

As seen in the above table, the conductor resistance of the cables and wires are almost equal, therefore, their electrical characteristics are considered adequate. The neutral wire proposed is 600 VCV 60 mm² wire. The reason why the rated amperage of the proposed aerial wire is larger than that of the cables is that the aerial wire size was determined primarily by the mechanical strength requirement.

2) Automated Distribution System

As mentioned in Section 2.3 hereof, replacement of the existing 4.16 KV distribution system with the 13.8 KV system is presently in progress. In the design, it is planned to use the switches of 15 KV rating which are capable of switching for both the 4.16 KV and 13.8 KV systems. It is proposed to use pole switches for the 4.16 KV system, however, the decision to use the primary side voltage of the transformers for operation of the switches will be designed for a rating of 13.8 KV.

Since the existing 4.16 KV distribution system is not design as a loop, but a radial system the requested pole switch (to be open at all times) is planned at the tail end of the 4.16 KV main, so that a loop system should be formed upon transition to the 13.8 KV system.

When the strength of the poles are considered, it will be more suitable to install the pole-mounted switches on a more sturdy pole, the wooden poles will be replaced with precast concrete poles, and these will be twelve (12) wooden poles replaced with concrete pole.

Locations of the pole switches were selected in consideration of the criteria listed below:

- The pole switches should be installed for the zones in which frequent problems and faults are expected.
- To the extent possible, the pole switches should be located where the maintenance can be easily performed.
- a. In order to select the optimum type of pole switch, a comparative study of the types of the air switch, gas-insulated switch and vacuum insulated switch should be made. The air switch is inferior to the vacuum and gas-insulated switch and are not listed herein.

Comparison of Pole-Top Switches

Item	Vacuum type	Gas-insulated type
Performance	Arcs disappears quickly, almost no damage to contactors. Good durability.	Arc disappearance time is longer than vacuum type, more damage to contactors. Less durable than vacuum type
Size and weight	Both are almost equal in size and weight.	
Switching surge	No major problems.	No major problems.
Maintenance	Maintenance free	Periodical change of gas and absorbent is required
Repair/disposal	No problem	There are problems in repair/disposal of gas and absorbent.
Safety	Good	Good
Economy	Similar	Similar

From the above study, the Poles-mounted of vacuum switch will be proposed in the design as its performance is excellent in its operation and maintenance.

b. Automatic Re-closing Relay (4 units)

As noted hereinbefore, the it is planned to change the 4.16 KV system to the 13.8 KV system. Taking into account that the existing system will be converted to the 13.8 KV system eventually, four (4) automatic re-closing relays rated for the 13.8 KV system are proposed in the design.

c. Fault section Indicator

The fault section indicator is proposed for installation in the main control room wherein the operators are stationed at all times.

d. A bucket track will be provided for maintenance and inspection of the overhead distribution lines. The maintenance vehicle will have a lift height of approximately 15 m to be able to maintain the poles, with a radius of approximately 11 m, and a lift capacity of approximately 2,000 kg.

4.3.4 Selection of Equipment

The proposed equipment was selected taking into account primarily the performance, reliability, ease of maintenance, low running cost, fast availability of the spare parts and other qualities.

Major equipment proposed and the outline specifications are given below.

(1) Equipment Schedule

Equipment	Quantity	Outline Specification
Electricity Generation Facilities;		
1. Diesel Engine	2	3,750 PS, 600 rpm, Radiator Cooling System
2. Generator	2	2,500 KW (3,125 KW), 600 rpm, 4,160 V, 60 HZ, 3-phase, 12-poles
3. Main Transformer	1	6,300 KVA (step-up), 4.16/13.87 KV, 60 HZ, 3-phase, Oil-immersed, Outdoor type
4. Station Transformer	1	300 KVA, 4.16/0.48 KV, 60 HZ, 3-phase, Oil-immersed, outdoor type
5. Generator Breaker Panel	2	7.2 KV, 600 A, 20 KA, Vacuum circuit breaker, Indoor cubicle type
6. Main Trans. Breaker Panel	1	7.2 KV, 600 A, 20 KA, Vacuum circuit breaker, Indoor cubicle type
7. Station Trans. Breaker Panel	1	7.2 KV, 600 A, 20 KA, Vacuum circuit breaker, Indoor cubicle type
8. NGR Panel	1	Generator neutral grounding, Indoor cubicle type
9. Feeder Circuit Breaker	1	7.2 KV, 600 A, 20 KA, Vacuum circuit breaker, Indoor cubicle type
10. Tie Breaker Panel	1	13.8 KV, 600 A, 21 KA, Vacuum circuit breaker, Indoor cubicle type
11. Feeder Circuit Panel	1	13.8 KV, 600 A, 21 KA, Vacuum circuit breaker, Indoor cubicle type
12. Feeder Circuit Breaker	2	13.8 KV, 600 A, 21 KA, Vacuum circuit breaker, Indoor cubicle type
13. Arrester Panel	1	13.8 KV, Indoor cubicle type
14. Generator Panel	2	Indoor cubicle type

15. Battery & Charger	1	DC 110 V, Control source
16. Feeder Control Panel	1	Indoor cubicle type
17. Generator Control Panel	1	Indoor cubicle type
18. Automatic Synchronizing Panel	1	Indoor cubicle type
19. Low Voltage Distribution Panel	5	Indoor cubicle type
20. Lighting Distribution Panel	1	Indoor cubicle type
Distribution Facilities:		
21. Aerial distribution line	26,000 m (approx.)	13.8 KV, 170 mm ² , Al-conductor
22. Neutral line	8,000 m (approx.)	13.8 KV, 85 mm ² , Al-conductor
23. Pole mounted switch	24	15.5 KV, 600 A, Vacuum switch
24. Fault section indicator	4	
25. Reclosing relay	4	
26. Pole (16 m)	58	Precast concrete
Pole (14 m)	104	Precast concrete
27. Bucket Truck	1	Lifting height 15 m (approx.), Working radius 11 m (approx.), Maximum load 200 kg (approx.)

4.3.5 Basic Design Drawing

The basic design is prepared for the following drawings:

No.	Name of Drawing	Drawing No.
1.	Site Plan	NP-0001
2.	Single Line Diagram-1	NP-0101
3.	Single Line Diagram-2	NP-0102
4.	Fuel Flow Diagram	NP-0103
5.	Lub. Oil Flow Diagram	NP-0104
6.	Cooling Water Flow Diagram	NP-0105
7.	Starting Air and Exhaust Gas Flow Diagram	NP-0106
8.	General Arrangement of Equipment	NP-0201
9.	Plan & Section	NP-0202
10.	Elevation, Section, Door & Window & Finish Schedule	NP-0203
11.	Distribution Feeder and Location of Pole Switch	PD-0001
12.	New Back Feeder Line	PD-0002

4.4 Implementation Plan

4.4.1 Implementation Policies

The project will be implemented in accordance with the general rules of the Japan Grant Aid and will formally commence after the agreement between both Governments of Japan and the Federated State of Micronesia as the Exchange of Notes has been concluded.

The detailed design will be started after the Japanese Consultant has been selected by the Government of Micronesia, the contract for the Detailed Design and Construction Supervision has been concluded between the two parties, and after the Government of Japan has verified the contract. After the detailed design has been completed, a Japanese Trading firm will be selected by competitive tendering. The construction contract will also be concluded with the Government of Micronesia, and after the verification by the Japanese Government, the contract will come into effect.

The project will, thereafter, be implemented by the Office of Budget, Planning and Statistics (OBPS) of the State Government of Pohnpei of the Federated States of Micronesia.

After the completion of the project, Pohnpei Utilities Corporation (PUC) will operate, manage and maintain the project.

Demarcation of the scope of works for the project between Japan's Grant Aid and the Federated States of Micronesia is as follows:-

(1) Scope of Construction Items by the Japanese Side

- 1) To procure 2.5 MW x 2 UNITS Diesel Power Plant with Power House
- 2) Installation of Back Feeder Systems
 - Nanphonmal - Sekera (Approx. 2.0 km) power distribution lines, 13.8 KV, 3 Phase, 4 Wire.
 - Nanphonmal - Kolonia Connection Point (Approx. 4.9 km) power distribution lines, 13.8 KV, 3 Phase, 4 Wire.
 - Dousokell Bridge (Approx. 0.25 km) power cable 13.8 KV, 3 Phase, 4 Wire.

- 3) Automated Distribution System
 - 24 number Pole-mounted switches.
 - Automatic reclosing relay and four (4) number fault section indicator (digital timing) to be provided in the control room in the power house.
 - 4) Supply of Maintenance Truck for power distribution system with bucket arm.
 - 5) Technical coordination work for interface between existing power system (2.5 MW x 2 plants) and this project.
- (2) Scope of Work Items by the Federated State of Micronesia Side.
- To clear, level and reclaim the Project Site
 - To provide fuel storage tank
 - To provide cooling water storage tank
 - To improve the access road to the project site and to arrange the site road
 - To construct wall and/or fences around the project site

The construction of the civil and building works will be carried out by local contractors employed by a Japanese Trading firm, and employment of Japanese skilled workers will be considered for such works as the erection of the structural steel for the power house and the installation of the equipment.

4.4.2 Implementation Method

The State Government of Pohnpei of the Federated Station of Micronesia has its own port facility which island countries have, and there are two companies which own and operate shipping companies and operate a regular shipping line between Japan. The vessels sail to the various countries in the South Pacific Islands with a schedule of one month, and one vessel departs from Japan towards the end of each month. The goods and material from Japan basically make use of this regular schedule.

There are no cargo handling equipment at the port in Pohnpei. The ship's hoisting gear of the scheduled boat to Pohnpei has a capacity of 19 tons, and will not be able to hoist the heaviest piece of the generator equipment of 28 tons. It will be necessary to obtain the assistance of the main vessel to unload the heavy piece of equipment of 28 tons. All other construction supplies and generator equipment can

be transported by use of the scheduled boat with assistance from the main vessel only when needed. Also, it will be necessary to provide adequate methods for inland transportation of heavy components of construction materials.

Due to the high rainfall and high humidity, utmost care must be taken with the storage of cement by constructing storage facilities, and the placing of concrete.

The construction and erection activities shall be carried out with special care so as not to disturb the operation of the existing power plant nor to damage these facilities since the Site is in the vicinity of the existing power plant.

4.4.3 Construction and Supervisory Plan

(1) Detailed Design

In order to confirm the site soil conditions, the soil investigation will be carried out by the consultant immediately after the contract comes into effect.

The detailed design will be carried out on the basis of the Basic Design.

The tender documents, consisting of the general conditions of contract, form of contract, the special conditions, the technical specifications including technical fill-in data, and drawings will be prepared according to information obtained and the detailed design.

The tender document will be approved by the State Government of Pohnpei.

(2) Tendering

The appointed consultant will assist the State Government of Pohnpei with the advance notice for the tender, the prequalification of the tender, tender announcement and delivery of the tender documents, evaluation of tenders, and will expedite the conclusion of the contract between the Federated States of Micronesia and the Japanese trading firm.

(3) Construction Supervision

After conclusion of the Contract the consultants will perform the duties of the Engineer designated in the contract documents.

The major duties to be carried out by the consultant for construction supervision are as follows:-

- Approval of the materials and equipment
- Inspection of equipment
- Quality control of the works
- Schedule Control
- Cost control

4.4.4 Procurement Plan

(1) Basic Idea for Procurement

The construction materials locally available are as follows:-

- Fine aggregates (sand)
- Coarse aggregates (crushed stone)
- Ready mixed concrete (two locations)
- Concrete blocks
- Wood

Materials other than the above were imported at the request of the respective projects. Cement and reinforcing bars, which are major items of construction materials, are periodically or regularly imported in order to satisfy the requirements of the works. Materials other than those locally available and cement and reinforcing bars will be imported from Japan for the project. The construction plant and equipment necessary for erection that is available in Pohnpei is as follows:-

- Truck Cranes (15 ton)
- Concrete mixer trucks (3 m³)
- Dump trucks (6 ton)
- Excavators (1.8 m³)
- Electric Pole erection trucks

Plant and equipment other than the above will temporarily be imported for the purpose of this project.

Trailer trucks for heavy cargos are available. However, unloading cranes or other devices for unloading heavy cargos will be imported from Japan if required.

(2) Procurement Materials

1) Materials to be Procured Locally:

Ready-mixed concrete, reinforcing steel bar, Portland Cement, sand, aggregates for concrete, concrete blocks, lumber and timber, gasoline, and diesel fuel oil.

2) Materials to be Procured from Japan:

Power Generation Equipment:
and Associated Facilities

Diesel-driven generating equipment and related components, foundation materials for generating equipment, transformers and substation equipment, tools for installation of equipment, building facilities to enclose the equipment, electrical lighting equipment and water supply materials, temporary construction materials.

High-Voltage Equipment:
and Materials

Equipment for high-voltage equipment and special tools, utility vehicles for elevated work, trucks to transport poles, 4-wheel drive vehicles, pole mounted vacuum switches, operating transformers, fault section indicator automatic re-closing relays and erection materials.

3) Equipment to be Procured from Third Countries

The equipment will not be procured from Third Countries from the following reasons:

- All materials and equipment required for the project can be procured in Japan, but can also be obtained in many other countries.
- Neighbouring Third Countries are Continental U.S., Guam, Australia, and other qualified countries.

- Continental U.S. : Electrical generating equipment can be procured from the U.S. but they are of the high-speed type and will not be suitable for this project. Also timely delivery of supplies cannot be relied on.
- Guam : Precast concrete poles are considered. The poles manufactured in Guam are hexagonal in shape and not compatible with the round poles currently in use. The poles are manufactured for a strength of 500 to 700 kg/m² and do not conform to the 1,000 kg/m² required.
- Australia : Alsthom, a French firm, is registered in Australia and engaged in the sales of electric generating equipment, but their diesel engines are procured from U.K., and there are problems with their reliability, together with timely delivery of replacement parts.

The project being conducted with financing from the Government of Pohnpei, consisting of power generating equipment (2.5 MW x 2 Plants) was tendered by International Competitive Tendering in which Japan won the contract on the basis of cost and capability. The electric distribution system for the south side of Pohnpei Island in 1990 was constructed with materials and equipment from Japan.

In view of the trust that the Government of Pohnpei has in Japanese goods, it has been decided to use materials and equipment from Japan.

4.4.5 Implementation Schedule

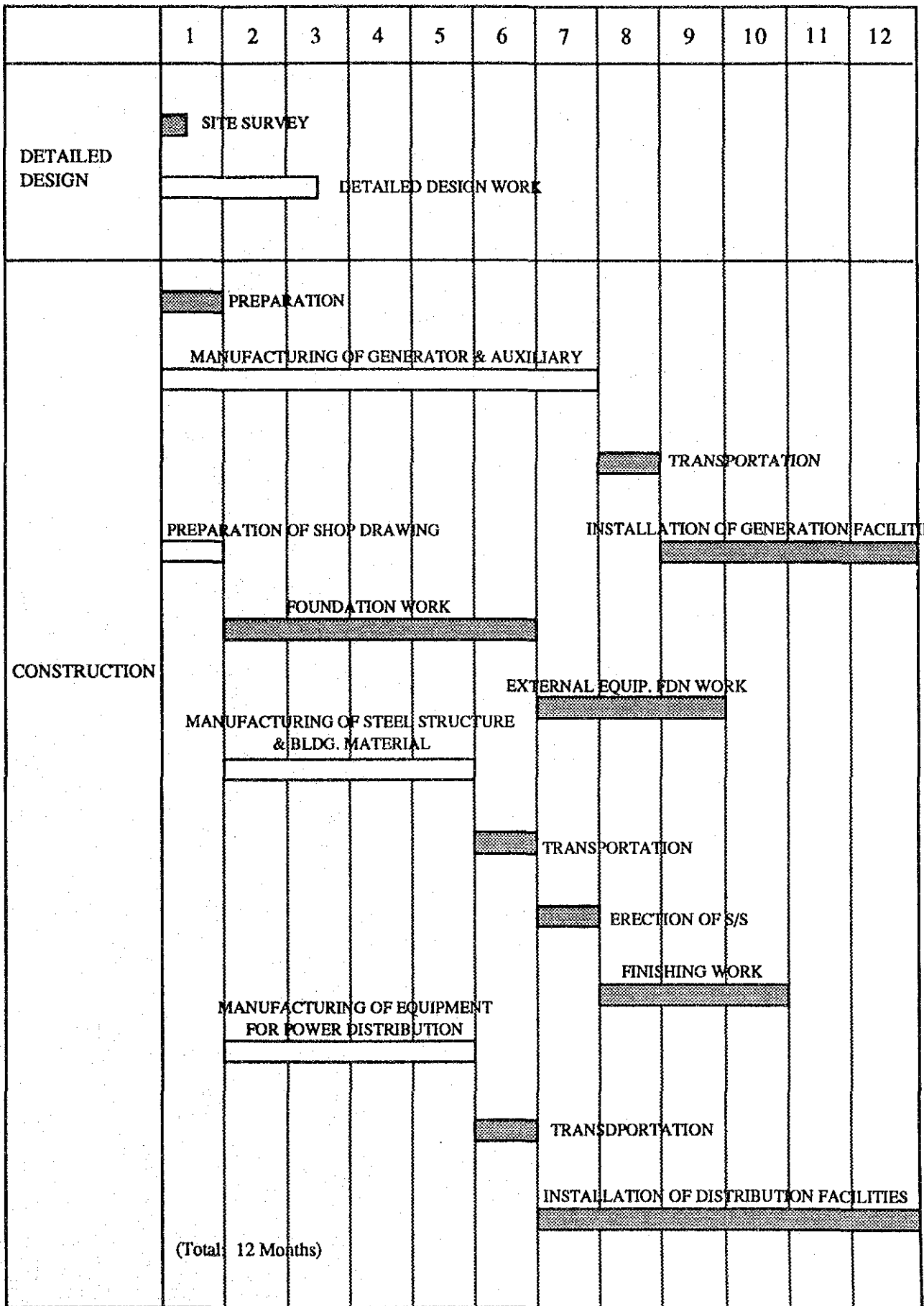
The time required by the Japanese side will be 4 months for detailed design, 12 months for construction (to include procurement of materials), for a total of 16 months.

