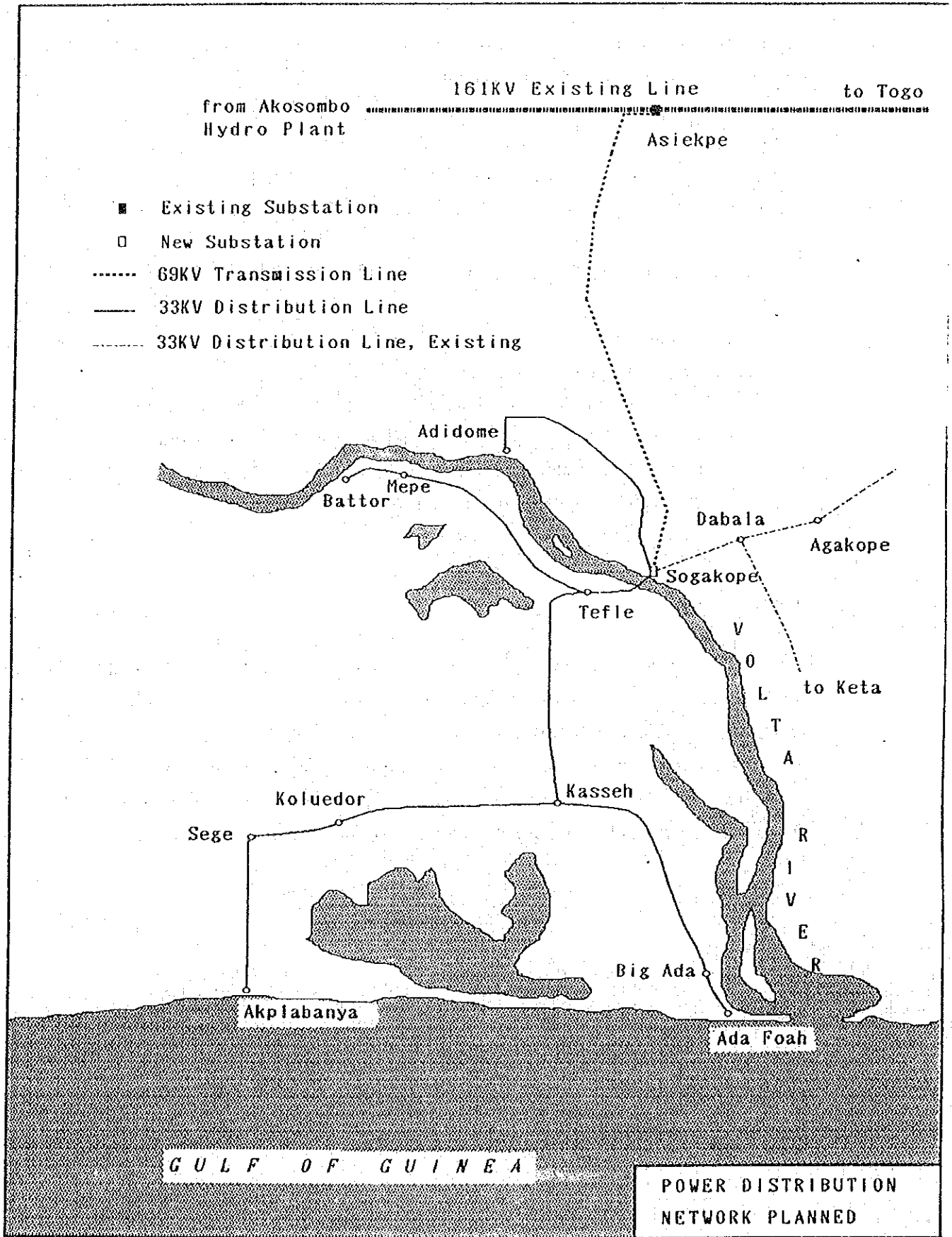
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Annex-I



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UNDERTAKING BY THE GOVERNMENT OF THE REPUBLIC OF GHANA

1. To provide cleared, embanked and leveled land for the Project.
2. To provide all the foundations for substation equipment.
3. To provide the land for temporary site office, warehouse and stockyard during the implementation period.
4. To conduct the survey work for transmission and distribution lines according to specifications in the basic design study report (draft) prepared and explained by the Japanese team.
5. To provide temporary facilities such as water supply, drainage, electricity and fence, etc., in and around the sites.
6. To ensure speedy unloading, tax exemption, customs clearance of the goods for the Project at the port and/or airport of disembarkation.
7. To accord Japanese nationals whose services may be required in connection with the supply of the products and services under the verified contracts such facilities as may be necessary for their entry into the Republic of Ghana and stay therein for the performance of their work.
8. To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in the Republic of Ghana with respect to the supply of the products and services under the verified contracts.
9. To bear commissions to a Japanese foreign exchange bank for the banking services based upon the Banking Arrangement.

