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Mr. Leonilo V. Oroclo	Chief Engineer
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• Materials Investigation & Testing Services Division

Mr. Felipe N. De Guzman	Manager
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- Ambuklao Hydroelectric Power Plant

Mr. Wilfredo P. Ringor	Plant Manager
------------------------	---------------

(5) 会議出席者リスト

NAPOCOR と事前調査団との会議における出席者は次のとおりである。

ATTENDANTS

Date: August 22, 1986

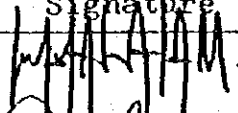

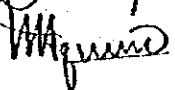
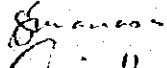
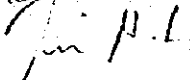

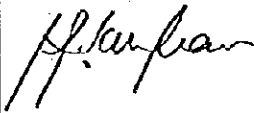
Place: NPC, Diliman Quezon City

Name	Title	Signature
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2. JOSE V. LAHOZ, JR.	Prin. Engr. II, Hydro Planning Div.	
3. PRICILLANO DELA CRUZ	Principal Engr. II, Eng'g. Surveys & Investigation Division	
4. FELIPE N. DE GUZMAN	Manager, Materials Investigation & Tests Services Division	
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<p>Date: Sept. 2 1986</p> <p>Mr. Zosimo P. Santos Sr. Manager, Engineering Surveys & Investigation Services Div.</p> <p>Mr. Leonilo V. Orocio Chief, Project Investigation & Site Engineering, ESTSD-TSD</p>		

ATTENDANTS

Date: 24 Aug. 1986



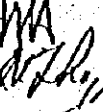

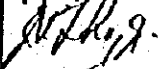

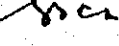



Place: Ambuklao Dam Guest House (NAPOCOR)

Name	Title	Signature
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7 RODOLFO S. SAN JUAN - Sr. Geotechnical Engr	JICA	
8 海老原 純二	"	
9 森谷 虎彦	"	
10 山川 精一	"	

ATTENDANTS

Date: Sept. 3, 1980

Place: NAPOCOR 本社

Name	Title	Signature
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小澤 勝彦	"	B. Soto
山川 精一	"	

添 付 資 料 リ ス ト

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Implementing Arrangement (I/A)

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IMPLEMENTING ARRANGEMENT
ON
THE TECHNICAL COOPERATION
BETWEEN
THE JAPAN INTERNATIONAL COOPERATION AGENCY
AND
THE NATIONAL POWER CORPORATION
FOR
THE STUDY FOR AMBUKLAO DAM REHABILITATION PROJECT
IN THE REPUBLIC OF THE PHILIPPINES

AGREED UPON BETWEEN
THE JAPAN INTERNATIONAL COOPERATION AGENCY
AND
THE NATIONAL POWER CORPORATION

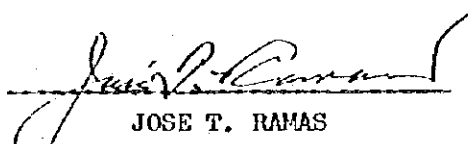
QUEZON CITY,

September , 1986



BUNZO SATO

Team Leader
Japan International
Cooperation Agency



JOSE T. RAMAS

Vice President, Engineering
National Power Corporation

I. INTRODUCTION

In response to the request of the Government of the Republic of the Philippines (hereinafter referred to as "GOP"), the Government of Japan (hereinafter referred to as "GOJ") has decided to conduct the Study for AMBUKLAO Dam Rehabilitation Project (hereinafter referred to as "the Study") and exchanged the Notes Verbales with GOP concerning the implementation of the Study.

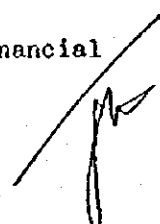
The Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official agency responsible for the implementation of technical cooperation program of GOJ, will undertake the Study, in accordance with the relevant laws and regulations in force in Japan.

On the part of GOP, the National Power Corporation (hereinafter referred to as "NAPOCOR") shall act as counterpart agency to the Japanese study team and also as coordinating body in relation with other governmental and non-governmental organizations concerned for the smooth implementation of the Study.

The present document constitutes the implementing arrangement between JICA and NAPOCOR under the above-mentioned Notes Verbales exchanged between the two Governments.

II. OBJECTIVE OF THE STUDY

The main objective of the Study is to formulate a rehabilitation plan including a determination of necessary safety control system for Ambuklao Dam in Luzon, and to assess its technical, and financial aspects.



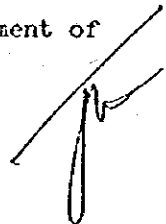
(B5)

III. SCOPE OF THE STUDY

The Study will cover the following items, and its job responsibility is shown in the Appendix I.

1. Review of the previous studies, surveys, and all existing data and materials relevant to the study.
2. Review of the present monitoring system.
3. Inspection of dam, spillway, reservoir, power station and outlet of tailrace tunnel.
4. Formulation of the suitable monitoring system for the dam.
5. Additional field work
 - (1) Topographic survey for the dam safety analysis
 - (2) Installation of measuring system for the dam deformation.
 - (3) Drilling, trenching, pitting and its laboratory test of dam materials and site permeability test if necessary.
 - (4) Installation of measuring system for leakage water.
6. Preparation of manual for measurement of leakage, deformation and bore hole water level.
7. Monitoring
 - (1) Leakage and its water quality.
 - (2) Deformation
 - (3) Bore hole water level.
 - (4) Reservoir water level.
 - (5) Inflow and outflow
 - (6) Rainfall and temperature.
 - (7) Earthquake
8. Stability analysis of the dam, spillway and left abutment of the dam.