The implementation schedule is shown on Fig.4.1.

Detailed demarcation of the project, in accordance with the general rules of Japan's Grant Aid, is as follows:-

No.	Work Items	Japan's Grant Aid	Micronesia
1.	Possession and grading of the project Site		○
2.	Access road		○
3.	Fencing for the Site and surrounding area		○
4.	Power plant building	○	
5.	2.5 MW x 2 Units diesel generator	○	
6.	Back feeders as defined	○	
7.	Automated distribution system as defined	○	
8.	One bucket truck for maintenance purposes	○	
9.	Interface works between the project and that currently under construction	○	
10.	Cooling water make-up		○
11.	Oil storage tank		○
12.	Storm drainage	○	
13.	Hook-up of telephone line		○
14.	Empty conduct for Telephone plant building	○	
15.	Furniture, desks/chairs		○
16.	Bank charge (for Japanese bank)		
	- A/P advice charge		○
	- Payment charge		○
17.	Transportation charge		
	- Transportation of materials and equipment from Japan	○	
	- Import tax and custom clearance charges		○
	- Inland transportation	○	
18.	Help for Japanese on arrival and during stay in FSM		○
19.	Expenses for the operation, arrangement, and maintenance of the project		○
20.	Consultant fee for Basic Design and Supervision	○	
21.	All expenses other than Japan's Grant Aid		○

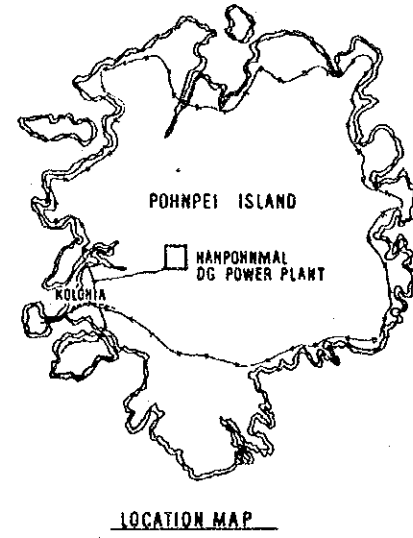
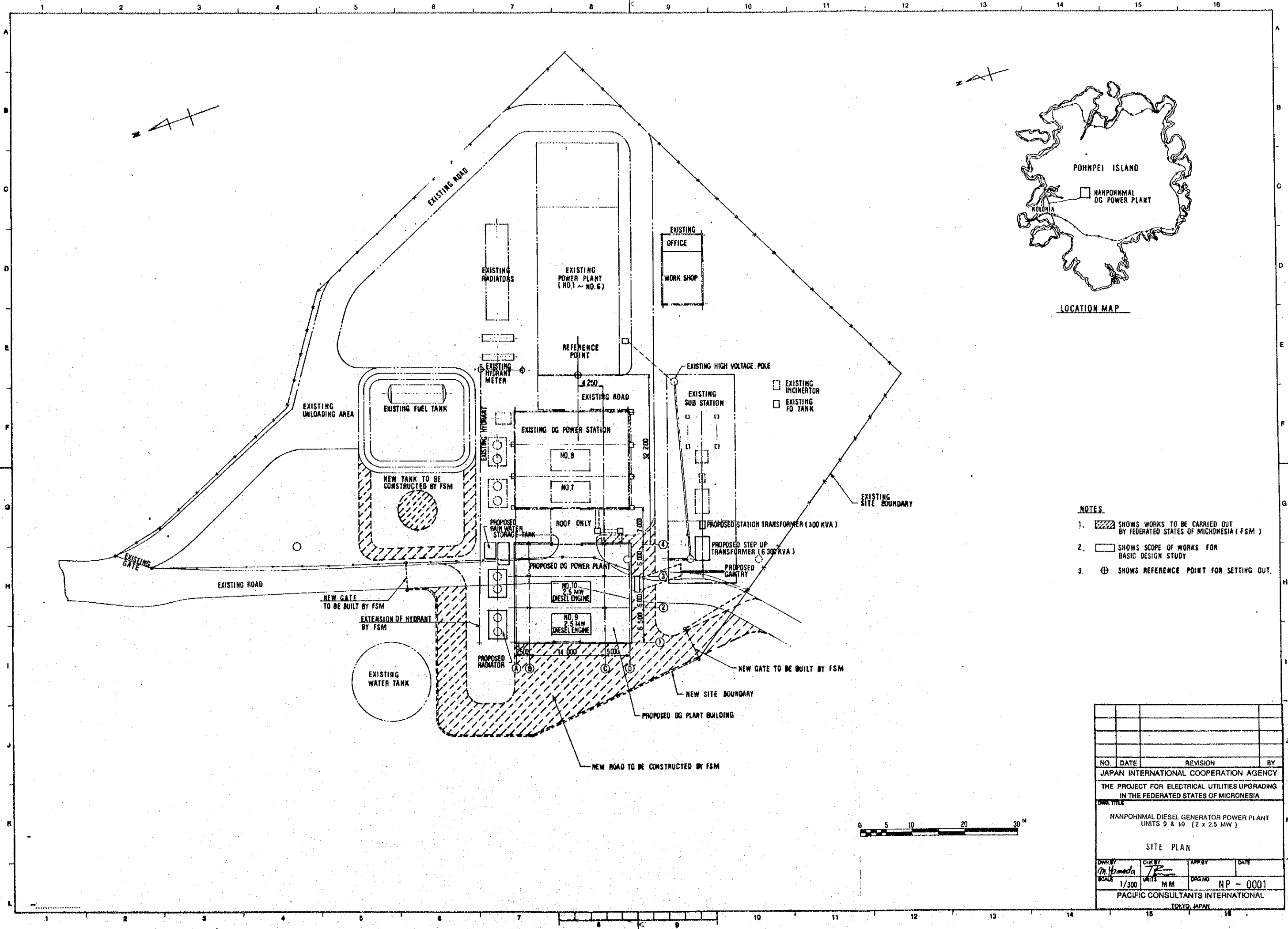
Fig. 4.1 Project Implementation Schedule



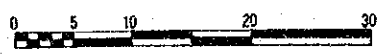
4.4.6 Scope of Works

Following scope to be undertaken by the Government of Federated States of Micronesia and all the expenses necessary to carry out such scope are to be borne by the Government of Federated States of Micronesia.

<u>Description of Works</u>	<u>Budgeted Cost</u>
To clear, level and reclaim the Project Site	\$50,000
To provide for fuel storage tank	\$50,000
To provide for cooling water storage tank	\$25,700
To improve the access road to the project site and to arrange the site road	\$75,000
To construct wall and/or fences around the project site	\$41,500
Total	\$242,200



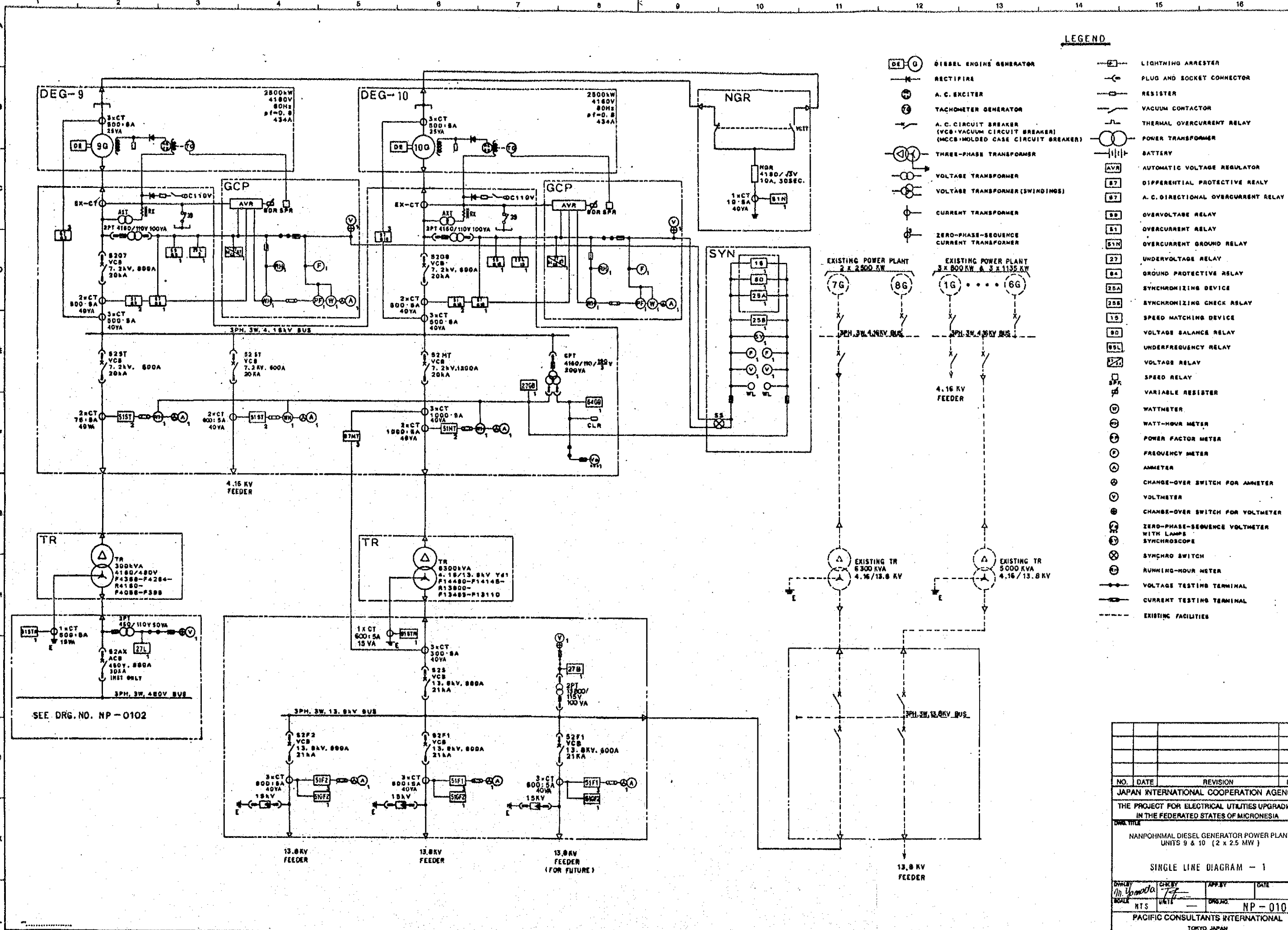
- NOTES**
1. SHOWS WORKS TO BE CARRIED OUT BY FEDERATED STATES OF MICRONESIA (FSM)
 2. SHOWS SCOPE OF WORKS FOR BASIC DESIGN STUDY
 3. SHOWS REFERENCE POINT FOR SETTING OUT.



NO.	DATE	REVISION	BY
JAPAN INTERNATIONAL COOPERATION AGENCY			
THE PROJECT FOR ELECTRICAL UTILITIES UPGRADING IN THE FEDERATED STATES OF MICRONESIA			
DRAWN TITLE			
NANPOHNMAL DIESEL GENERATOR POWER PLANT UNITS 9 & 10 (2 x 2.5 MW)			
SITE PLAN			
OWNED BY	DRAWN BY	APP. BY	DATE
	<i>M. Yamada</i>	<i>TR</i>	
SCALE	UNITS	DWG. NO.	
1/300	M.M.	NP - 0001	
PACIFIC CONSULTANTS INTERNATIONAL			
TOKYO, JAPAN			

LEGEND

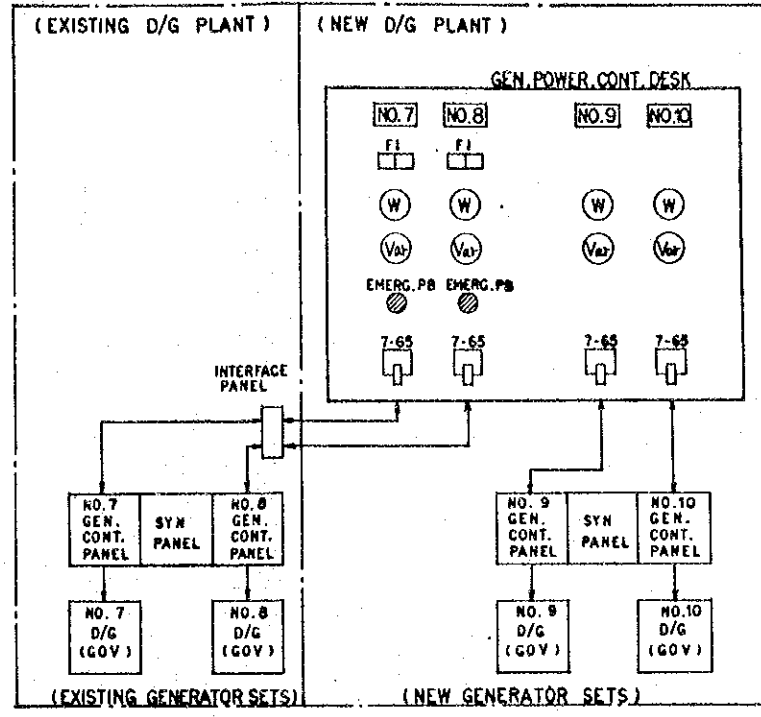
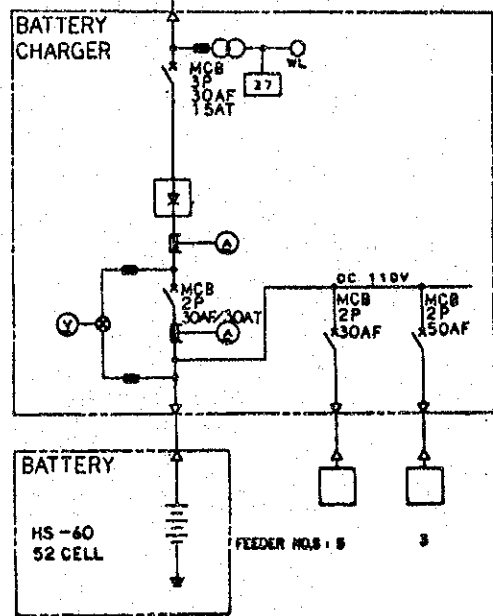
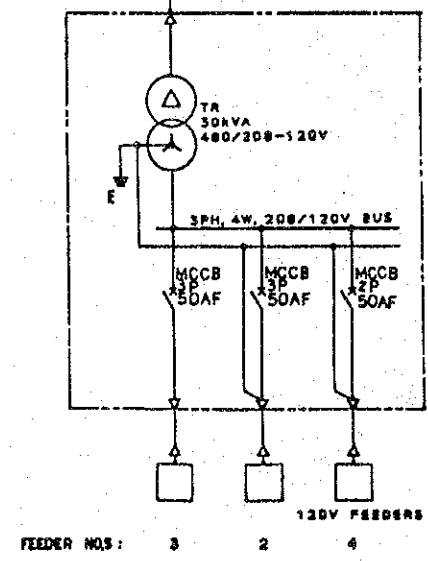
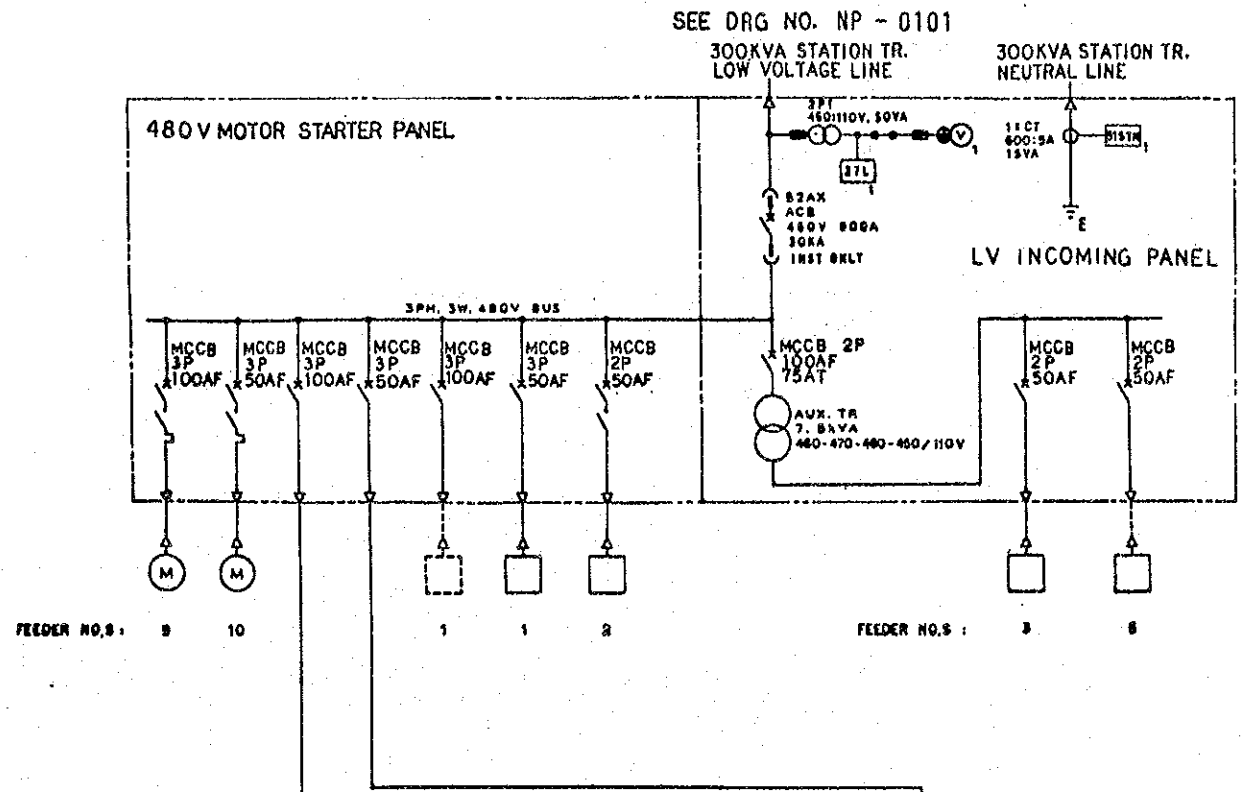
- DIESEL ENGINE GENERATOR
- RECTIFIER
- A.C. EXCITER
- TACHOMETER GENERATOR
- A.C. CIRCUIT BREAKER (VCB-VACUUM CIRCUIT BREAKER) (MCCB-MOLDED CASE CIRCUIT BREAKER)
- THREE-PHASE TRANSFORMER
- VOLTAGE TRANSFORMER
- VOLTAGE TRANSFORMER (WINDINGS)
- CURRENT TRANSFORMER
- ZERO-PHASE-SEQUENCE CURRENT TRANSFORMER
- LIGHTNING ARRESTER
- PLUG AND SOCKET CONNECTOR
- RESISTOR
- VACUUM CONTACTOR
- THERMAL OVERCURRENT RELAY
- POWER TRANSFORMER
- BATTERY
- AUTOMATIC VOLTAGE REGULATOR
- DIFFERENTIAL PROTECTIVE RELAY
- A.C. DIRECTIONAL OVERCURRENT RELAY
- OVERVOLTAGE RELAY
- OVERCURRENT RELAY
- OVERCURRENT GROUND RELAY
- UNDERVOLTAGE RELAY
- GROUND PROTECTIVE RELAY
- SYNCHRONIZING DEVICE
- SYNCHRONIZING CHECK RELAY
- SPEED MATCHING DEVICE
- VOLTAGE BALANCE RELAY
- UNDERFREQUENCY RELAY
- VOLTAGE RELAY
- SPEED RELAY
- VARIABLE RESISTOR
- WATTMETER
- WATT-HOUR METER
- POWER FACTOR METER
- FREQUENCY METER
- AMMETER
- CHANGE-OVER SWITCH FOR AMMETER
- VOLTMETER
- CHANGE-OVER SWITCH FOR VOLTMETER
- ZERO-PHASE-SEQUENCE VOLTMETER WITH LAMPS
- SYNCHROSCOPE
- SYNCHRO SWITCH
- RUNNING-HOUR METER
- VOLTAGE TESTING TERMINAL
- CURRENT TESTING TERMINAL
- EXISTING FACILITIES