10. To bear all expenses, other than those to be borne by the Grant Aid necessary for the execution of the Project.
11. To assign full time counterpart engineers/technicians, to the Project, who will receive the technical transfer regarding the operation and maintenance technique for the Project.
12. To take necessary measures against and responsibility for the interruption of electricity during a construction period when it is necessary.
13. To ensure proper maintenance and operation of the facilities constructed and equipment procured under the Grant Aid.

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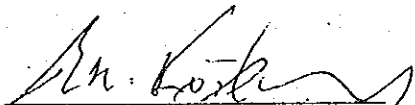
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TECHNICAL NOTES
THE BASIC DESIGN STUDY ON THE PROJECT FOR
ELECTRIFICATION OF ADA FOAH, CAPITAL OF DANGBE EAST DISTRICT
IN THE REPUBLIC OF GHANA

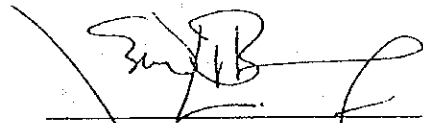
The Basic Design Study Team dispatched by Japan International Cooperation Agency (JICA) had a series of discussions with the authorities concerned of the Government of the Republic of Ghana and conducted field surveys in the Project sites.

As a result of the discussions and field surveys, both parties have confirmed the main technical items described on the attached sheets.

Confirmed and signed on 7th December, 1992

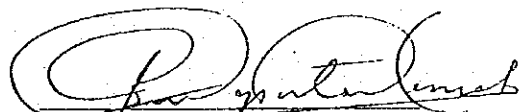


Mr. Masasi Koike
Leader
EPDC International Ltd.

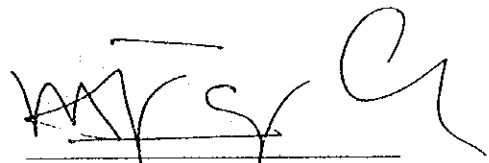


Dr. Joe Oteng Adjei
Programme Officer
National Electrification
Scheme
Ministry of Energy

Witnesses;



Mr. B. K. Dapatem
Div. Manager, Project
Electricity Corporation
of Ghana



Mr. Norbert Anku
System Planning
Volta River Authority

ATTACHMENT

1. Organization for the implementation of the Project is as shown on Fig. 1 attached.
2. Facilities border between ECG and VRA is shown on Fig. 2 attached.
3. Disconnecting switch is to be installed at the border.
4. Precise measuring instrument is to be installed for sale and purchase of energy at the border.
5. Designing of 69kV facilities for the Project are, in principle, to be similar to the existing facilities of Ho system. However disconnecting switch for by-pass is excluded. VRA proposed for the use of glass insulator.
6. Route of 69kV line crossing under the existing 161kV lines will be decided by the study of the drawing submitted by VRA (Drawing No. 6016). JICA(EPDCI) will consider an alternative of 69kV cable out-going.
7. Candidate land for Sogakope Substation should be decided by both ECG and VRA by the next visit of JICA mission.
8. The result of 69kV line route survey will be submitted by the time of signing of Exchange of Notes to be made between both Governments.
9. The following communication facilities are included in the supply under the Project.

for VRA : HF Radio at Sogakope Substation

Facilities for SCADA extension are not included. VRA requested that capacitive voltage transformers (CVT) should be used instead of the potential transformer (PT) on the bus at Sogakope substation.

Page

D.P.

for ECG : Portable VHF/FM transceivers and base station unit for the construction work.

Further communication facilities between branch offices and substations are not included.