(B.S)



9. Safety analysis for the spillway capacity and leakage in the power station.
10. Review of the present organization chart and preparation of new organization chart if necessary for the dam safety control system.
11. Safety analysis of sedimentation of the dam, generating facility and outlet of tailrace tunnel.
12. Formulation of rehabilitation plan
 - (1) Rehabilitation plan
 - (2) Preliminary design
 - (3) Construction method
 - (4) Implementation time schedule
 - (5) Financial construction cost with itemized quantity
 - (6) Disbursement schedule
 - (7) Economic Analysis.
13. Formulation of the standards of safety control system
 - (1) Monitoring
 - (2) Inspection
 - (3) Detailed Inspection
 - (4) Remedial works

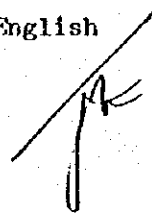
IV. STUDY SCHEDULE

The study will be carried out in accordance with the Appendix I.
(tentative study schedule.)

V. REPORTS

JICA shall prepare and submit the following reports in English to the GOP by the date as shown in the Appendix I.

(B.S)



1. Inception Report
 - * Fifteen (15) copies
 - * Covering the program of the Study with its detailed schedule
2. Progress Report
 - * Fifteen (15) copies
 - * Covering the progress of the Study
3. Interim Report
 - * Fifteen (15) copies
 - * Covering the progress of the Study
4. Draft Final Report
 - * Twenty (20) copies
 - * Covering all the Study and analysis
5. Final Report
 - * Thirty (30) copies

VI. UNDERTAKING OF GOP

In accordance with the Notes Verbales exchanged between GOJ and GOP, GOP shall accord privileges, immunities and other benefits to the Japanese study team and, through the authorities concerned, take necessary measures to facilitate smooth conduct of the Study.

1. GOP shall be responsible for the dealing with claims which may be brought by the third parties against the members of the Japanese study team and shall hold them harmless in respect of claims or liabilities arising in the course of or otherwise connected with the discharge of their duties in the implementation of the Study, except when such claims or liabilities arise from the gross negligence or willful misconduct of the above mentioned members.

(B.S)

2. The NAPOCOR shall, at its own expense, provide the Japanese study team with the following, if necessary, in cooperation with other agencies concerned:

- (1) Available data, information and materials (including photographs and maps) related to the Study.
- (2) Counterpart personnel consisting of engineers.
- (3) Administrative and technical support staff.
- (4) Suitable office space at Quezon City and Site with adequate floor space and necessary office equipment.
- (5) Credentials or identification cards to the members of the study team.
- (6) Appropriate number of vehicles with drivers and fuel.

3. The NAPOCOR shall make necessary arrangements with the governmental and non-governmental organizations concerned for the following:

- (1) to secure the safety of the Japanese study team,
- (2) to permit the members of the Japanese study team to enter, leave and sojourn in the Philippines for the duration of their assignment therein,
- (3) to exempt the members of the Japanese study team from taxes, duties and any other charge on equipment, machinery and other materials brought into and out of the Philippines, for the conduct of the Study,
- (4) to exempt the members of the Japanese study team from income tax and charges of any kind imposed on or in connection with any emolument or allowance paid to the members of the Japanese study team for their services in connection with the implementation of the Study.

(B.S)


- (5) to arrange customs clearance, handling and storage at the port/airport and inland transportation of equipment, machines, instruments, tools and other articles to be brought into the Philippines, in connection with the implementation of the study,
- (6) to provide necessary facilities to the Japanese study team for remittance as well as utilization of the funds introduced into the Philippines from Japan in connection with the implementation of the Study,
- (7) to secure permission for entry into private properties or restricted areas for the conduct of the Study,
- (8) to secure permission to take all data and documents (including photographs and maps) related to the Study to Japan by the Japanese study team,
- (9) to arrange/coordinate meetings with authorities/agencies concerned,
- (10) to provide medical services as needed. Its expenses will be chargeable on members of the Japanese study team,
- (11) to hire laborers as needed. Its expenses will be chargeable on members of the Japanese study team.

VII. UNDERTAKING OF GOJ

In accordance with the Notes Verbales exchanged between GOJ and GOP, GOJ through JICA, shall take necessary measures for the implementation of the Study.

1. To dispatch, at its own expense, study team to the Philippines
2. To pursue technology transfer to the Philippines counterpart personnel in the course of the Study.

(B.5)



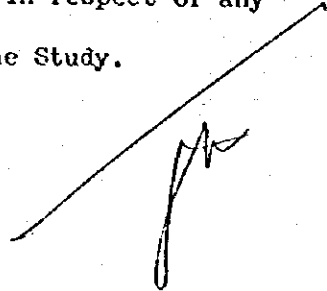
VIII. TECHNICAL UNDERTAKING

The division of technical undertaking by JICA and NAPOCOR is detailed in Appendix II.

IX. CONSULTATION

JICA and NAPOCOR shall consult with each other in respect of any matter that may arise from, or in connection with the Study.