TR
3000VA
4180/480V
F4388-F4284-
R4180-
F4088-F398

SEE DRG. NO. NP-0102

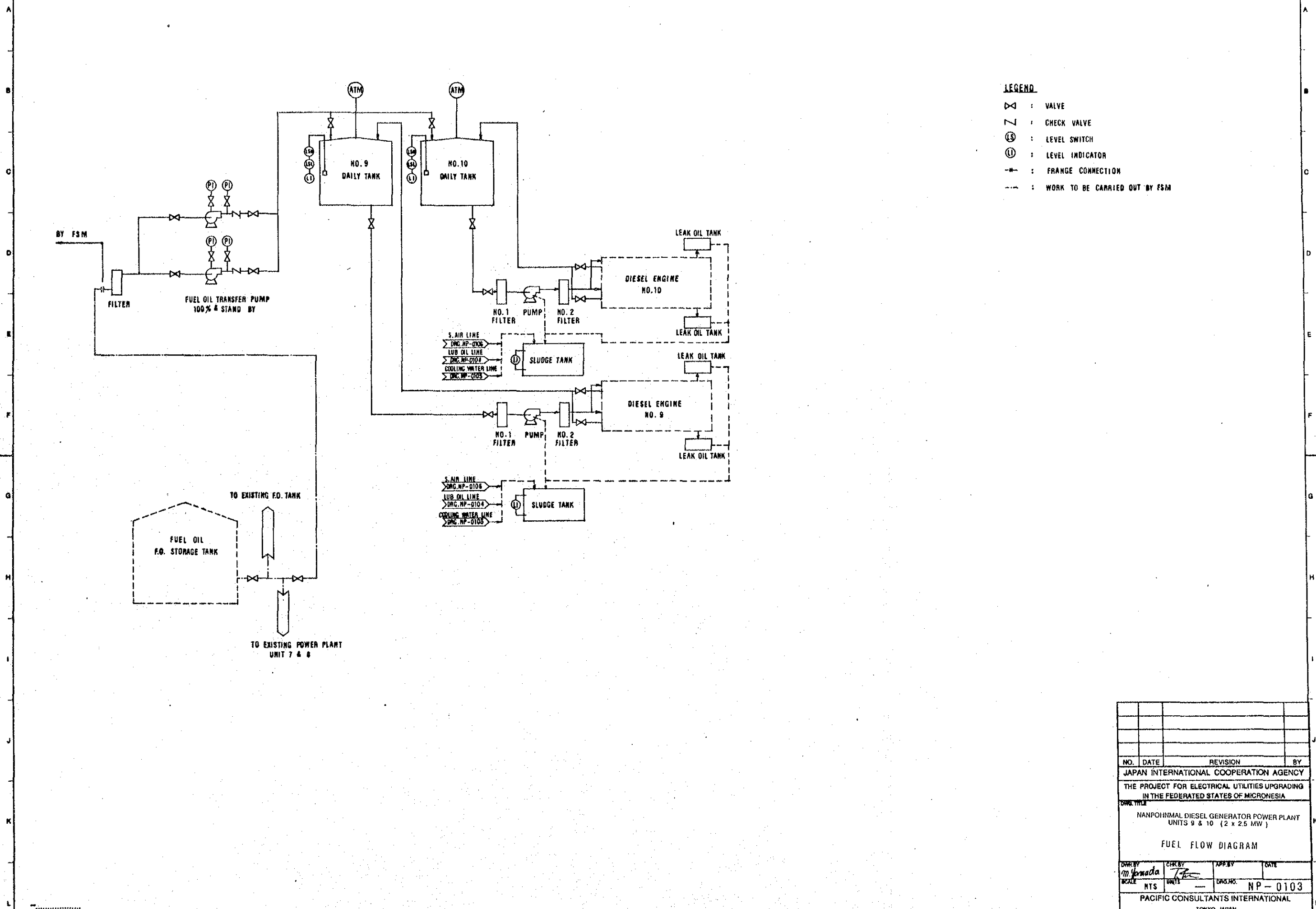
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JAPAN INTERNATIONAL COOPERATION AGENCY			
THE PROJECT FOR ELECTRICAL UTILITIES UPGRADING IN THE FEDERATED STATES OF MICRONESIA			
DRAWN BY NANPOHNMAL DIESEL GENERATOR POWER PLANT UNITS 9 & 10 (2 x 2.5 MW)			
SINGLE LINE DIAGRAM - 1			
DESIGNED BY M. Yamada	CHECKED BY T. ...	APP. BY	DATE
SCALE NTS	UNITS	DRG. NO. NP-0101	
PACIFIC CONSULTANTS INTERNATIONAL TOKYO, JAPAN			



SYSTEM CONFIGURATION OF GENERATOR POWER CONTROL

NO.	DATE	REVISION	BY
JAPAN INTERNATIONAL COOPERATION AGENCY			
THE PROJECT FOR ELECTRICAL UTILITIES UPGRADING IN THE FEDERATED STATES OF MICRONESIA			
DRAWN TITLE			
NANPOHNMAL DIESEL GENERATOR POWER PLANT UNITS 9 & 10 (2 x 2.5 MW)			
SINGLE LINE DIAGRAM - 2			
DRAWN	CHECKED	APP. BY	DATE
SCALE	NTS	UNITS	DRG. NO.
PACIFIC CONSULTANTS INTERNATIONAL			NP-0102
TOKYO, JAPAN			

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16



LEGEND

- ⊗ : VALVE
- ∇ : CHECK VALVE
- ⊕ : LEVEL SWITCH
- ⊙ : LEVEL INDICATOR
- † : FRANGE CONNECTION
- : WORK TO BE CARRIED OUT BY FSM

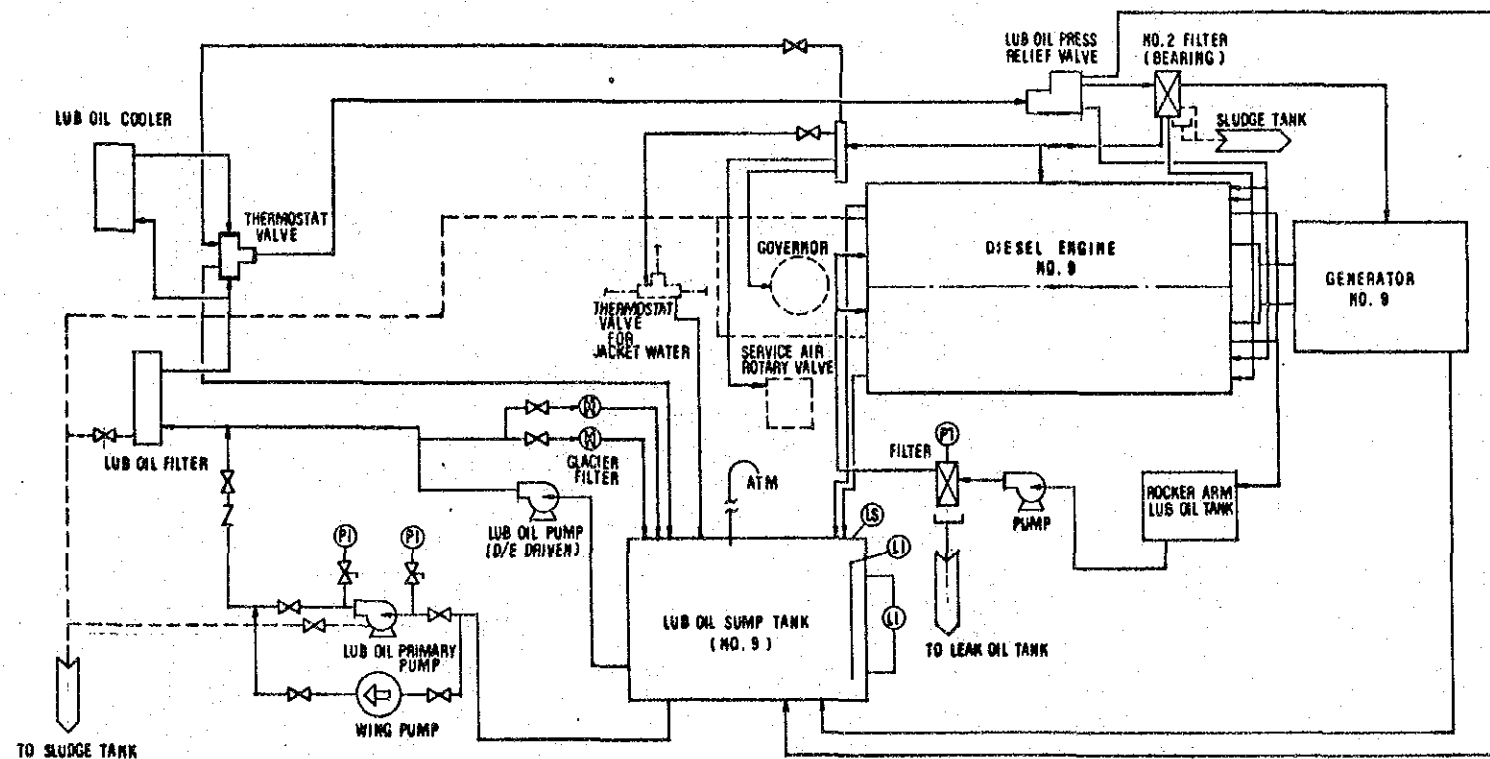
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JAPAN INTERNATIONAL COOPERATION AGENCY			
THE PROJECT FOR ELECTRICAL UTILITIES UPGRADING IN THE FEDERATED STATES OF MICRONESIA			
DRAWN TITLE			
NANPOHMAL DIESEL GENERATOR POWER PLANT UNITS 9 & 10 (2 x 2.5 MW)			
FUEL FLOW DIAGRAM			
DRW BY M Yamada	CHK BY TFC	APP BY	DATE
SCALE NTS	UNITS ---	DWG NO. NP-0103	
PACIFIC CONSULTANTS INTERNATIONAL TOKYO, JAPAN			

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16

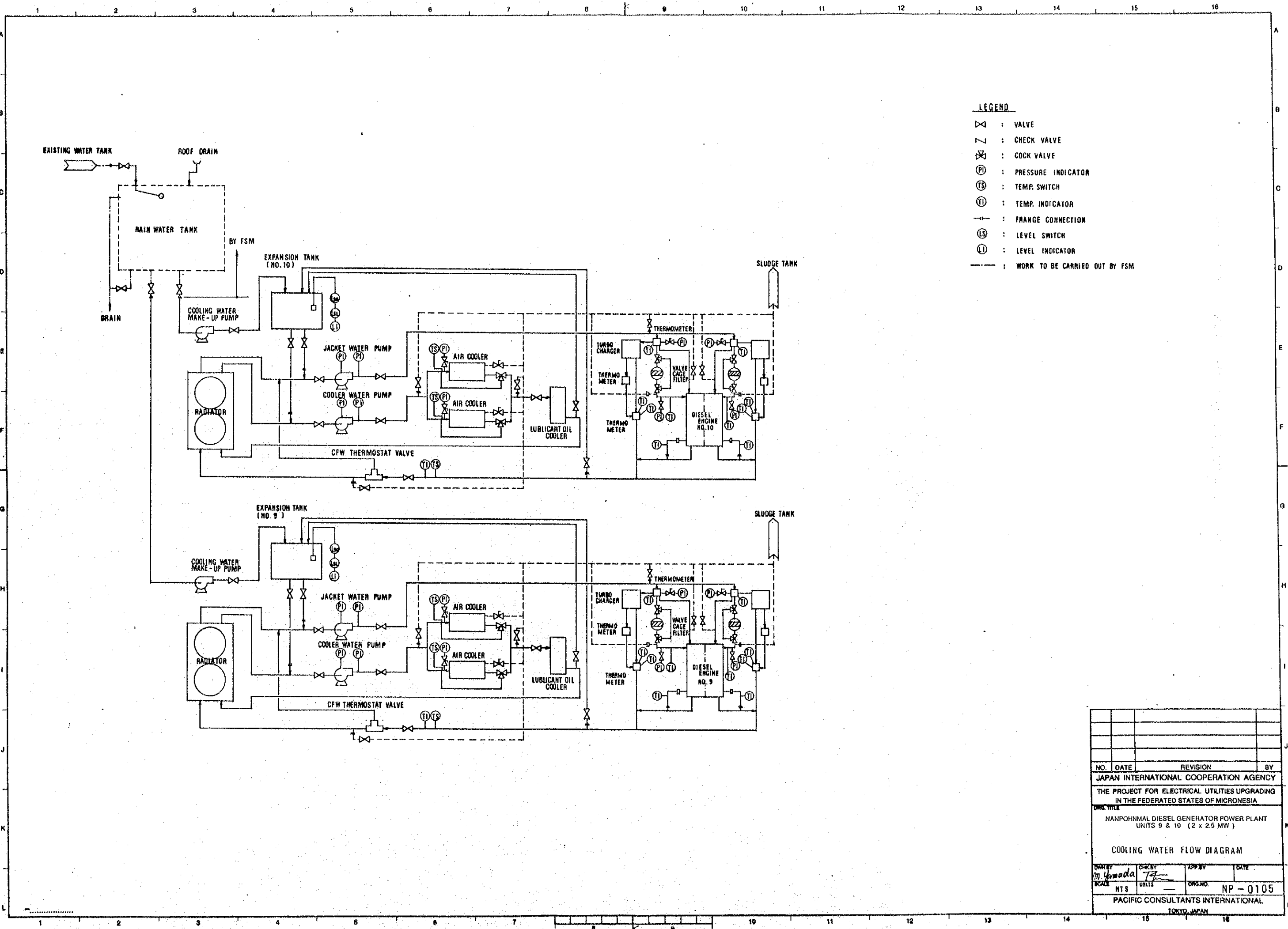
FOR LUB OIL PIPE LINE FOR GENERATOR UNIT NO.10
REFER TO UNIT NO.9 AS SHOW ON BELOW.