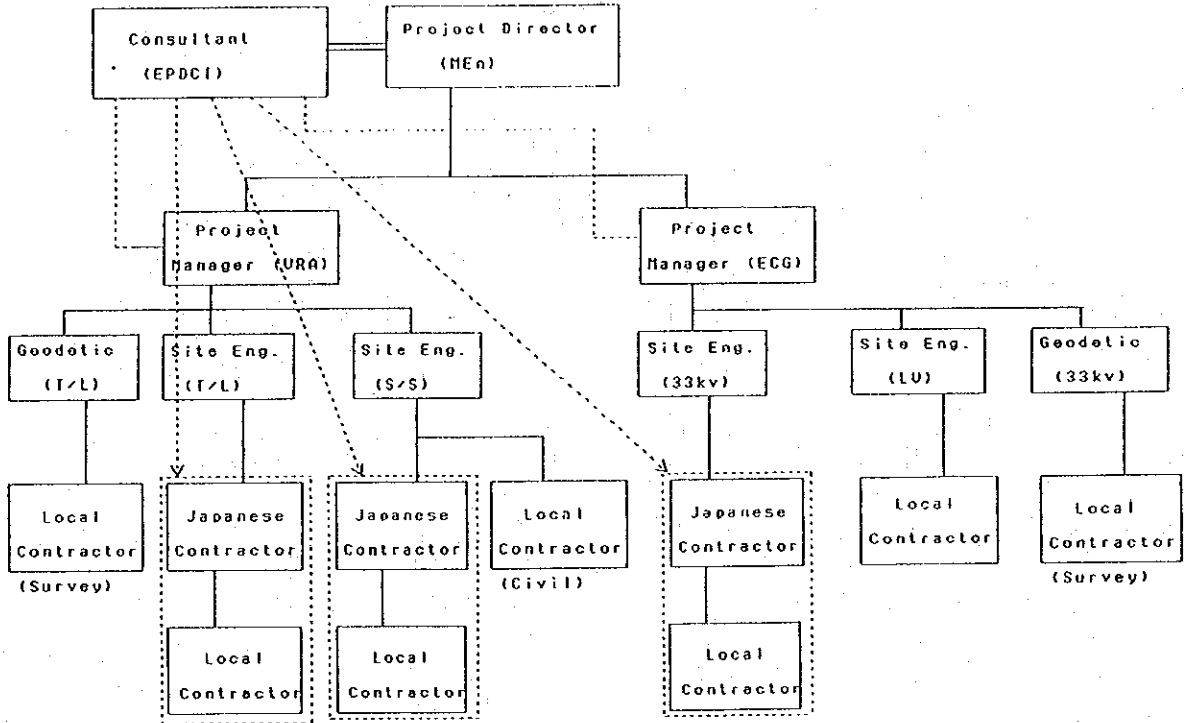
10. Site stockyard at Sogakope for the equipment and materials for the Project should be provided by ECG and VRA.