(B.S)



APPENDIX I

Tentative Study Schedule and Its Job Responsibility

- ██████████ - work in Philippines by JICA
- ▤▤▤▤▤▤▤▤ - work in Philippines by NAPOCOR
- ▢▢▢▢▢▢ - work in Japan by JICA

Year	1987												1988				
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
Month	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.
(1) Review of the previous studies, surveys and all existing data and material relevant to the study	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢
(2) Review of the present Monitoring System	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢
(3) Inspection of dam, spillway, reservoir, P/S, outlet of tailrace tunnel	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢
(4) Formulation of the suitable monitoring system for the dam	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢
(5) Additional field work and supervision	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢
(6) Preparation of manual for measurement of leakage, seepage and bore hole water level	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢
(7) Monitoring and supervision	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢
(8) Stability analysis of the dam, spillway and left abutment of the dam	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢
(9) Safety analysis for the spillway capacity and leakage at P/S	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢
(10) Review of the present organization chart and preparation of new organization chart if necessary for the dam safety control system	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢
(11) Safety analysis of sedimentation to the dam and generating facility	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢
(12) Formulation of the rehabilitation plan	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢
(13) Formulation of the standards of safety control system	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢
Inception Report	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢
Specification for the additional field work	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢
Progress Report	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢
Interim Report	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢
Draft Final Report	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢
Final Report	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢	▢

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APPENDIX II

Technical Undertaking by JICA and the NAPOCOR Ambuklao Dam Rehabilitation Project

W O R K I T E M	UNDERTAKING BY JICA	UNDERTAKING BY NAPOCOR
1. Previous studies, surveys, and all existing data and materials relevant to the study	1. Review of the previous studies, surveys and all existing data and materials relevant to the study	1. Provision of counterpart engineers of all relevant data and materials
2. Present monitoring system	1. Review of the present monitoring system	1. Provision of the data for present monitoring system
3. Inspection of dam, spillway, reservoir and outlet of tailrace tunnel	1. Inspection	1. Provision of counterpart engineers for guidance and transport facilities
4. Suitable monitoring system for the dam	1. Formulation of the suitable monitoring system	
5. Additional field work	1. Supervision	1. Provision of counterpart engineers for supervision and transport facilities
6. Manual for measurement of leakage deformation and bore hole water level and its analysis	1. Preparation of manual	2. Field work
7. Monitoring	1. Supervision	
8. Stability analysis of the dam, spillway and left abutment of the dam	1. Stability analysis	1. Provision of counterpart engineers for supervision and transport facilities
9. Safety analysis for the spillway capacity and leakage of P/S	1. Safety analysis	2. Monitoring
10. Organization chart of dam safety control system	1. Preparation of new organization chart	1. Provision of required data for analysis
11. Safety analysis of sedimentation to the dam generating facility	1. Safety Analysis	1. Provision of required data for analysis
12. Rehabilitation plan	1. Formulation of the whole rehabilitation plan	1. Provision of the present organization chart
13. Standards of safety control system for Ambuklao Dam	1. Formulation of the standards	1. Provision of counterpart engineers and of all relevant data and materials
		1. Provision of counterpart engineers and of all relevant data and materials
		1. Provision of counterpart engineers and of all relevant data and materials
		1. Provision of counterpart engineers

MINUTES OF MEETING
FOR
PRELIMINARY STUDY OF
AMBUKLAW REHABILITATION PROJECT
IN
THE REPUBLIC OF THE PHILIPPINES

The Preliminary Study Team organized by the Japan International Cooperation Agency (JICA) arrived in Manila on August 21, 1986 and had a series of discussion with the National Power Corporation (NAPOCOR) officials concerned.

The following were discussed and agreed mutually:

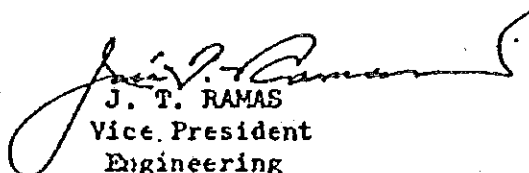
1. NAPOCOR request the supply of necessary instrument for the execution of additional field works and monitoring. Specification and quantity of instruments are attached in the Appendix IA. Preliminary study team states to take the NAPOCOR's requests back to Japan.
2. Both parties tentatively agree on the general scope and schedule.
3. Regarding the undertaking of GOP in Item VI, 3 (11), NAPOCOR will bear the labor expenses during monitoring stage, JICA will bear the labor expenses during additional field works.
4. NAPOCOR requests the counterpart training in Japan, the details are attached in the Appendix IIA. Preliminary Study Team states to take the NAPOCOR's requests back to Japan.

Quezon City

September , 1986



BUNZO SATO
Team Leader
Preliminary Study Team
Japan International
Cooperation Agency



J. T. RAMAS
Vice President
Engineering
National Power Corporation

APPENDIX IA

LIST OF REQUIRED INSTRUMENT FOR ADDITIONAL FIELD WORK
AND MONITORING

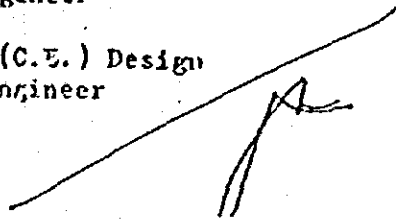
- | | |
|--|--------|
| 1. Water Leakage Measuring Device | 1 set |
| Automatic recording, Q max 1,000 l/min.
min. one week | |
| 2. <u>Ground Water Table Meter</u> | 3 sets |
| Portable type max depth 50m
Battery UM-2 x 1, lamp and buzzer | |
| 3. <u>Transmit with distance meter</u> | 1 set |
| Battery, 2NOS
Mirror with accessories 3NOS | |
| 4. Inclinometer | 1 set |
| 5. Piezometer | 1 set |