LEGEND

- ⊗ : VALVE
- Z : CHECK VALVE
- ⊕ : LEVEL INDICATOR
- ⊖ : LEVEL SWITCH
- ∩ : FUNNEL
- Ⓟ : PRESSURE INDICATOR

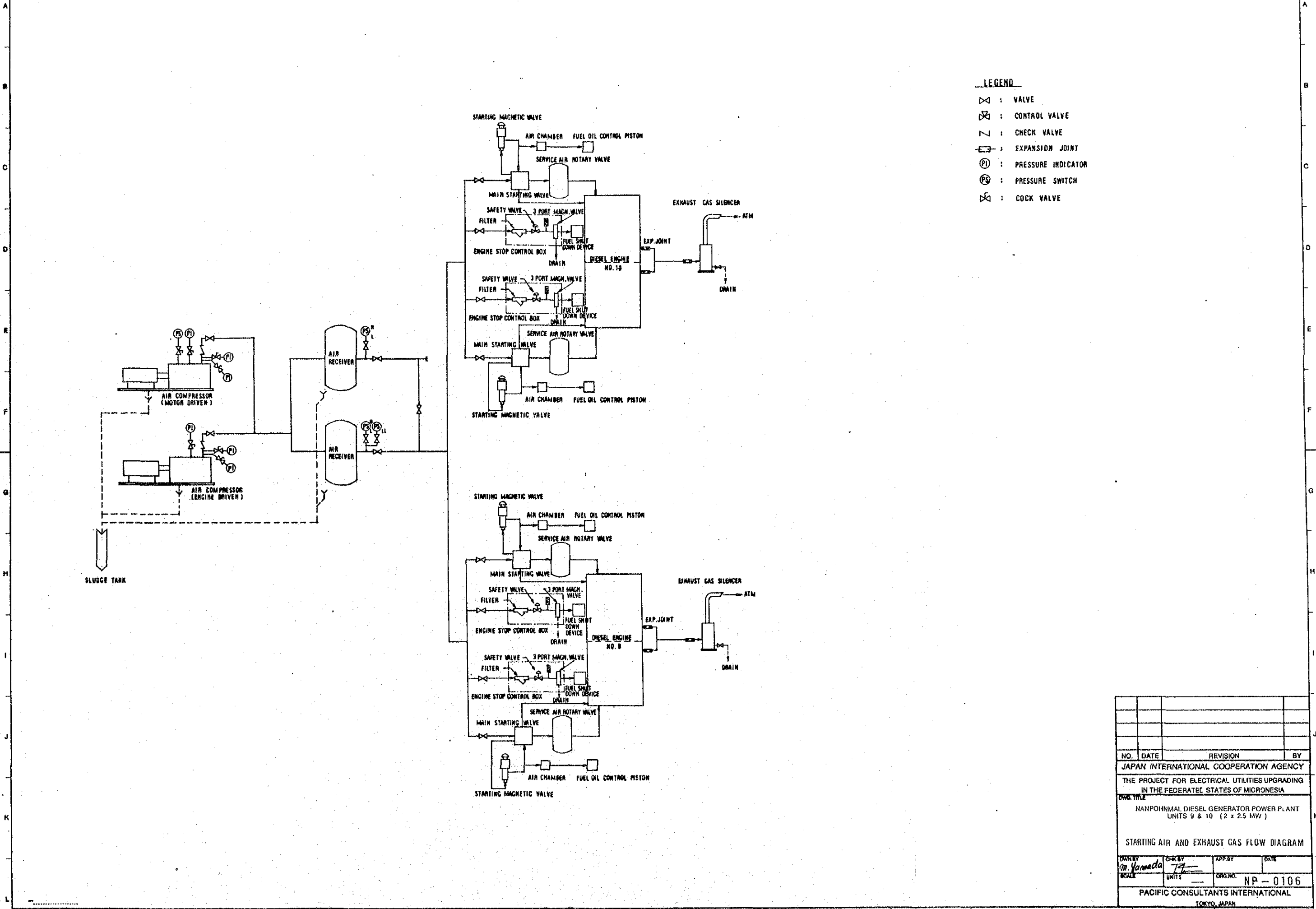


NO.	DATE	REVISION	BY
JAPAN INTERNATIONAL COOPERATION AGENCY			
THE PROJECT FOR ELECTRICAL UTILITIES UPGRADING IN THE FEDERATED STATES OF MICRONESIA			
DRAWN BY NANPOHNMAL DIESEL GENERATOR POWER PLANT UNITS 9 & 10 (2 x 2.5 MW)			
LUB. OIL FLOW DIAGRAM			
DRAWN BY <i>M. Yamada</i>	CHECK BY <i>R.</i>	APP. BY	DATE
SCALE NTS	UNITS --	DWG. NO. NP-0104	
PACIFIC CONSULTANTS INTERNATIONAL TOKYO, JAPAN			

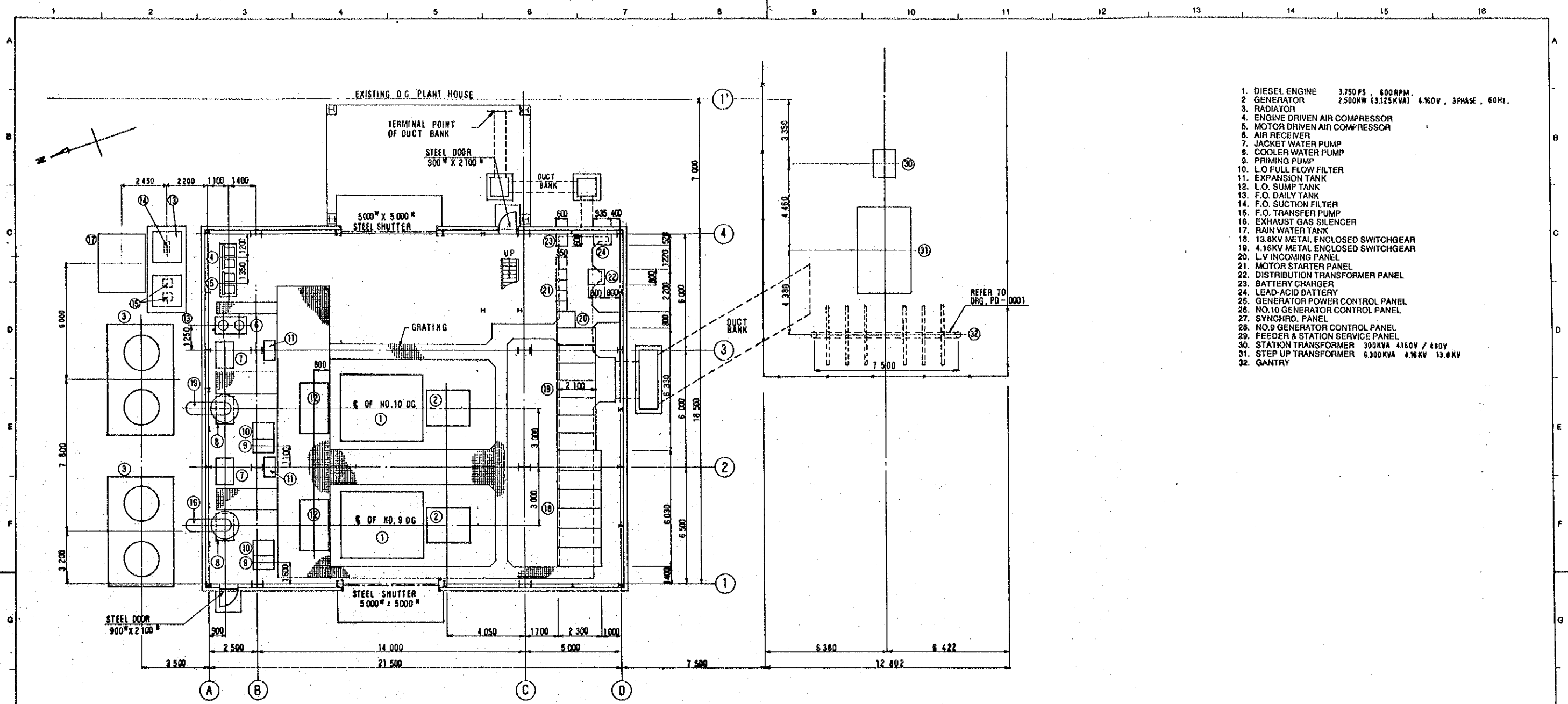


- LEGEND**
- ⊗ : VALVE
 - ∇ : CHECK VALVE
 - ⊗ : COCK VALVE
 - ⊕ : PRESSURE INDICATOR
 - ⊕ : TEMP. SWITCH
 - ⊕ : TEMP. INDICATOR
 - ⊕ : FRANGE CONNECTION
 - ⊕ : LEVEL SWITCH
 - ⊕ : LEVEL INDICATOR
 - : WORK TO BE CARRIED OUT BY FSM

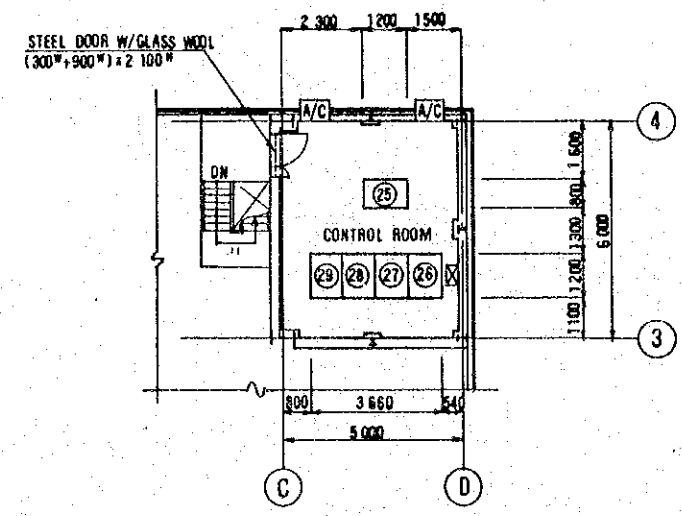
NO.	DATE	REVISION	BY
JAPAN INTERNATIONAL COOPERATION AGENCY			
THE PROJECT FOR ELECTRICAL UTILITIES UPGRADING IN THE FEDERATED STATES OF MICRONESIA			
OWNER TITLE			
NANPOHNMAL DIESEL GENERATOR POWER PLANT UNITS 9 & 10 (2 x 2.5 MW)			
COOLING WATER FLOW DIAGRAM			
DRAWN BY	CHECK BY	APP. BY	DATE
M. Yamada	T. F.		
SCALE	UNITS	DRAWING NO.	
HTS		NP-0105	
PACIFIC CONSULTANTS INTERNATIONAL			
TOKYO, JAPAN			



NO.	DATE	REVISION	BY
JAPAN INTERNATIONAL COOPERATION AGENCY			
THE PROJECT FOR ELECTRICAL UTILITIES UPGRADING IN THE FEDERATEL STATES OF MICRONESIA			
DRAWN TITLE			
NANPOINMAL DIESEL GENERATOR POWER PLANT UNITS 9 & 10 (2 x 2.5 MW)			
STARTING AIR AND EXHAUST GAS FLOW DIAGRAM			
DRAWN BY <i>M. Yamada</i>	CHECK BY <i>[Signature]</i>	APP. BY	DATE
SCALE	UNITS	DRG. NO.	NP-0106
PACIFIC CONSULTANTS INTERNATIONAL TOKYO, JAPAN			



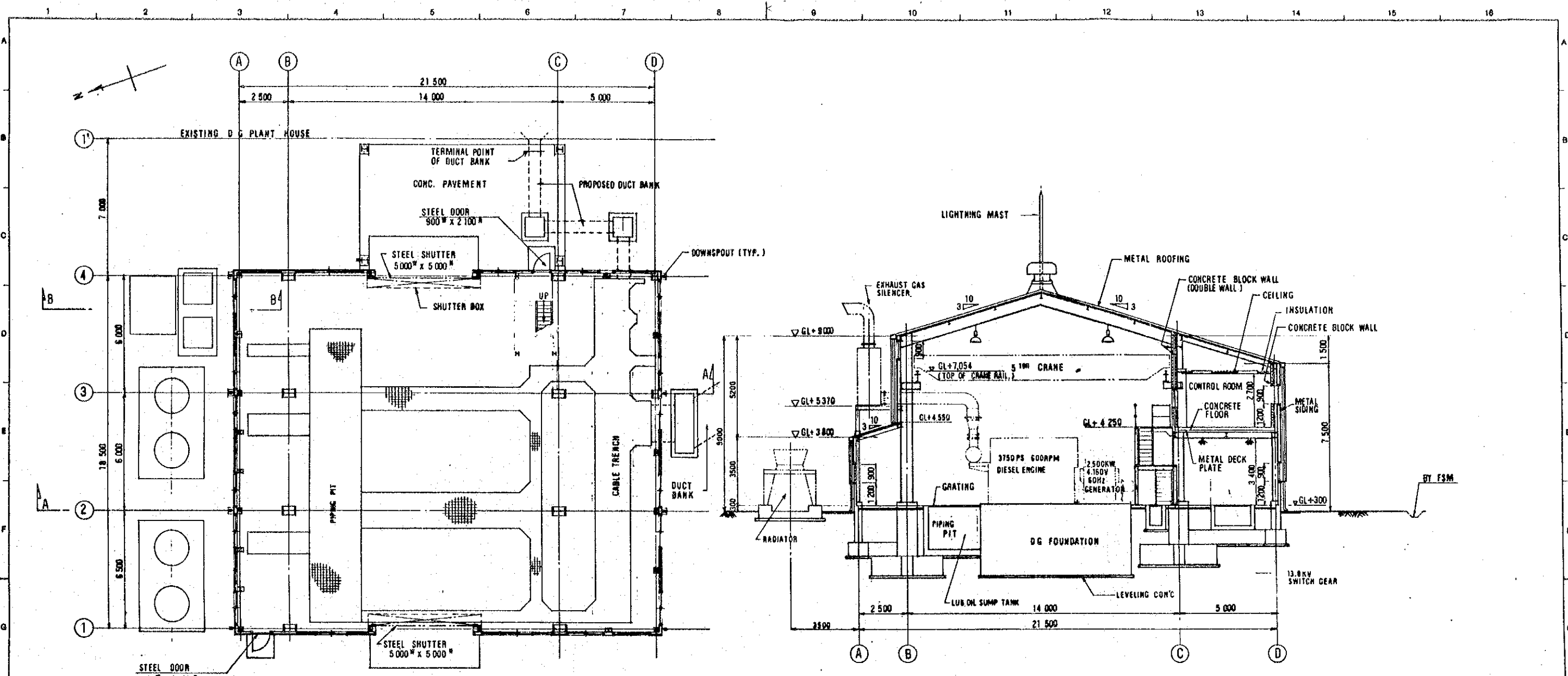
1ST FLOOR PLAN (GL + 300)



2ND FLOOR PLAN (GL + 4.250)

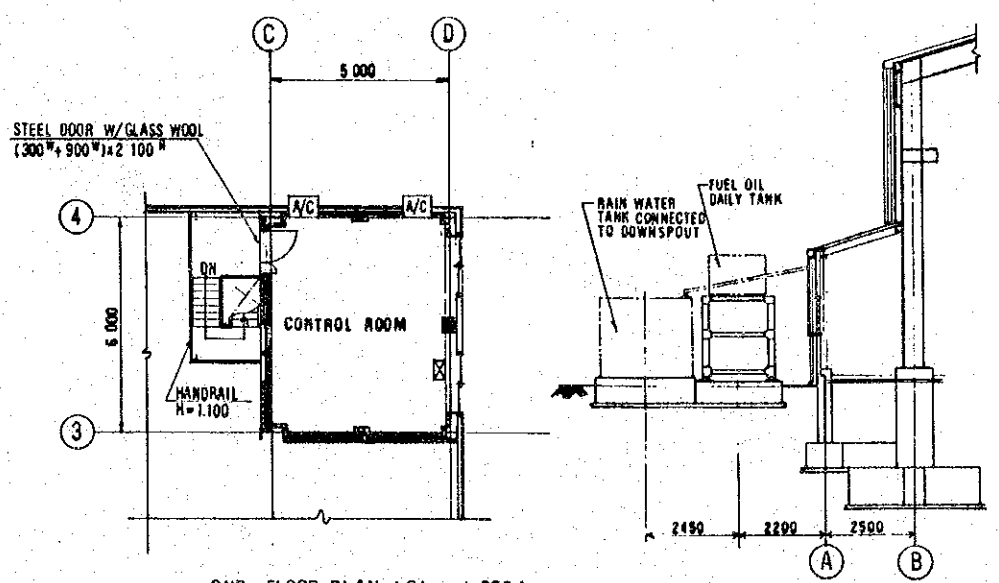
1. DIESEL ENGINE 3750 PS, 600RPM.
2. GENERATOR 2500KW (3.125KVA) 4.16KV, 3PHASE, 60Hz.
3. RADIATOR
4. ENGINE DRIVEN AIR COMPRESSOR
5. MOTOR DRIVEN AIR COMPRESSOR
6. AIR RECEIVER
7. JACKET WATER PUMP
8. COOLER WATER PUMP
9. PRIMING PUMP
10. L.O FULL FLOW FILTER
11. EXPANSION TANK
12. L.O. SUMP TANK
13. F.O. DAILY TANK
14. F.O. SUCTION FILTER
15. F.O. TRANSFER PUMP
16. EXHAUST GAS SILENCER
17. RAIN WATER TANK
18. 13.8KV METAL ENCLOSED SWITCHGEAR
19. 4.16KV METAL ENCLOSED SWITCHGEAR
20. LV INCOMING PANEL
21. MOTOR STARTER PANEL
22. DISTRIBUTION TRANSFORMER PANEL
23. BATTERY CHARGER
24. LEAD-ACID BATTERY
25. GENERATOR POWER CONTROL PANEL
26. NO.10 GENERATOR CONTROL PANEL
27. SYNCHRO. PANEL
28. NO.9 GENERATOR CONTROL PANEL
29. FEEDER & STATION SERVICE PANEL
30. STATION TRANSFORMER 300KVA 4160V / 480V
31. STEP UP TRANSFORMER 6300KVA 4.16KV 13.8KV
32. GANTRY