POSA

W.R. Duper

JSA

Fig. 1 Organization of Implementation Stage for Ada Foah Electrification Project



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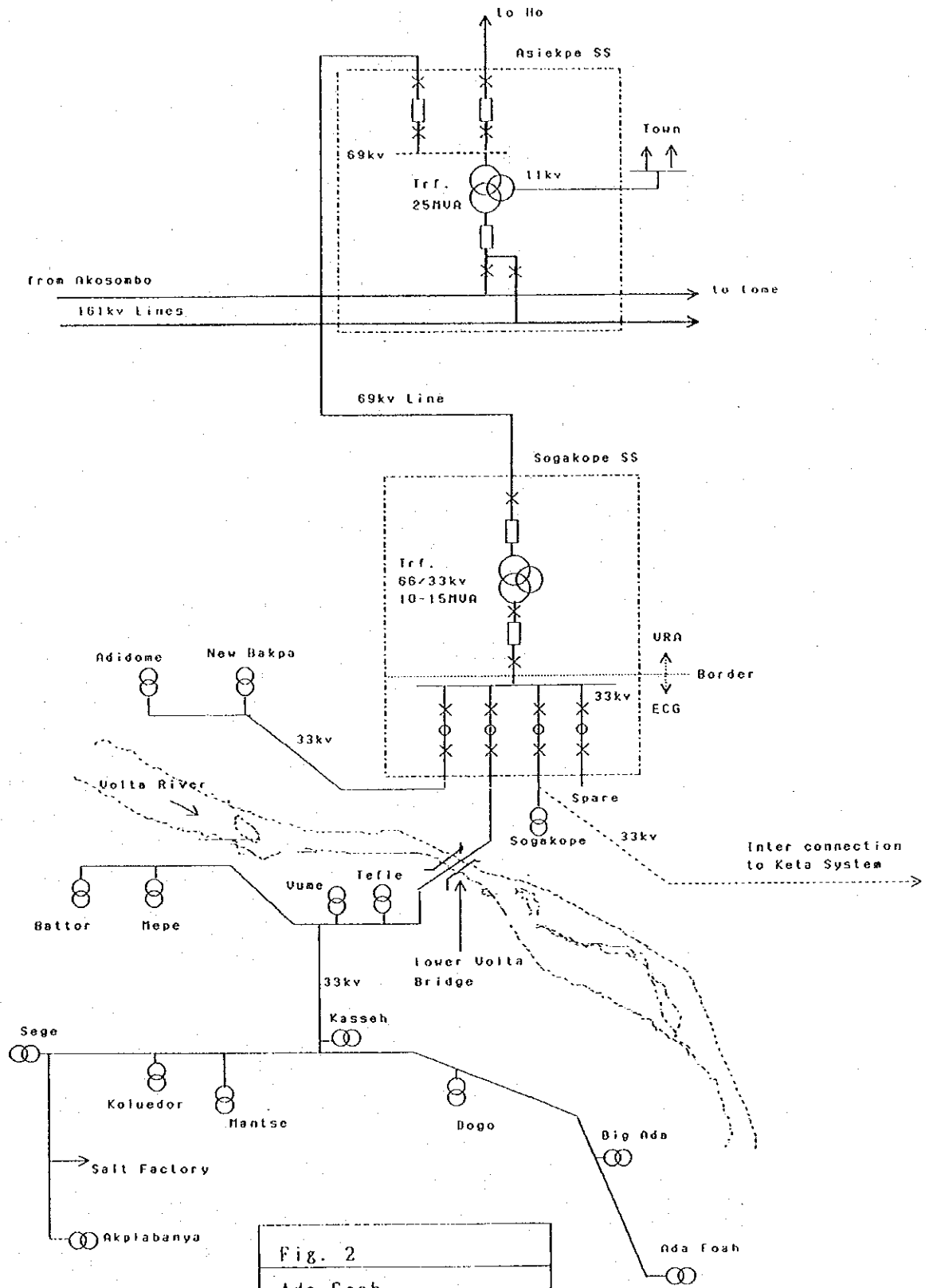


Fig. 2
 Ada-Foah
 Electrification Proj.
 Dec. 3, 1992

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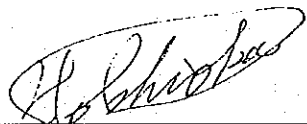
MINUTES OF DISCUSSIONS
BASIC DESIGN STUDY ON THE PROJECT FOR
ELECTRIFICATION IN LOWER VOLTA AREA
IN THE REPUBLIC OF GHANA
(CONSULTATION ON DRAFT REPORT)

In November 1992, the Japan International Cooperation Agency (JICA) dispatched a Basic Design Study team on the Project for Electrification in Lower Volta Area (hereinafter referred to as "the Project") to the Republic of Ghana, and through discussions, field survey, and technical examination of the results in Japan, has prepared the draft report of the study.

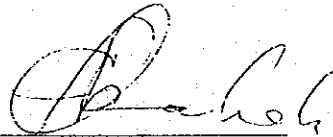
In order to explain and to consult the Ghanaian side on the components of the draft report, JICA sent to the Republic of Ghana a study team, which is headed by Mr. Hidetoshi Ishioka, First Basic Design Study Division, Grant Aid Study and Design Department of JICA, and is scheduled to stay in the country from March 9, 1993.

As a result of discussions, both parties confirmed the main items described on the attached sheets.

Accra, 15th March, 1993




Mr. Hidetoshi Ishioka
Leader
Basic Design Study Team



Mr. Charles Abakah
Director
International Economic
Division, Ministry of
Finance & Economic
Planning

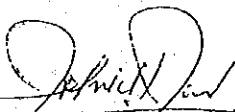
W I T N E S S E S



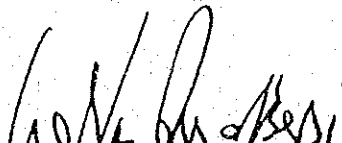
Mr. J. K. Owusu
Ag. Chief Director
Ministry of Energy



Mr. E. A. K. Kalitsi
Chief Executive
Volta River Authority



Mr. John K. Hagan
Managing Director
Electricity Corporation
of Ghana



Dr. F. Y. Addo-Abedi
Deputy Chief Executive
Ghana Highway Authority

A T T A C H M E N T

1. Title of the Project

The official title of the Project is changed to "The Project for Electrification in Lower Volta Area".