APPENDIX IIA

PROPOSED COUNTERPART TRAINING IN JAPAN

FISCAL YEAR	1986	1987
Field Specialty	Hydro Planning	1. Geotechnical Engineering 2. Hydro Design Engineering
Duration	Two (2) months	One (1) month each
Qualification	Hydro Planning Engineer (C.E.)	1. Geologist and/or Geotech. Engineer 2. Hydro (C.E.) Design Engineer

(B5)



<u>List of Drawings:</u>	<u>Date:</u>	<u>Ref. No.</u>	<u>Remarks:</u>
1. Downstream Retaining Wall, Plan & Sections (Spillway)	March 5, 1956		A.B
2. Spillway Chute Slab	February 21, 1954		A.B
3. Spillway Diezometer piping Layout & Detail	December 14, 1955		C
4. Spillway Drainage System, Plan, Sections & Details	January 31, 1956		A.B
5. Settlement Indicators at Dam, Plans, Sections & Details: 720, 685, 665 (No. 14-20) 720, 685, 665 (No. 1-13)	March 17, 1954		C
6. Spillway Drainage Tunnel	August 30, 1955		C
7. Plan & Profile of Grout Curtain along the Cut off Wall of the Spillway	June 4, 1956		C
8. Plan & Profile of Grout Line for Exploratory Drift at Spillway	June 14, 1956		A.B
9. Spillway Right Abutment Wall, Detail of Temporary W.S. at C. Joint	(?)		

Note:
 A B- As built drawing
 C - Construction Drawings

<u>Document Title:</u>	<u>Date:</u>	<u>Ref. No.</u>	<u>Remarks:</u>
1. Project Location Map	March 22, 1956	A - 0 - 1	C
2. General Plan of Development	June 1948	A1 - 0 - 13	C
3. General Plan of Development	August 1948	A1 - 0 - 1	C
4. Access Road Tunnel Drilling and Blasting Pattern	Sept. 1, 1954		C
5. Section at Curve Access Road Tunnel Timbering	Sept. 2, 1954		C
6. Section at Curve Access Road Tunnel Timbering			C
7. Section at Tangent Access Road Tunnel Timbering with Tight Lagging	Sept. 20, 1954		C
8. Tailrace Tunnel Concrete Lining	June 24, 1955		C
9. Tailrace Tunnel & Transition Bar Schedule Sheet 2 of 2	May 1, 1955		C
10. Tailrace Tunnel Transition Concrete & Keine Sheet 1 of 2	May 18, 1955		C
11. Access Tunnel Proposals for Excavation at "Cave-In"	March 18, 1955		C
12. Access Tunnel Rock Bolting and Netting	January 12, 1955		C
13. Low Level Outlet 60" Spherical Valve Foundation	February 23, 1955		C

Note: C - Construction Drawings

14. Low Level Outlet Backfill Grouting	March 21, 1955	C
15. Low Level Outlet Wooden Rails and Skid for Liners	February 24, 1955	C
16. Low Level Outlet Excavation Plan Sheet 2 of 2	February 23, 1955	C
17. Low Level Outlet Excavation Plan Sheet 1 of 2		C
18. Low Level Outlet Lifting Rig and Skid	February 22, 1955	C
19. Low Level Outlet By-Pass, Blow-off & Vent Piping Details for 60" Spherical Valve	October 16, 1954	AIN22CN3 C
20. Equipment Arrangement for Low Level Outlet	December 23, 1954	A1 10 22CN1 C
21. Low Level Outlet 5'-0"Ø Conduit Liner Assembly Sections & Details	August 8, 1954	A1m 1CN B C
22. Low Level Outlet Vent Pipe Assembly & Details	November 23, 1955	A1 mCN 14 C
23. Tunnel 'A' Inlet Plan and Section (As built)	November 1, 1954	A B
24. Low Level Outlet Plan & Elevation	February 19, 1955	A1 B1 CN1BR3 C
25. Low Level Outlet Access Tunnel Portal	August 31, 1954	A1 B1 ON 16 A B

Note:

- A B - As built drawing
- C - Construction Drawing

26. Diversion Tunnel No. 10 Temporary Timber Lining and First Stage Concrete at Howell Bunger Valve Location	January 2, 1963	A1 - 1 - 42	C
27. Tunnel "A" Inlet Bar Schedule	February 19, 1955		C
28. Tunnel "A" Inlet Bar Reinforcement	February 15, 1955		C
29. Low Level Outlet Closure Auxiliary Discharge Regulating Valve	November 4, 1954	A1 m2 CN 2	C
30. Settlement Indicators at Dam Plans. Sections & Details	March 17, 1954	A1 m5CN 2	C
31. Tunnel "A" Inlet Sections (as built)	November 15, 1954	A1 m1 CN 13	A B
32. Location of Foundation Explorations	May 1950	A1 - 1 - 1	C
33. Intake Structure Plan	March 3, 1952	A1 - 11 - 1	C
34. Tunnel "B" Closure Bulkhead, Flap Gate Plug, and Inlet Trash Rack	April 12, 1956		C
35. Rockfill Dam Part Plan Sections & Details (AS actually built)			A B
36. Dam Plan, Section and Elevation	July 27, 1948	A1 - 0 - 4	C
37. Spillway Piezometer Piping Layout and Detail			C
38. Spillway Structure Plan & Sections Excavation			C
39. Powerstation Excavation Plan and Elevation Plan (As built)	July 1, 1956		A B

Note:

A B - As built drawing

C - Construction Drawing

40. Piezometer Piping for Turbine Net Effective Head measurement	June 24, 1956	A1 M1 ON5	C
41. Access Road Tunnel to Powerstation Plan and Section (as actually built)		not clear	A B
42. Powerstation Excavation Plan and Elevation Plan (as built)	July 1, 1956	A1 a10 A61	A B
43. Grout Curtain Along Axis of Dam, Spillway Ogee and Gravity Wall Plan and Profile	June 25, 1956	A1 a5 AB	C
44. Grout Curtain Along Axis of Dam, Spillway Ogee and Gravity Wall Plan and Profile		not clear	C
45. Grout Curtain Along Axis of Dam, Spillway Plan & Section		not clear	C
46. Spillway Piezometer Piping Layout and Detail	Dec. 14, 1954	not clear	C
47. Penstock Power Conduit Drain Plan, Sections and Details (as built)	May 15, 1955	A1 m6 Cn 4	A B
48. Penstock Sections and Details	July 19, 1955	A1 m6 ON 6	C
49. Plan & Profile of Grout Lane for Exploratory Grout at Spillway		not clear	a B
50. Spillway Excavation Plan (as actually excavated)		not clear	A B
51. Spillway Right Abutment Wall-Plan (as actually built)	July 3, 1954	not clear	a B
52. Spillway Left Gravity Wall As built Plan, Section and Details	July 6, 1956	not clear	C

Note:

A B - As built drawing
C - Construction Drawing

53. Spillway Structure Plan, Elevation and Sections	July 31, 1948	A1 - 0 - 6	C
54. Diversion Tunnel "B" Profile & Section and Inlet & Outlet Portal Details	not clear	not clear	C
55. Diversion Tunnels Nos. 11 & 12 Inlet Structure- Plan & Location Plan	August 17, 1951	A1- 1 - 12	C
56. Diversion Tunnels nos. 11 & 12 Inlet Structure Elevation & Section	August 18, 1951	A1 -1 - 12A	C
57. Diversion Tunnel NO. 1 Plan, Profile, & Section	April 20, 1949	A1 - 1 - 3	C
58. Tunnels "A", "B" & "C" Location Plan	Sept. 14, 1953	not clear	C
59. Tailrace Tunnel Profile, Sections and Outlet Portal Structure	August 14, 1951	A1- 4 - 2	C
60. Tailrace Tunnel Profile, Sections and Outlet Portal Structure	October 17, 1950	A1 - 4 - 2	C
61. Tailrace Tunnel Plan section	September 9, 1954	not clear	C
62. As built Plan of Tail Tunnel Shaft	Nov. 3, 1955	not clear	C

Note:

C - Construction Drawings

<u>Document Title:</u>	<u>Date:</u>	<u>Ref. No.</u>	<u>Remarks:</u>
1. Intake Structure Section	March 13, 1952	A1-11-5	C
2. Diversion Tunnels Nos. 11 & 12, Tunnel & power Shaft Sections and Outlet Portal Structures Details	August 3, 1951	A1-1-9	C
3. Diversion Tunnel No.10, Inlet Structure & Tunnel Transition	July 1, 1950		C
4. Graphical Log of Foundation Exploration	June 12, 1950		C
5. Diversion Tunnels Nos. 11 & 12 Profiles	July 18, 1958	A1-1-8	C
6. Spillway Bucket			
7. Rock Fill Dam, Clay Core & Blanket Plan Sta. 4+828.00 to Sta. 4+930.00	March 9, 1954		C
8. Electric Heater for Asphalt Seal at the Spillway Right Abutment Joint	December 3, 1957		C
9. Spillway Headwater Floatwell, Assembly & Detail	May 22, 1954		C
10. Repair of Damaged Spillway Training Wall, Plan & Sections	June 27, 1956		A B
11. Spillway Ogee & Chute to Elevation 698.993, Section & Details	May 5, 1954		C
12. Spillway Headwater Floatwell Installation	December 6, 1955	A, a12 AB4	C
13. Spillway Right Abutment Wall, Plan & Elevation	May 5, 1954	A, B:2CN27	C

Note:

- A,B - As built drawing
- C - Construction Drawings

<u>Document Title:</u>	<u>Date:</u>	<u>Ref. No.</u>	<u>Remarks:</u>
14. Spillway Anchors Bars Layout & Sections	December 22, 1955		A-B
15. Spillway Waterstop Plans, Sections, & Details	February 10, 1955	A, a 12 A88	A-B
16. Approach Slab, Slope Paving & Wrap Around Plans, Sections, & Details	February 23, 1956		A-B
17. Spillway Right Abutment Reinforcing Bar Schedule	March 12, 1956		A-B
18. Rockfill Dam Clay Core & Blanket-Plan Sta. 4 + 930.00 to end	September 23, 1954	A, b 5 CN 7 B1	C
19. Rockfill Dam Clay Core & Blanket- Sections Sta. 4 + 828.00 to Sta. 4 + 930.00	March 9, 1954	A, b5CA + 6	C
20. Rockfill Dam Riprap	February 22, 1956		C
21. Graphical Log of Foundation Explorations	May 2, 1952	A, - 1- 2A	C
22. Rock Fill Dam Clay Core & Blanket- Sections Sta. 4 + 930.00 to end	September 9, 1954	A, b5CNBR1	C
23. Valve Chamber Drainage Piping	September 9, 1955		C
24. Intake Tower Strut and Grout Plug Sections & Details (As Actually Built)	March 22, 1956	A, CD 11 ab 4	A, E
25. Tunnel Profile and Sections and Inlet and Outlet Portal Detail		A, B1 CN3	C

Note:

A B = As built drawing

C - Construction Drawings

<u>Document Title:</u>	<u>Date:</u>	<u>Ref. No.:</u>	<u>Remarks:</u>
26. Penstock Manifold Plan Sections & Details	Nov. 18, 1954	A, MCCN 1	C
27. Penstock Liner Plan, Sections & Details	Nov. 18, 1954	A, MCCN 2	C
28. Penstock Sections & Details	July 19, 1955		C
29. Valve Chamber Emergency Overflow Tunnel Concrete and Reinforcement	May 21, 1965	A, -9 CN- 2	C
30. Low Level Outlet Valve Chamber Excavation	Aug. 27, 1964		C
31. Valve Chamber Compressed Air Piping	Dec. 13, 1964	A, M 6 CN 6	C
32. Valve Chamber Drainage Piping	Sept. 8, 1955		C
33. Valve Chamber Drainage Piping	Sept. 8, 1955		C
34. Valve Chamber Miscellaneous Steel			C
35. Grout Curtain Along Axis of Plan and Profile	June 25, 1956	A, a5 A	C
36. Valve Chamber Compressed Air Piping	Jan. 1, 1955	A ND 6 CN 5	C
37. Valve Chamber Drainage Piping	Sept. 8, 1955	A, m 6, CN 10	C
38. Diversion Works Profile and Sections	July 13, 1948	A, -0-15	C
39. Diversion Works Profile Sections	Aug. 5, 1948	A, - 0 - 3	C

Note:
C - Constructions Drawing

<u>Document Title:</u>	<u>Date:</u>	<u>Ref. No.</u>	<u>Remarks:</u>
40. Diversion Tunnel No.1 Plan, Profile, & Section	April 20, 1949	A, -1 -3	C
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42. Tunnel "B" Plan Profile Sections & Details as actually constructed	March 15, 1956		A B
43. Tunnel "C" Cut-off Grouting	December 7, 1954	A, b1 CN 21	C
44. Tunnel "C" Backfill Grouting	December 3, 1954	A, b1 CN 20	C
45. Tunnel "C" - Penstock manifold Water Seal	April 13, 1954	A, LI ON 10	C
46. Tunnel "B" Plug Sections & Grout pipe Details	March 5, 1955	A, B1 CN 20	C
47. Tunnel "B" Plug Section & Grouting Details	October 5, 1954	A, B1CN12B1	C
48. Tailrace Tunnel Transition Reinforcement	March 28, 1955	A, b4 CN 5	C
49. Power House Turbine & Basement Floor Plans	Sept. 5, 1948	A, - 0 - 19	C
50. Power Station Access Tunnel Section	July 30, 1954	A, B100 N2	C
51. Power Facilities Standard Details	Nov. 17, 1954	A, b1 00 N1A	C
52. Powerstation Access Tunnel Portal	July 18, 1954		C
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54. Power House Longitudinal Section	July , 1948	A, - 0 - 11	C
55. Power Facilities Foundation Treatment	Nov. 13, 1954	A, b10 CN 4	C

Note:

- A B - As built drawing
- C - Construction Drawings

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56. Power House Longitudinal & Transverse Sections	Sept. 6, 1948	A, -0 - 21	C
57. Powerstation Generator Floor Framing Plan (As Built)	Aug. 16, 1956	A, a 10 A B6	A B
58. Tailrace Tunnel Profile Sections and Outlet Portal Structure	Aug. 14, 1951	A, - 4 - 2	C
60. Power Intake Plan	Nov. 20, 1956	A, - 11 - 1	C
61. Intake Structure Plan	March 3, 1952	A, - 11 - 1	C
62. Power Intake Sections	Nov. 23, 1956		C
63. Tailrace Tunnel Plan & Sections	Sept. 4, 1954	A, b4 Cn 2	C
64. Low Level Outlet Access Tunnel Portal	Aug. 31, 1954	A, b10 CN 16	C
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66. Low Level Outlet Access Tunnel	Oct. 12, 1954	A, b1CN 15R1	C
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68. Low Level Outlet Intake Trash Rack Assembly and Details	Nov. 4, 1954		C
69. Access Tunnel Location Plan	October 15, 1954		C
70. Tailrace Tunnel Profile, Sections and Outlet Portal Structure	October 17, 1950	A, - 4 - 2	C

Note:

- A B - As built drawing
- C - Construction Drawings

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2. Electronic Piezometer Plots			C
3. Composite Geologic Map of Ambukiao Spillway Basin and Vicinities			C
4. Inclinometer Plots From: May 1977 to Nov. 1977		GL-27-C	C
5. Inclinometer Plots-DDHC From: Sept. 7-Oct. 12, 1977		27-D	C
6. The Movement of Casing- Elevation 682.85 695.83M	August 4, 1977	GL-46	C
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8. Data Plot on Rainfall, Water Discharges and Piezometric Heads of Group 3 Elevation <u>680.00m</u> From: Jan. to Dec. 1978	January 1978	Plate 3	C
9. Data Plot on Rainfall, Water Discharges and Piezometric Heads of Group 4 Elevation <u>700.00m</u> <u>717.57m</u> From: Jan. to April, 1985.			C
10. Data Plot on Rainfall, Water Discharges and Piezometric Heads of Group 5 Elevation <u>724.34m</u> From: Jan. to April, 1986			C
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12. Data Plot on Rainfall, Water Discharges and Piezometric Heads of Group 3 Elevation 680.00m 700.00m From: Jan. to March, 1986
13. Data Plot on Rainfall, Water Discharges and Piezometric Heads of Group 2 Elevation 660.00m 680.00m From: Jan. to April, 1986
14. Data Plot on Rainfall, Water Discharges and Piezometric Heads of Group 1 Elevation 600.00m 660.00m From: Jan. to March, 1986
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18. Electronic Piezometer Plots
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19. Electronic Piezometer Plots
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20. Electronic Piezometer Plots
Period: July 1978
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22. Geologic section Passing Borehole 3SP
- | | | |
|----------------|--------------|---|
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| February 1978 | GL-47-2 | C |
| March 1978 | GL-47-3 | C |
| April 1978 | GL-47-4 | C |
| June 1977 | GL-47-6 | C |
| May 19, 1977 | GL-Inst.32-H | C |
| Sept. 27, 1977 | GL-Inst.32-0 | C |