NO.	DATE	REVISION	BY
JAPAN INTERNATIONAL COOPERATION AGENCY			
THE PROJECT FOR ELECTRICAL UTILITIES UPGRADING IN THE FEDERATED STATES OF MICRONESIA			
NANPORNAL DIESEL GENERATOR POWER PLANT UNITS 9 & 10 (2 x 2.5 MW)			
GENERAL ARRANGEMENT OF EQUIPMENT			
DESIGNED BY <i>M. Yamada</i>	CHECKED BY <i>T. Tak</i>	APP. BY	DATE
SCALE 1/100	UNITS M M	PROJ. NO. NP - 0201	
PACIFIC CONSULTANTS INTERNATIONAL TOKYO, JAPAN			



1ST FLOOR PLAN (GL+300)

SECTION A - A



2ND FLOOR PLAN (GL+4250)

SECTION B - B

NO.	DATE	REVISION	BY
JAPAN INTERNATIONAL COOPERATION AGENCY			
THE PROJECT FOR ELECTRICAL UTILITIES UPGRADING IN THE FEDERATED STATES OF MICRONESIA			
PROJECT TITLE NANPOHNMAI DIESEL GENERATOR POWER PLANT UNITS 9 & 10 (2 x 2.5 MW)			
PLAN & SECTION			
DESIGNED BY M. Yamada	CHECKED BY T. ...	APPROVED BY	DATE
SCALE 1/100	UNITS M M	DWG. NO. N P - 0202	
PACIFIC CONSULTANTS INTERNATIONAL TOKYO, JAPAN			

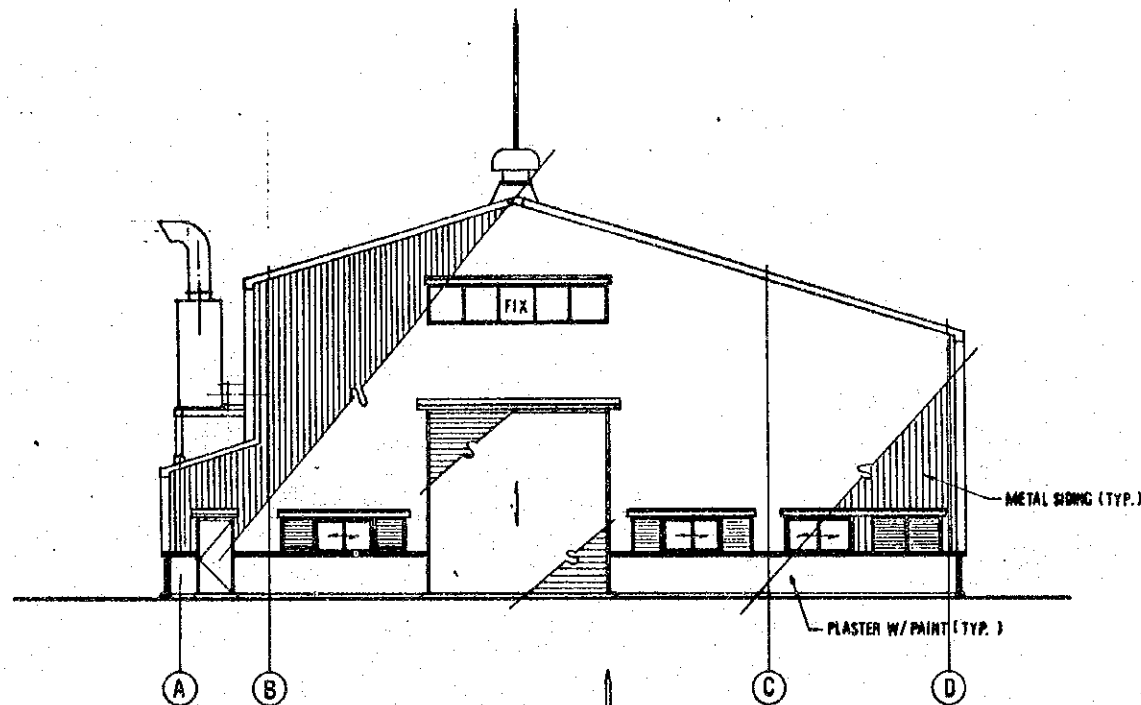
FINISH SCHEDULE

EXTERIOR FINISH

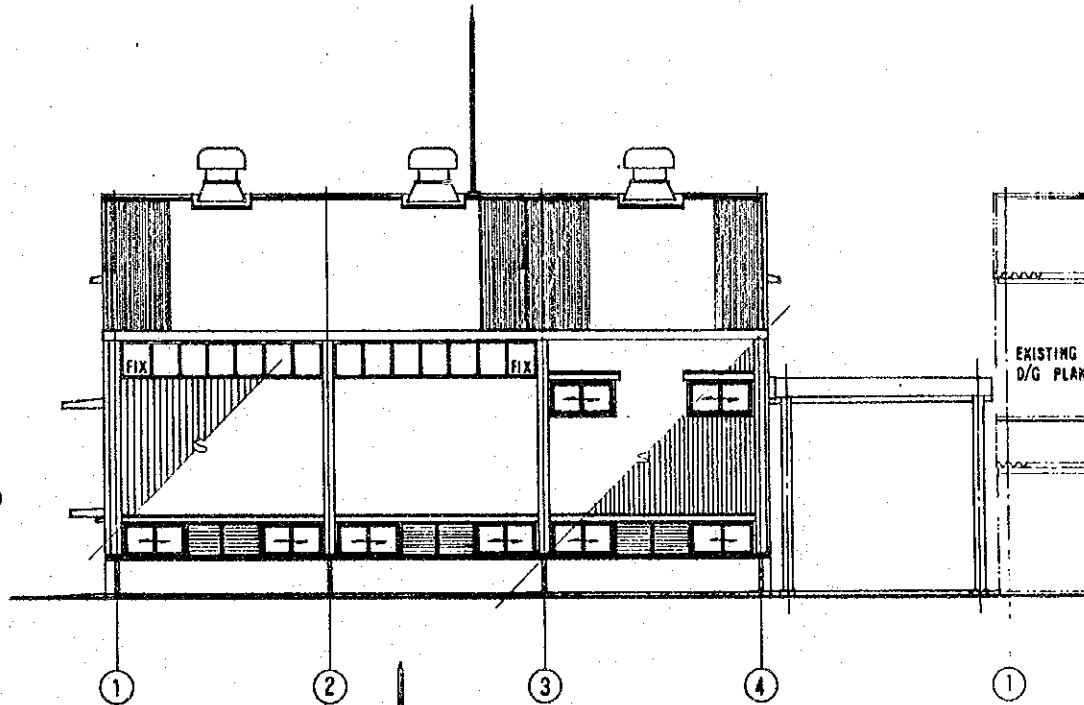
WALL	POLY VINYLIDENE A-FLUORIDE PRE-COATED STEEL SHEET SIDING (THK. 0.5 ^{MM} H=20 ^{MM} , PLASTER W/PAINT ON CONC. BLOCK)	
ROOF	POLY VINYLIDENE A-FLUORIDE PRE-COATED STEEL SHEET ROOFING (THK. 0.8 ^{MM} H=85 ^{MM}) WITH THERMAL INSULATION THK. 5 ^{MM}	
WINDOW	STEEL WINDOW W/ PAINT	
DOOR	STEEL DOOR FOR DG HALL --- STEEL DOOR W/PAINT (900 ^W x 2100 ^H) STEEL DOOR FOR CONTROL ROOM --- STEEL DOOR W/PAINT INSULATED TYPE (900 ^W x 2100 ^H)	
ROLL-UP DOOR	STEEL SHUTTER W/PAINT W/PAINT (5000 ^W x 5000 ^H) WITH HAND OPERATED	
LOUVER	STEEL LOUVER W/PAINT WITH MOSQUITO NET	
EAVES GUTTER	GI SHEET W/PAINT (THK. 1.6 ^{MM})	
DOWNSPOUT	100 ^Ø PVC PIPE COVERED WITH STEEL FLASHING W/ PAINT	

INTERIOR FINISH

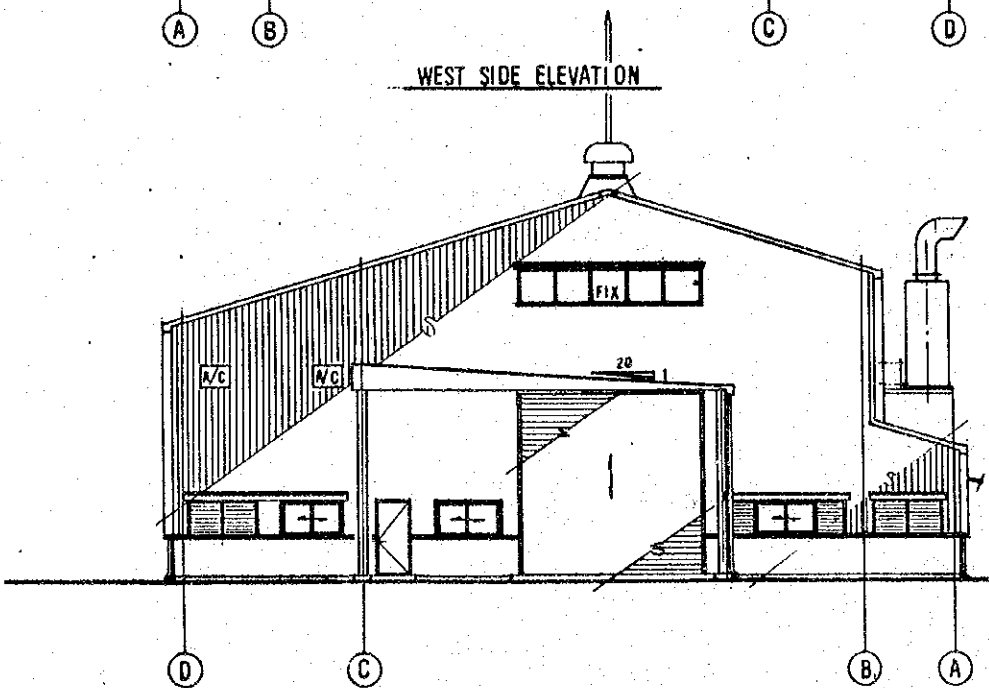
DESIGNATION	FLOOR	WALL	CEILING
DG HALL	CONCRETE STEEL TROWEL WITH HARDENER	EXPOSED METAL SIDING	EXPOSED METAL ROOFING INSULATED TYPE
CONTROL ROOM	CONCRETE STEEL TROWEL WITH HARDENER	MORTAR PLASTER W/PAINT ON CONC. BLOCK THK. 15 ^{MM}	ACOUSTIC PLASTER BOARD THK. 9 ^{MM} W/ INSULATION



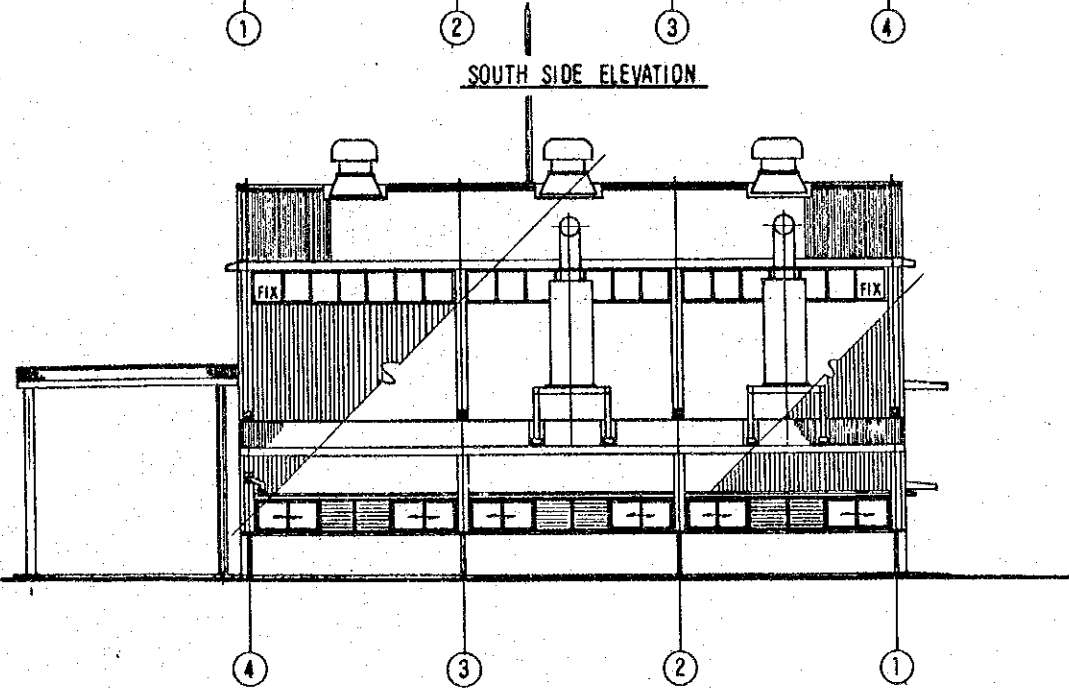
WEST SIDE ELEVATION



SOUTH SIDE ELEVATION

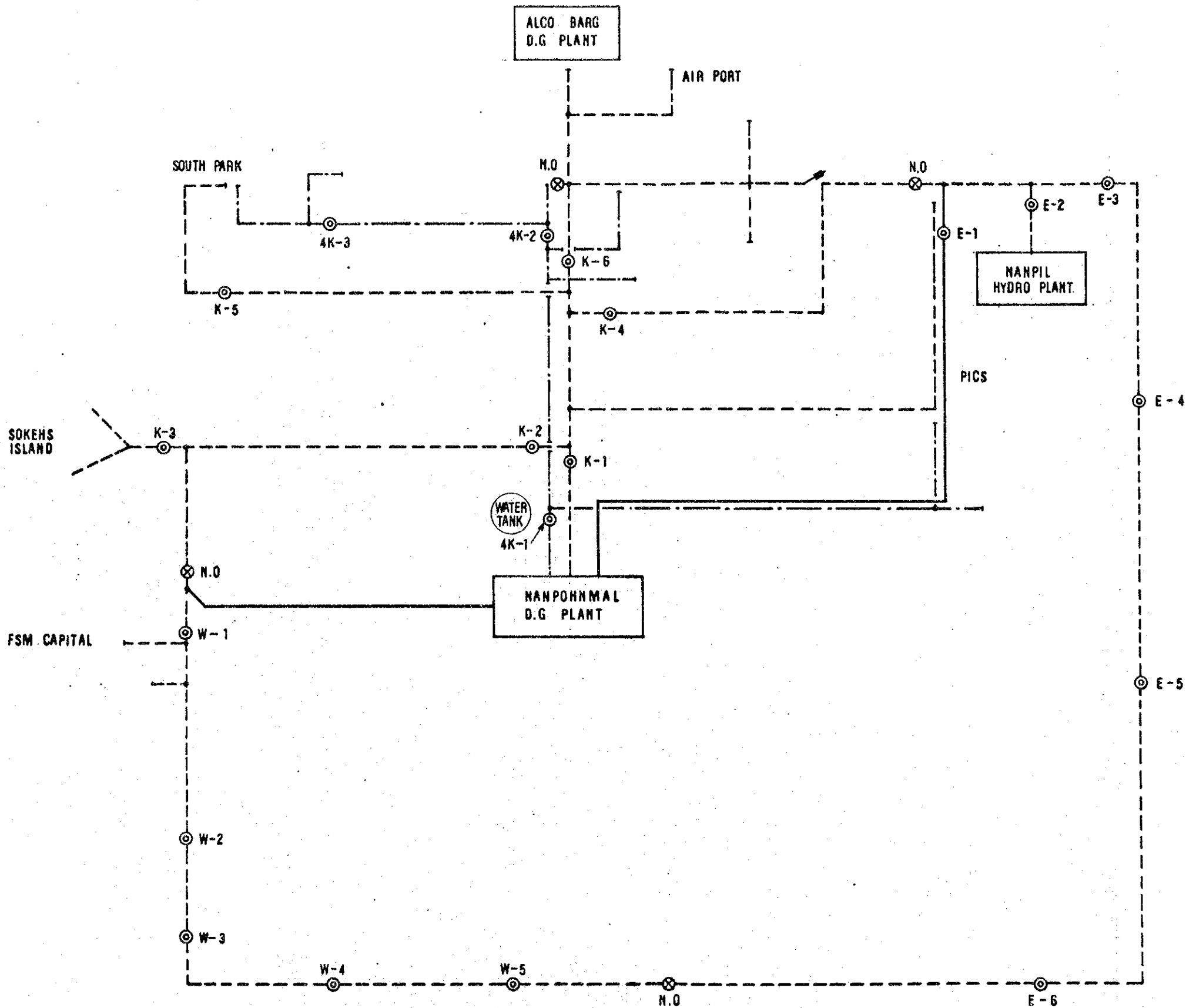


EAST SIDE ELEVATION



NORTH SIDE ELEVATION

NO.	DATE	REVISION	BY
JAPAN INTERNATIONAL COOPERATION AGENCY			
THE PROJECT FOR ELECTRICAL UTILITIES UPGRADING IN THE FEDERATED STATES OF MICRONESIA			
DRAWN TITLE			
NANPOHNAL DIESEL GENERATOR POWER PLANT UNITS 9 & 10 (2 x 2.5 MW)			
ELEVATION, SECTION, DOOR & WINDOW & FINISH SCHEDULE			
DRAWN BY M. Yamada	CHECK BY T. [Signature]	APP BY	DATE
SCALE 1/100	UNITS MM	DWG. NO. NP-0203	
PACIFIC CONSULTANTS INTERNATIONAL TOKYO, JAPAN			