2. Components of Draft Report

The Government of the Republic of Ghana has agreed and accepted in principle the components of the draft report proposed by the Team. In addition the technical matters were agreed by both sides as shown in Annex-2.

3. Japan's Grant Aid System

- (1) The Government of the Republic Ghana has understood the system of Japanese Grant Aid explained by the Team.
- (2) The Government of the Republic of Ghana will take necessary measures, described in Annex-1 for smooth implementation of the Project on condition that the Grant Aid assistance by the Government of Japan is extended to the Project.

4. Further Schedule

The team will make the final report in accordance with the confirmed items, and sent it to the Government of the republic of Ghana by the end of May.

5. Operation and Maintenance for the Facilities

The Government of the Republic of Ghana stressed that it will allocate necessary budget for the works including operation

and maintenance of the facilities to be constructed as well as the equipment to be procured under the Project, on condition that the grant aid by the Government of Japan is extended to the Project.

Annex-1

Necessary measures to be taken by the Government of the Republic of Ghana in case Japan's Grant Aid is executed

1. To provide cleared, embanked and leveled land for the Project.
2. To provide all the foundations for substation equipment.
3. To provide the land for temporary site office, warehouse and stockyard during the implementation period.
4. To conduct the survey work for transmission and distribution lines according to specifications in the basic design study report (draft) prepared and explained by the Japanese team.
5. To provide temporary facilities such as water supply, drainage, electricity and fence, etc., in and around the sites.
6. To ensure speedy unloading, tax exemption, customs clearance of the goods for the Project at the port and/or airport of disembarkation.
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10. To bear all expenses, other than those to be borne by the Grant Aid necessary for the execution of the Project.
11. To assign full time counterpart engineers/technicians, to the Project, who will receive the technical transfer regarding the operation and maintenance technique for the Project.
12. To take necessary measures against and responsibility for the interruption of electricity during a construction period when it is necessary.
13. To ensure proper maintenance and operation of the facilities constructed and equipment procured under the Grant Aid.

ISSUES DISCUSSED

1. Implementation Agency

ECG and VRA insisted that Ministry of Energy & Mines (MEN) as an implementation agency is not realistic because all actual works will be done under responsibilities of ECG and VRA. JICA team ("the team") replied that implementation agency for the Project should be only one. Therefore both parties discussed and agreed the implementation agency is MEN as mentioned in the Minutes signed on 27th November, 1992 ("the Minutes"). The team requested to the Ghanaian side to have a meeting to confirm and decide the roles of each organization. (MEN, ECG and VRA)

2. Capacity of Main Transformer of Sogakope Substation

ECG have a plan to feed power to all Keta system from Sogakope Substation and Aflao is to be a stand-by. Accordingly, it is necessary to increase transformer capacity from 10MVA to 15MVA. The team agreed to the ECG proposal.

3. Take-Off of 69KV at Asiekpe Substation

VRA proposed for wood pole supported overhead line take-off instead of the use of 69KV power cable. The team replied that wood poles may not be suitable for 69KV line because the line should have a fundamental function as the supply source for all other facilities to be constructed under the Project. The team agreed to use overhead line construction.

4. Maximum Demand Meter in Sogakope Substation

ECG requested to the team to provide maximum demand meter and the team agreed.

5. Phase Conductors of 69KV Transmission Line

VRA requested the use of AAAC 185 sq.mm instead of ACSR and the team agreed.

6. Phase Conductors for Distribution Lines

ECG proposed that phase conductor should be copper in the area within 1km from seashore while aluminum for the others, and that bare conductors are to be used for low voltage lines instead of PVC insulated conductors described in the draft report. The team agreed. ECG proposed to the team to consider to purchase local made LV conductors but details are to be considered at the time of detailed design stage.

7. Pole-mounted Transformers

ECG is now on progress of the detailed design of low voltage distribution lines and it is expected that total number and capacity of the transformer may differ from the plan in the draft report. It is possible to make minor changes at the time of detailed design stage.

8. Training in Japan

ECG and VRA requested that four engineers - two from ECG and two from VRA - are to be dispatched to Japan for training mainly to learn maintenance method of gas insulated circuit breakers. The team replied that it is impossible to receive four trainees but there is possibility to receive two trainees.

9. Kind of Insulators

Insulators to be supplied under this Project are Japan-made high quality porcelain type.

JICA