23. Geologic Section B-1 Passing thru Drainhole DDH-22 Projecting Piezometer Hole 4SP & Drainholes DDH 16, 14, 11, 24, 23, & Adit 2 & 3	May 20, 1977	GL-42-B	C
24. Passing thru Mid Section of Inclinator Hole DDH-A & Piezometer Holes are 4SP & 2SP	April 29, 1977	GL-Inst.32-E	C
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26. Passing thru Piezometer Hole 6SP Projected Inclinator Hole are DDH-B	Sept. 27, 1977	Inst. 32-I	C
27. Passing thru Inclinator Borehole "C" & 3SP Projected Drainholes 17, 12, 2, 7, 22 & 21 Inclinator Borehole "A" & Piezometer Hole 2SP	May 23, 1977	GL-Inst.32-I	C
28. Geologic Section Passing Borehole 2SP	Sept. 26, 1977	GL-32-M	C
29. Geologic Section Passing Borehole 5SP	Sept. 26, 1977	GL-Inst.32-N	C
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31. Passing thru Drainhole 6SP Drainhole DDH 6, 10, 23, 22, 21 & Adit No. 1.	May 9, 1977	GL-42-D	C
32. Passing thru Piezometer Holes 10TPV 9TPV & 7TPV Projected Inclinator Hole DDH-A & Piezometer Hole 1SP	Sept. 27, 1977	GL-Inst.32-7	C

- | | | | |
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| 35. Passing thru Inclinerometer Holes DDH 2, 7, 21 & 20 & Inclinerometer Hole 2SP | April 27, 1977 | GL-Inst.32-D | C |
| 36. Passing thru Inclinerometer Borehole "B" & Spillway Bucket Project are Holes 5SP & 6SP; Drainholes 1, 6, & 9, Adit No.1 & Test Pit No.1 | May 24, 1977 | GL-Inst.32-G | C |
| 37. Passing thru Drainhole DDH-19 Projecting Piezometer Holes 5SP & 6SP Drainholes DDH 9, 20 & Adit No.1 | May 8, 1977 | GL-42-E | C |
| 38. Geo-Instrumentation Report/Bulletin for the Month of March 1986 | | | |
| 39. Geo-Instrumentation Report/Bulletin for the Month of April 1986 | | | |
| 40. Geo-Instrumentation Report/Bulletin for the Month of May 1986 | | | |
| 41. Pictorials: Two Volumes | | | |
| 42. Earthquake Bulletin. Ambuklao Micro-earthquake Monitoring Station.
May 12 - Dec. 31, 1985 | | | |