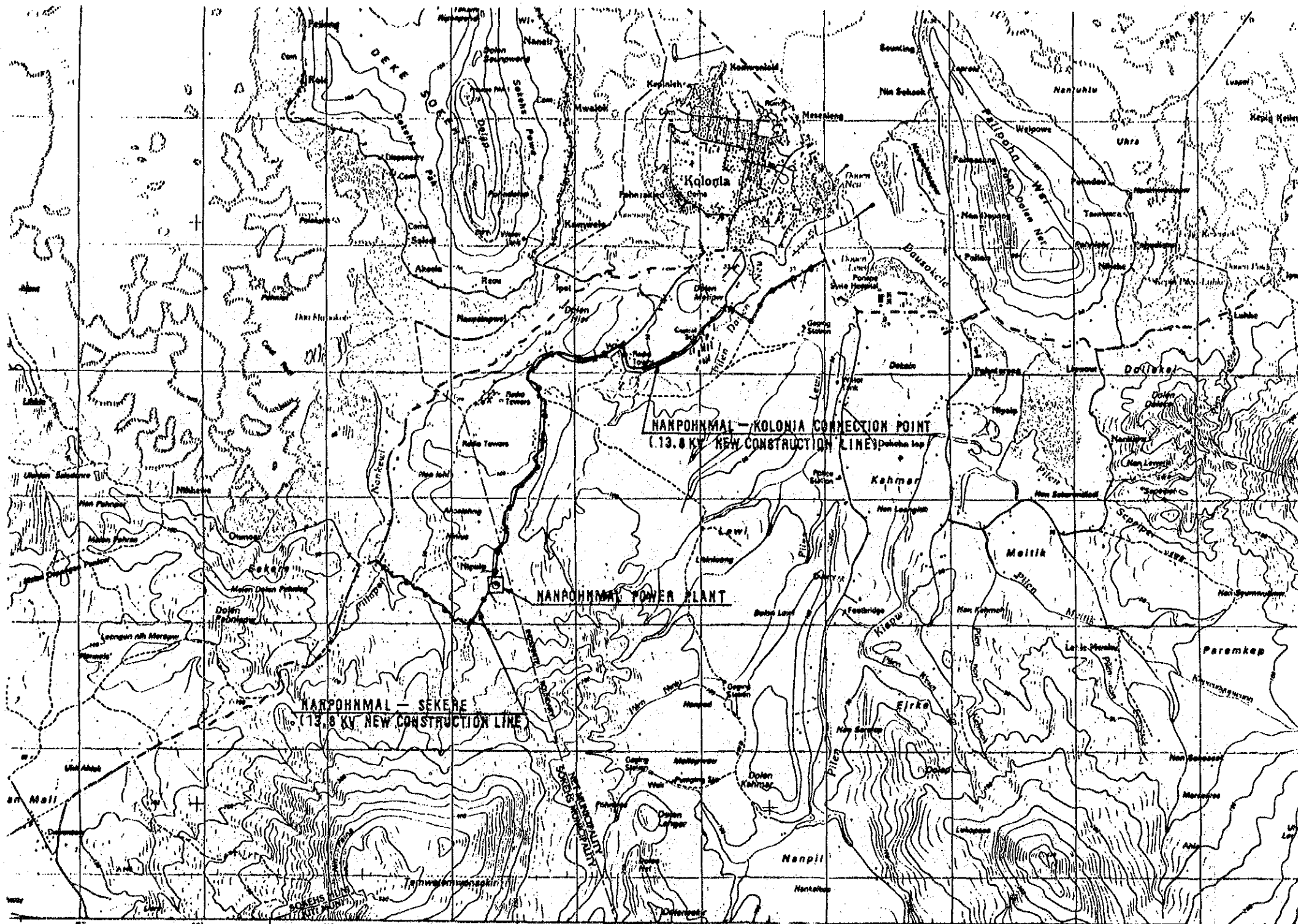
LEGEND

- : EXISTING 13.8 KV DIST. FEEDER
- : EXISTING 4.16 KV DIST. FEEDER
- : NEW 13.8 KV BACK FEEDER
- ⊙ : POLE SWITCH (20 NOS)
- ⊗ N.O. : POLE SWITCH (NORMAL OPEN , 4 NOS)

NOTES

- K1~K6 : 13.8 KV KOLONIA FEEDER
- 4K1~4K3 : 4.16 KV KOLONIA FEEDER
- E1~E6 : 13.8 KV EAST FEEDER
- W1~W5 : 13.8 KV WEST FEEDER

NO.	DATE	REVISION	BY
JAPAN INTERNATIONAL COOPERATION AGENCY			
THE PROJECT FOR ELECTRICAL UTILITIES UPGRADING IN THE FEDERATED STATES OF MICRONESIA			
DWA. TITLE			
POWER DISTRIBUTION SYSTEM DISTRIBUTION FEEDER AND LOCATION OF POLE SWITCH			
DWN. BY	CHK. BY	APP. BY	DATE
SCALE	UNITS	DRG. NO.	PD - 0001
PACIFIC CONSULTANTS INTERNATIONAL TOKYO, JAPAN			



NO.	DATE	REVISION	BY
JAPAN INTERNATIONAL COOPERATION AGENCY			
THE PROJECT FOR ELECTRICAL UTILITIES UPGRADING IN THE FEDERATED STATES OF MICRONESIA			
DWG. TITLE			
POWER DISTRIBUTION SYSTEM			
NEW BACK FEEDER LINE			
CHKD BY	CHKD BY	APP. BY	DATE
SCALE	UNITS	DRG. NO.	PD - 0002
PACIFIC CONSULTANTS INTERNATIONAL			
TOKYO, JAPAN			

CHAPTER 5 PROJECT EVALUATION AND CONCLUSION

Chapter 5 Project Evaluation and Conclusion

This project is planned for the purpose of upgrading the electricity supply system to make a stable electricity supply possible in the State of Pohnpei, through the construction of a new diesel engine generator plant of 5 MW capacity (with 2 units of 2.5 MW generator) and the upgrading and improvement of the existing electricity distribution network. At present, the electricity supply in the State is in a serious condition. The following effects are expected after the implementation of the Project.

1. It will become possible to provide all the stand-by individual consumers with electricity, thus contribute to stabilization and upgrading of living environment of the public. In three to four years after completion of the project, about 7,900 individuals or approximately 30 % of the residents of the State will enjoy the benefits therefrom.
2. Similarly, it will become possible to provide all the stand-by industrial and commercial customers with electricity, thus facilitate an unhindered, on-schedule implementation of the Second Five-Year National Development Plan in progress for the nation's economic independence.
3. By putting the existing equipment, currently in poor condition, into stand-by status upon completion of the project, the efficiency of electricity supply will be improved considerably. In addition, the maintenance costs will be decreased as a result, and it will contribute to improvement of the financial conditions of the PUC.
4. In the present electricity distribution system, trouble in the system results in the interruption of electricity supply for the whole area of the State. The proposed improvement and upgrading of the distribution networks will make it possible to localize the areas of electricity supply failure and keep the power failure to a minimum.

The proposed project is expected to contribute greatly to the individuals as well as to the State's economy as described above, therefore, it is considered appropriate to implement the project by Japan's grant aid. Also, it is found that the organization of the FSM and the Pohnpei State governments proposed for implementation of this project are adequate for proper implementation of the project.

In order to maximize the benefits from this project, and to operate and maintain the facilities in good conditions, it is recommended for the governments of FSM and the PUC to take actions as listed below.

1. To maintain proper functioning of the facilities and equipment at all times, a maintenance program will be established for each facility and equipment, and the daily maintenance will be performed in accordance with the program.
2. The PUC, who will be in charge of operation and maintenance of the facilities and equipment upon completion of the project, must improve its financial conditions by reduction of the costs and increase of the income through implementation of the following:
 - 1) It will be necessary to keep the fuel cost as low as possible since this is the largest cost item. At the present time fuel oil for the diesel engine is handled by one company in the State of Pohnpei, the Mobil Oil Company, and Type A diesel fuel oil is handled by them. In order to change over to the Type C fuel oil it will be necessary for them to make preparations for this change. It will not be easy for them to make this change, but negotiations must be continued for them to consider making this change.

According to the balance sheet of the Pohnpei Utility Company (PUC), the share of the fuel costs is 60 % of the costs. A preliminary trial cost estimate of the operational expenses (direct cost of the operating costs) in paragraph 4.3.4 indicates that this cost will be 80 %.

- 2) It is felt that 100 % collection of the electric bills are necessary as this is the only source of revenue for PUC. (According to the Year Book - 1991 the rate of collection was less than 60 %).

Appendices

- Appendix-1** Lists of Members of the Study Team
- Appendix-2** Study Schedule
- Appendix-3** Persons met by the Study Team
- Appendix-4** Minutes of Meetings
- Appendix-5** Data Collection List

Appendix-1 Lists of Members of the Study Team

LIST OF THE MEMBERS OF THE BASIC DESIGN TEAM
FOR THE BASIC DESIGN STUDY ON THE PROJECT
FOR ELECTRIC UTILITIES UPGRADING
IN THE FEDERATED STATES OF MICRONESIA

Takahiro Ikari	Team Leader Officer, Grant Aid Division Economic Cooperation Bureau Ministry of Foreign Affairs
Hidetoshi Ishioka	Project Coordinator First Basic Design Study Division Grant Aid Study & Design Department Japan International Cooperation Agency
Yukio Toyoshima	Member, Power Plant Planning Engineer Pacific Consultants International
Toshiro Sato	Member, Power Generation Facility Planning Engineer Pacific Consultants International
Hiroshi Kadowaki	Member, Power Distribution Facility Planning Engineer Pacific Consultants International
Nobuo Kuga	Member, Power House Planning Engineer Pacific Consultants International

LIST OF THE MEMBERS OF THE BASIC DESIGN TEAM
FOR THE DRAFT FINAL REPORT EXPLANATION

Shumon Yoshiara	Team Leader First Project Management Division Grant Aid Project Management Department Japan International Cooperation Agency
Yukio Toyoshima	Member, Power Plant Planning Engineer Pacific Consultants International
Toshiro Sato	Member, Power Generation Facility Planning Engineer Pacific Consultants International
Nobuo Kuga	Member, Power House Planning Engineer Pacific Consultants International

Appendix-2 Study Schedule

SCHEDULE FOR THE BASIC DESIGN STUDY MISSION

Jul. 3 (Fri.)	Leaving Tokyo, Arriving at Guam Courtesy call at the Agana Consulate - General of Japan (T. Ikari/H. Ishioka)
Jul. 4 (Sat.)	Leaving Tokyo, Arriving at Guam (Y. Toyoshima/T. Sato/H. Kadowaki/N. Kuga) Internal Meeting
Jul. 5 (Sun.)	Leaving Guam, Arriving at Pohnpei Meeting at Japan Overseas Cooperation Office
Jul. 6 (Mon.)	Courtesy call at the Department of External Affairs of FSM, OBPS and PUC. Site inspection of Nanpohnmal Power Plant
Jul. 7 (Tue.)	Explanation on Inception Report to OBPS and PUC Site inspection of the distribution line in Pohnpei island
Jul. 8 (Wed.)	Discussion on the existing generation facilities and electricity demand with OBPS and PUC Site Inspection of the under construction Power Plant and Nanpil Hydraulic Power Plant
Jul. 9 (Thu.)	Internal Meeting Discussion on Minutes with OBPS and PUC
Jul. 10 (Fri.)	Discussion on minutes with FSM and signing of the Minutes of Discussion
Jul. 11 (Sat.)	Internal Meeting Leaving Pohnpei for Guam. (T. Ikari/H. Ishoka)
Jul. 12 (Sun.)	Internal Meeting Leaving Guam, Arriving at Tokyo (T. Ikari/H. Ishioka)
Jul. 13 (Mon.)	Discussion on the Distribution System with PUC
Jul. 14 (Tue.)	Site Inspection of the Distribution Line Data Collection of the Construction Materials.
Jul. 15 (Wed.)	Data Collection at Mobil Oil Office Data Collection of the Construction Material Cost Site Inspection Nanpohnmal
Jul. 16 (Thu.)	Data Collection of the Construction Materials Cost Collected Data Arrangement
Jul. 17 (Fri.)	Discussion on Questionnaire with PUC Data Collection of the Construction Materials
Jul. 18 (Sat.)	Collected Data Arrangement
Jul. 19 (Sun.)	Internal Meeting
Jul. 20 (Mon.)	Site Inspection of the Distribution Line with PUC
Jul. 21 (Tue.)	Data Collection of the Power Demand of Private House, Shop and Public Building, etc.

Jul. 22 (Wed.) Discussion on Location of the Pole-mounted Switch
 with PUC
 Leaving Pohnpei for Guam (N. Kuga)

Jul. 23 (Thu.) Discussion on Collected Data with OPBS and PUC

Jul. 24 (Fri.) Site Inspection of the Distribution Facilities
 in Colonia Town.

Jul. 25 (Sat.) Collected Data Arrangement

Jul. 26 (Sun.) Internal Meeting
 Leaving Pohnpei for Guam (T. Sato)

Jul. 27 (Mon.) Site Inspection of Fish Processing Plant and
 Palikir Housing Project
 Leaving Guam, Arriving at Tokyo (T. Sato)

Jul. 28 (Tue.) Site Inspection of CCM Complex Palikir, Quarry
 Site and Sokehs Industrial Park

Jul. 29 (Wed.) Discussion on the Supervisory and Control
 System for New Power Plant with PUC.

Jul. 30 (Thu.) Visiting Pohnpei Weather Station
 Leaving Pohnpei for Guam (H. Kadowaki)

Jul. 31 (Fri.) Report to Japan Overseas Cooperation Office
 Leaving Pohnpei for Guam (Y. Toyoshima)
 Leaving Guam, Arriving at Tokyo (H. Kadowaki)

Aug. 1 (Sat.) Leaving Guam, Arriving at Tokyo (Y. Toyoshima)

Sept. 19 (Sat.) Leaving Tokyo

Sept. 20 (Sun.) Arriving at Pohnpei
 Meeting at Japan Overseas Cooperation Office

Sept. 21 (Mon.) Courtesy Call at the Department of External Affairs
 of FSM, OBPS, PUC and Meeting with PUC.

Sept. 22 (Tue.) Explanation and Discussion on the Draft Report
 with PUC

Sept. 23 (Wed.) Explanation and Discussion on the Draft Report
 with OBPS and PUC
 Site Inspection of Nanpohnmal Power Plant Site

Sept. 24 (Thu.) Discussion on Minutes of Meeting with OBPS
 and PUC

Sept. 25 (Fri.) Additional Survey for Nanpohnmal Power Plant

Sept. 26 (Sat.) Internal Meeting

Sept. 27 (Sun.) Internal Meeting

Sept. 28 (Mon.) Discussion on Minutes with FSM and signing
 of the Minutes of Discussion.

Sept. 29 (Tue.) Leaving Pohnpei for Guam

Sept. 30 (Wed.) Report to the Agana Consulate - General of Japan
 Leaving Guam, Arriving at Tokyo

Appendix-3 Persons met by the Study Team

LIST OF PERSONS MET

AGANA CONSULATE - GENERAL

Mr. Yoshio Koshio	Consul
Mr. Seiji Higuchi	Vice Consul

THE FEDERATED STATES OF MICRONESIA

Mr. J. Mangefel	Deputy Secretary, Department of External Affairs (DEA)
Mr. J. R. Subolmar	Assistant Secretary of External Affairs for Asian, Pacific, European, United Nations and Multilateral Affairs Department of External Affairs Government of FSM
Mr. L. Robert	Deputy Chief, Division of International Affairs, DEA
Mr. C. D. Apis	Foreign Service Officer

THE STATE GOVERNMENT OF POHNPEI

Mr. J. P. David	Governor
Mr. B. Edward	Chairman, Public Works, Transportation Committee, Pohnpei Legislature
Mr. S. Kihleng	Special Project Officer, Office of Planning and Government Relations
Mr. N. Solomon	Special Assistant to Governor, Office of Budget, Planning & Statistics (OBPS)
Mr. R. C. Siron	Economic Planner, OBPS
Dr. D. E. Perin	Economic Advisor of OBPS
Mr. F. Henry	Assistant to the Governor, Office of Construction Management & Property Maintenance

POHNPEI UTILITIES CORPORATION

Mr. D. B. Morgan	General Manager
Mr. L. Edwin	Liaison Officer
Mr. R. W. Ritchie	Comptroller and Chief Financial Officer
Mr. M. Camacho	Branch Manager (Distribution)
Mr. J. Martin	Inspector
Mr. N. Anson	Supply Officer

JAPAN OVERSEAS COOPERATION VOLUNTEERS OFFICE IN MICRONESIA

Mr. Kyo Yoshida

Japan Overseas Cooperation Volunteers

Mr. Yasuo Ohno

Japan Overseas Cooperation Volunteers

OTHERS

Mr. H. Conort

Director, Economic Development Authority

Mr. T. Akinaga

General Manager, Telecommunications Corporation

Mr. Y. Helgenberger

Manager, Mobil (Pohnpei)

Mr. W. H. Lager

Commercial Sales Engineer, Mobil (Guam)

Mr. J. Urban

Engineer, Consultant, Public Design Ltd.

Mr. B. P. Abat

General Manager, MEI Company

Mr. J. Vitt

Chairman/General Manager, Pohnpei Travel Service

Mr. R. L. Latanloc

General Manager, Black Micro Corporation

Appendix-4 Minutes of Meetings

MINUTES OF DISCUSSIONS
OF
BASIC DESIGN STUDY ON THE PROJECT FOR
ELECTRIC UTILITIES UPGRADING
IN
THE FEDERATED STATES OF MICRONESIA

Based on the results of the Preliminary Study, the Government of Japan decided to conduct a Basic Design Study on Electric Utilities Upgrading Project in the Pohnpei State (hereinafter referred to as "the Project") and entrusted the study to the Japan International Cooperation Agency (hereinafter referred to as "JICA"). JICA sent to the Federated States of Micronesia (hereinafter referred to as "FSM") a study team, which is headed by Mr. Takahiro Ikari, Officer, Grant Aid Division, Economic Cooperation Bureau, Ministry of Foreign Affairs and is scheduled to study in the country from July 5, to July 31, 1992.

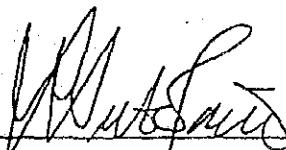
The Team held discussions with the officials concerned of the Government of FSM and Pohnpei State, and conducted a field survey at study area.

In the course of discussions and field survey, both parties have confirmed the main items described on the attached sheets. The team will proceed to further work and prepare the Basic Design Study report.

Palikir, July 10, 1992

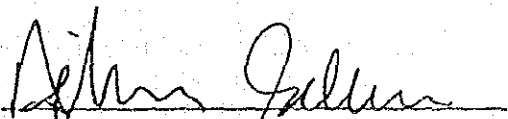


Mr. Takahiro Ikari
Leader
Basic Design Study Team, JICA



Mr. J. Ragimar Suboimar
Chief of International Affairs
Department of External Affairs
Government of FSM

WITNESS



Mr. Nick Solomon
Special Assistant to Governor
Office of Budget, Planning and Statistics
Government of Pohnpei State

ATTACHMENT

1. Objective

The objective of the Project is to upgrade power generating and distribution system in the Pohnpei State and thus contributing to the improvement of living conditions of inhabitants in the Project area.

2. Project area

The site of the Project is in Pohnpei main Island as shown in ANNEX I-1, 2, 3.

3. Executing Agency

The Department of External Affairs of Government of FSM is responsible for the coordination of the Project.

The Government of Pohnpei State takes responsibility for the administration and implementation of the Project and the management of the facilities and equipment provided under the Project.

The Pohnpei Utilities Corporation is the implementing body of the Project.

4. Request of the Government of FSM

The contents of the Project required by the Government of FSM are listed in ANNEX II.

5. Budget Allocation

The Government of Pohnpei State will allocate enough budget to implement the Project and take necessary measures to maintain proper operation of the Electrical Facilities.

6. Japan's Grand Aid System and Undertakings of the Government of FSM

1) The Government of FSM and Pohnpei State have understood the system of Japan's Grant Aid explained by the Team.

2) The Government of FSM and Pohnpei State will take the necessary measures, described in Annex-III, for smooth implementation of the Project on condition that the Grant Aid of the Government of Japan would be extended to the Project.

7. Further schedule

(1) The consultants will proceed to further studies in FSM until July 31, 1992.

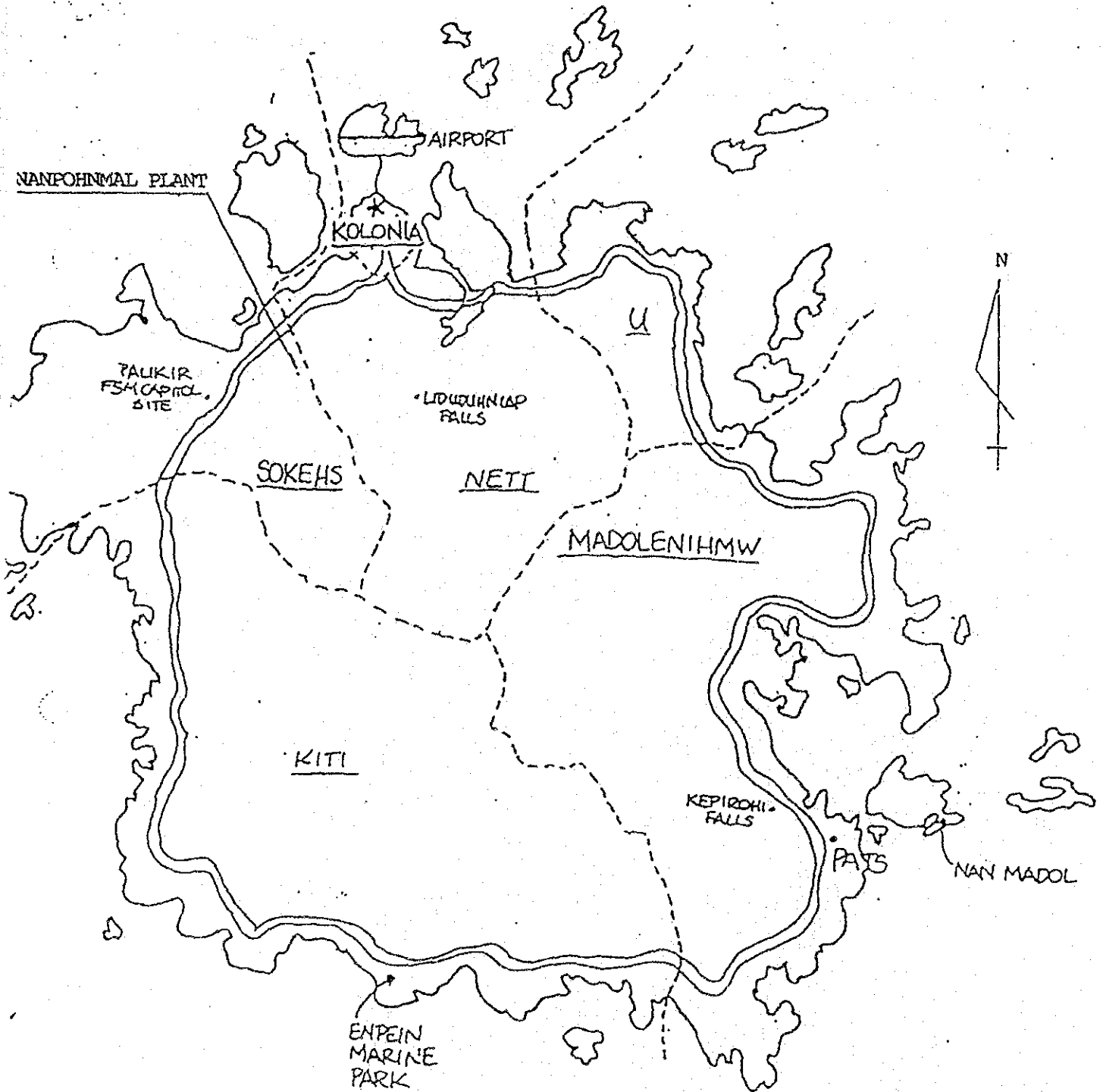
(2) JICA will prepare the draft report in English and dispatch a mission in order to explain its contents around October 1992.

- (3) In case that the contents of the report is accepted in principle by the FSM side, JICA will complete the final report and send it to the Government of FSM around November 1992.

8. Components

The final components of the Project may differ from those presented in ANNEX II, if it found necessary after further studies in Japan.

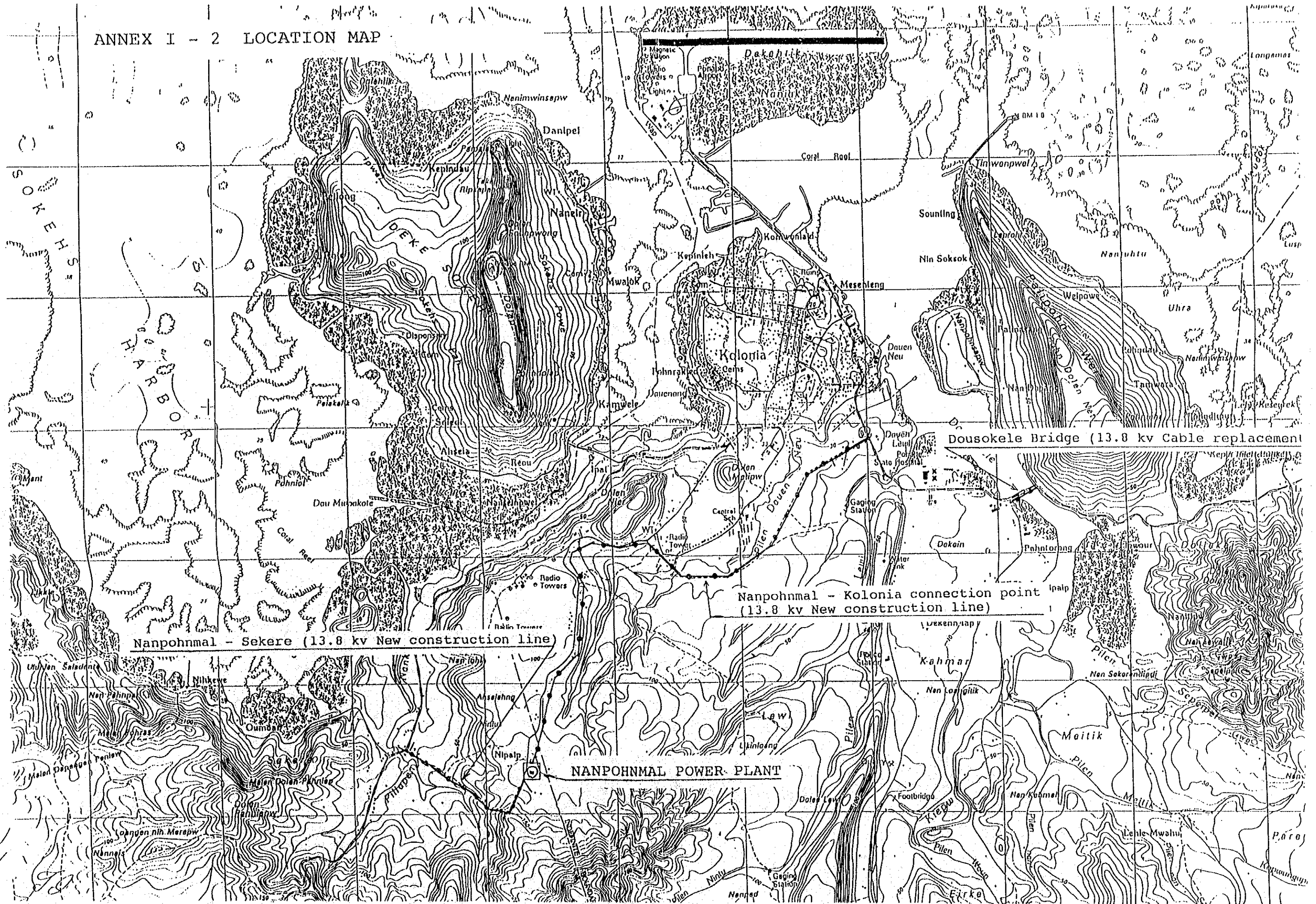
ANNEX I-1 PROJECT SITE



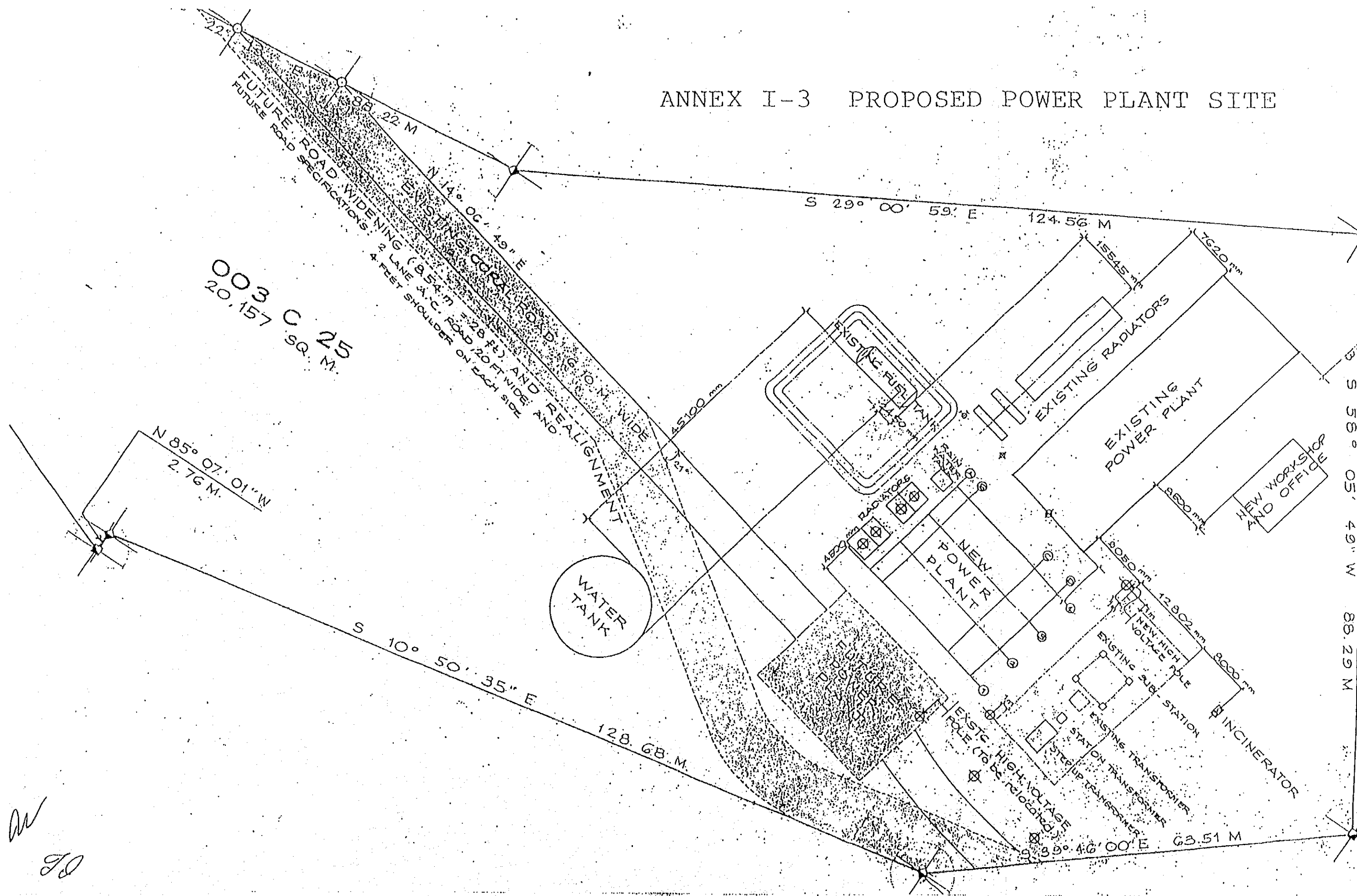
J.D.

W

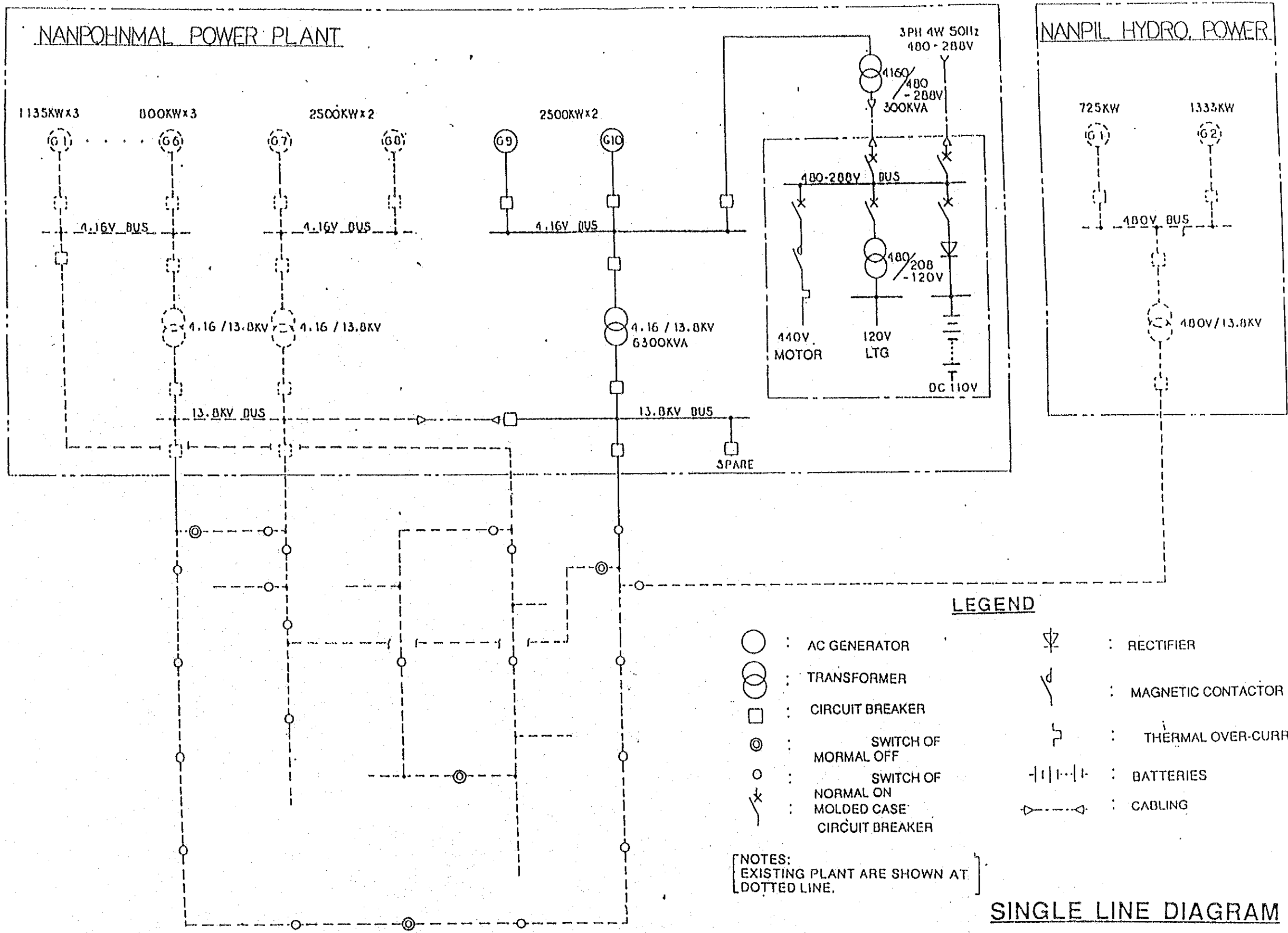
ANNEX I - 2 LOCATION MAP



ANNEX I-3 PROPOSED POWER PLANT SITE



aw
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SINGLE LINE DIAGRAM

ANNEX II

The contents of the Project required by the Government of FSM are as follows:

- 1) Diesel Engine Power Generation Units with spare parts and its installation and, constructions of connection to the existing power line and with generating system incorporated within the existing new power house facility if possible;
 - 2.5 MW(600 RPM or less) x 2 Units

- 2) Automated Distribution System, which mainly consists of materials and equipment such as pole mounted switches with magnet and timer and fault section indicators and reclosing relays, and their installations;
 - 24 numbers pole mounted switches with magnet and timer
 - 4 fault section indicators and reclosing relays

- 3) Three-phase Distribution Lines for Backfeeder, which consists of necessary materials, equipments and tools, and its constructions
 - Nanpohnmal - Sekere (13.8 kv New construction line)
 - Nanpohnmal - Kolonia connection point (13.8 kv New construction line)
 - Dousokele Bridge (13.8 kv Cable replacement)

- 4) Donation of one Bucket Truck (Lifting Height of approx. 15 m, Working Radius of approx. 11 m, and Maximum Load of approx. 200 kgf)

ANNEX III

Necessary measures to be taken by the Government of the Federated States of Micronesia are as follows:

1. To secure the ownership and/or the right to use the Project site.
2. To clear, level and reclaim the Project site when needed, prior to the commencement of the Project.
3. To provide necessary permission, license and other authorizations for smooth implementation of the Project.
4. To construct wall and fences around the Project site.
5. To improve the access road to the Project site and to rearrange the site road.
6. To provide facilities for the distribution of the electricity, water supply, drainage, telephone line and other incidental facilities.
7. To provide facilities for fuel supply system and cooling water system.
8. To bear advising commission of the Authorization to Pay (A/P) and Payment commission to the Japanese foreign exchange bank for banking services based upon the Banking Arrangement (B/A).
9. To ensure prompt unloading, tax exemption, and custom clearance of the goods for the project at port of disembarkation in FSM.
10. To ensure prompt unloading and internal transportation of the goods purchased and/or imported under the Grand Aid for the Project.
11. To accord Japanese nationals whose services may be required in connection with the supply of the products and services under the verified contract such facilities as may be necessary for their entry into FSM and stay therein for the performance of their work.
12. To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in FSM with respect to the supply of the projects and services under the verified contracts.
13. To maintain and use properly and effectively the facilities constructed and equipment under the verified contracts.
14. To bear all the expenses other than those to be borne by the Grant, necessary for construction of the facilities as well as for the transportation and installation of the equipment.
15. To coordinate and solve any matters related which may arise with third party and inhabitants living in the Project area during implementation of the Project.
16. To arrange Auger Truck (including the operator) for installation of poles on new backfeeder line construction without charge.

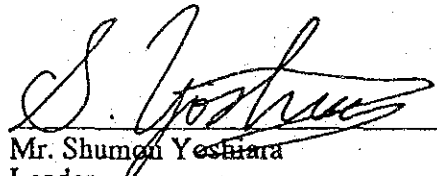
MINUTES OF DISCUSSION
OF
BASIC DESIGN STUDY ON THE PROJECT FOR
ELECTRIC UTILITIES UPGRADING
IN
THE FEDERATED STATES OF MICRONESIA
(CONSULTATION ON DRAFT REPORT)

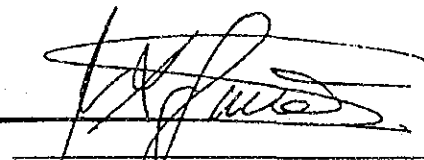
In July 1992 the Japan International Cooperation Agency (JICA) dispatched a basic design study team on the Project for Electric Utilities Upgrading in the Pohnpei State (hereinafter referred to as "the Project") to The Federated States of Micronesia (hereinafter referred to as "FSM"), and through discussions, field survey and technical examination on the results in Japan, has prepared a draft report of the study.

In order to explain and consult with FSM side on the contents of the report, JICA sent a team to FSM which was headed by Mr. Shumon Yoshiara, First Project Management Division, Grant Aid Project Management Department, JICA and scheduled to stay in the country from September 20 to 29, 1992.

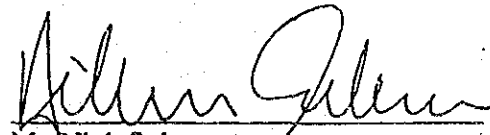
As a result of discussions, both parties confirmed the main items as described on the attached sheets.

Palikir, September 28, 1992


Mr. Shumon Yoshiara
Leader
Draft Report Explanation Team
JICA


Mr. J. Ragimar Subolmar
Assistant Secretary of External Affairs
for Asian, Pacific, European,
United Nations and Multilateral Affairs
Department of External Affairs
Government of FSM

WITNESS


Mr. Nick Solomon
Special Assistant to Governor
Office of Budget, Planning and Statistics
Government of Pohnpei State

ATTACHMENT

1. Components of Draft Report

The Government of FSM has agreed and accepted in principle the components of the Draft Report proposed by the team.

2. Japan's Grant Aid system

(1) The Government of FSM has understood the system of Japan's Grant Aid explained by the team.

(2) The Government of FSM will take the necessary measures, described in Annex I, for smooth implementation of the Project on condition that Grant Aid assistance by the Government of Japan is extended to the Project.

(3) The Government of FSM shall complete those facilities required in Annex I as described as FSM's scope of work prior to the construction of the Project.

3. Further schedule

The team will make the Final Report in accordance with the confirmed items, and send it to the Government of FSM in December 1992.

4. Technical Cooperation

The government of FSM requested Japanese side to extend following technical cooperation when Japan's Grant Aid is approved. The team promised to convey the desire to the Government of Japan and JICA and suggested FSM side to request it officially to the Government of Japan through the Consulate General of Japan in Guam.

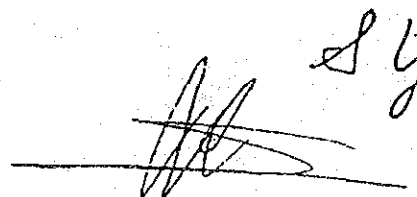
(1) Training of FSM Personnels in Japan

2 electricians

2 mechanics

5. Budget Allocation

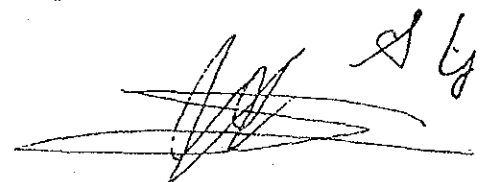
The Government of FSM will allocate enough budget to implement the Project for the components stated in Annex I and take necessary measures to maintain proper operation of the Electrical Facilities.

A handwritten signature and the initials 'S Y' are present in the bottom right corner of the page. The signature is written in dark ink and appears to be a stylized name. The initials 'S Y' are written in a larger, more legible font to the right of the signature.

ANNEX I

Necessary measures to be taken by the Government of the Federated States of Micronesia are as follows:

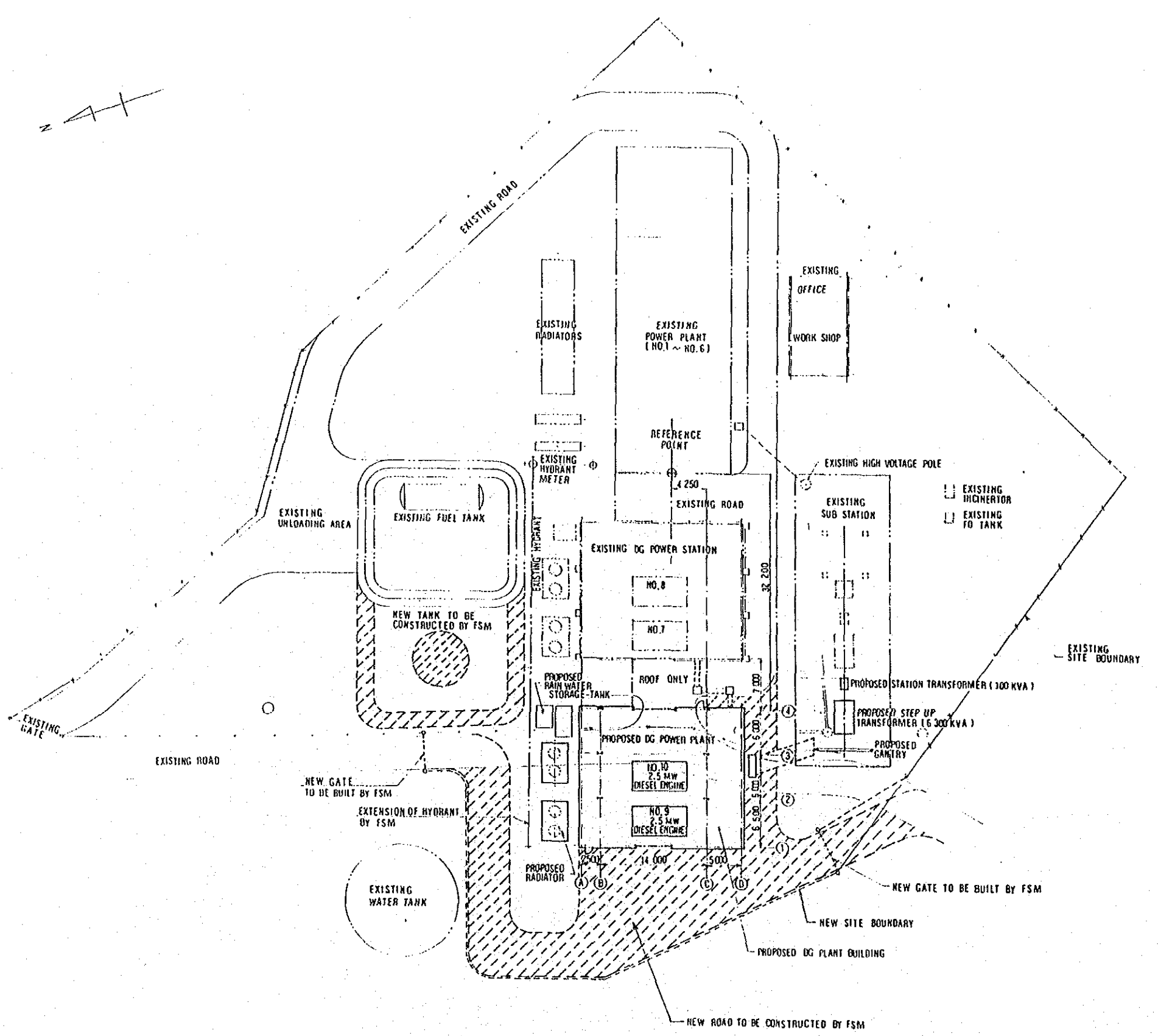
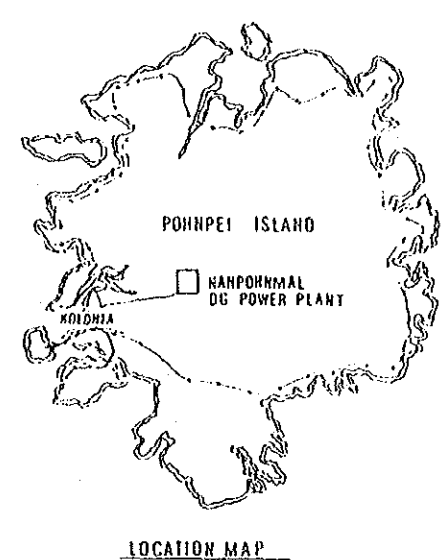
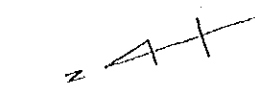
1. To secure the ownership and/or the right to use the Project site.
2. To clear, level and reclaim the Project site when needed, prior to the commencement of the Project.
3. To provide necessary permission, license and other authorizations for smooth implementation of the Project.
4. To construct wall and/or fences around the Project site.
5. To improve the access road to the Project site and to rearrange the site road.
6. To provide facilities for the distribution of the electricity, water supply, drainage, telephone line and other incidental facilities.
7. To provide facilities for fuel supply system and cooling water make-up system.
8. To bear advising commission of the Authorization to Pay (A/P) and Payment commission to the Japanese foreign exchange bank for banking services based upon the Banking Arrangement (B/A).
9. To ensure prompt unloading, tax exemption, and custom clearance of the goods for the project at port of disembarkation in FSM.
10. To ensure prompt unloading and internal transportation of the goods purchased and/or imported under the Grand Aid for the Project.
11. To accord Japanese nationals whose services may be required in connection with the supply of the products and services under the verified contract such facilities as may be necessary for their entry into FSM and stay therein for the performance of their work.
12. To exempt Japanese nationals from customs duties, internal taxes and other fiscal levies which may be imposed in FSM with respect to the supply of the projects and services under the verified contracts.
13. To maintain and use properly and effectively the facilities constructed and equipment under the verified contracts.
14. To bear all the expenses other than those to be borne by the Grant, necessary for construction of the facilities as well as for the transportation and installation of the equipment.
15. To coordinate and solve any matters related which may arise with third party and inhabitants living in the Project area during implementation of the Project.
16. To arrange Auger Truck (including the operator) for installation of poles on new backfeeder line construction without charge.



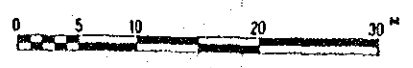
ANNEX II

Completion schedule of works proceeded by the Government of FSM

Description	Completed by
1. To secure the right to use the Project site	Mar., 1993
2. To clear, level and reclaim the Project site	Mar., 1993
3. Construction of wall and fence around the Project site.	Mar., 1993
4. Improvement of the access road and rearrangement of the site road.	Mar., 1993
5. Oil tank and connection of pipe including necessary equipment.	Nov., 1993
6. Water supply system and connection of pipe to the connection point designated by the basic design report issued by JICA for cooling water system and for service water.	Nov., 1993
7. Storm water drainage system for Nanpohnmal Power Plant site.	Nov., 1993
8. Storm water drainage system for the Project site including landscaping if necessary	Mar., 1994
9. Building service facilities connection to the new power plant house.(i.e. electricity, telephone, and other incidental facilities)	Nov., 1993
10. Improvement of existing 4.16kv distribution line to 13.8kv line where the Automated Distribution Protection Sytem will be installed	Sept., 1993



- NOTES**
1. [Hatched area symbol] SHOWS WORKS TO BE CARRIED OUT BY FEDERATED STATES OF MICRONESIA (FSM)
 2. [Dashed line symbol] SHOWS SCOPE OF WORKS FOR BASIC DESIGN STUDY
 3. (B) SHOWS REFERENCE POINT FOR SETTING OUT.



NO.	DATE	REVISION	BY
JAPAN INTERNATIONAL COOPERATION AGENCY			
THE PROJECT FOR ELECTRICAL UTILITIES UPGRADING IN THE FEDERATED STATES OF MICRONESIA			
DWD TITLE			
NANPOHNMAL DIESEL GENERATOR POWER PLANT UNITS 9 & 10 (2 x 2.5 MW)			
SITE PLAN			
DRAWN BY	DESIGNED BY	APP. BY	DATE
M. Yamada	TR		
SCALE	UNIT	DWG. NO.	
1/300	MM	NP - 0001	
PACIFIC CONSULTANTS INTERNATIONAL			
TOKYO, JAPAN			

Appendix-5 Data Collection List

LIST OF DATA COLLECTED

Data	Source
Organization of the Execution Branch FSM	Office of Budget, Planning & Statistics
Executive Organization of the Pohnpei State Government	Ditto
Answer to Questionnaire Vol. I	Ditto
Yearbook 1991	Ditto
Second National Development Plan 1992-1996	Ditto
1985 Sensus Report	Ditto
Campus Development Plan	Ditto
Pohnpei & Tourism	Ditto
Resident Workers Law	Ditto
Sokehs Light Industrial Park Investment Guide	Ditto
Organization Chart of PUC	Pohnpei Utilities Corporation
Answer to Questionnaire Vol. II	Ditto
Answer to Questionnaire Vol. II	Ditto
Answer to Questionnaire Vol. II	Ditto
Answer to Questionnaire Vol. II	Ditto
Kilowatt Hour Distribution (Feb. 1992)	Ditto
Power Generation Monthly Report (1991)	Ditto
Power Generation Monthly Report (1992)	Ditto
Budget Planning for the Project	Ditto
Projection of Superline Extension	Ditto
Load Shedding Schedule	Ditto
Location of Air Switch	Ditto
Revised Demand of Fish Processing Plant	Ditto
Soil Report for Nanpohnmal Power Plant Unit 7 & 8	Ditto
Characteristic Data of Diesel Oil	Ditto
Local Climatological Data	Weather Station
Metorological Data	Ditto
Housing Loan Data	Housing Authority
Telephone Directory	FSMTC
Topographic Map of Pohnpei Island	Guam Book Store

JICA