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- iii. Initial Investigation and Studies
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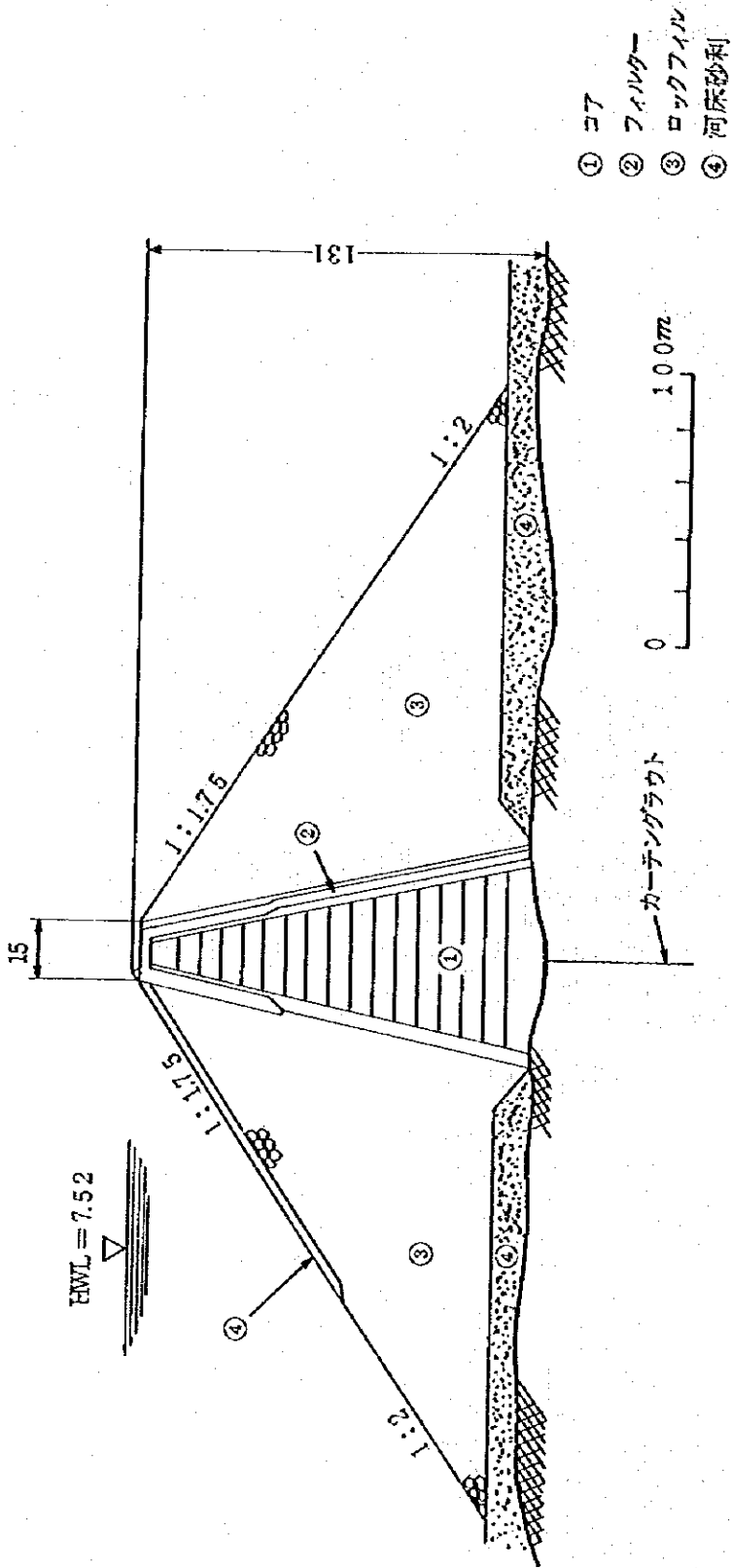
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5. Inclinometer Plot, A-Component, October 1977
6. Inclinometer Plot, A-Component, November 1977
7. Inclinometer Plot, B-Component, June 1977
8. Inclinometer Plot, B-Component, July 1977
9. Inclinometer Plot, B-Component, August 1977
10. Inclinometer Plot, B-Component, September 1977
11. Inclinometer Plot, B-Component, October 1977
12. Inclinometer Plot, B-Component, November 1977
13. Inclinometer Plot, A-Component, Jan.-March 1978
14. Inclinometer Plot, A-Component, April-May 1978
15. Inclinometer Plot, A-Component, June 1978
16. Inclinometer Data Plot, A-Component, June-July 1978
17. Inclinometer Data Plot, A-Component, Aug.-Sept. 1978
18. Inclinometer Data Plot, A-Component, September 1978
19. Inclinometer Data Plot, B-Component, Jan.-March 1978
20. Inclinometer Data Plot, B-Component, April-May 1978
21. Inclinometer Data Plot, B-Component, June-July 1978
22. Inclinometer Data Plot, B-Component, Aug.-Sept. 1978
23. Inclinometer Data Plot, B-Component, September 1978

24. Inclinometer Data Plot, B-Component, September 1978
25. Comparative Statistical Data, DDII-A, A-Comp., 1977
26. Comparative Statistical Data, DDII-A, B-Comp., 1977
27. Comparative Statistical Data, DDII-A, A-Comp., 1978
28. Comparative Statistical Data, DDII-A, B-Comp., 1978
29. Comparative Statistical Data, DDII-B, A-Comp., 1977
30. Comparative Statistical Data, DDII-B, B-Comp., 1977
31. Comparative Statistical Data, DDII-B, A-Comp., 1978
32. Comparative Statistical Data, DDII-B, B-Comp., 1978
33. Comparative Statistical Data, DDII-C, A-Comp., 1977
34. Comparative Statistical Data, DDII-C, A-Comp., 1977
35. Comparative Statistical Data, DDII-C, A-Comp., 1978
36. Comparative Statistical Data, DDII-C, B-Comp., 1978



- ① コア
- ② フィルター
- ③ ロックフィル
- ④ 河床砂利

Ambuklao ダム (フィリピン)

ダム名	竣工年	国	州	型式	ダム高 (m)	ダム頂長 (m)	ダム体積 (10 ³ m ³)	洪水吐総貯容量 (10 ⁶ m ³)	目的	所有者	設計者	施工者
Ambuklao	1955	フィリピン	Benguet	C.C.	129	605.7	7,679	327	H	National Power Corporation	Nat. Power Corp With Harza Engineering	Guy F. Atkinson

C.C. = Central Core
H = Hydro Power

WATER DISCHARGE MEASUREMENT & TEMPERATURE READING
ABUKLAW HYDROELECTRIC PLANT

Date AUG. 15, 1985 by _____ Computed by _____

Reservoir Elevation 752.04 meters Rainfall FAIR mm.

DRAIN HOLE No.	Elev.-M	Depth-M.	Temp. θ..	DISCHARGE MEASUREMENTS Seconds/liter/reading					Average Sec./liter	OPM
				1	2	3	4	5		
1.	752.25	25.00								
2.	753.25	30.00								
3.	752.25	42.00								
4.	752.25	53.00		20.0	20.0	20.0	20.0	20.0	20.0	0.7521
5.	742.25	30.00								
6.	742.25	35.00								
7.	742.25	51.00		12.0	12.0	12.0	12.0	12.0	12.0	1.321
8.	742.25	60.00		32.0	32.0	32.0	32.0	32.0	32.0	0.4953
9.	727.25	40.00								
10.	727.25	45.00		27.0	27.0	27.0	27.0	27.0	27.0	0.5871
11.	727.25	63.00								
12.	768.00	50.00								
13.	770.00	60.00								
14.	772.00	80.00								
15.	770.00	60.00								
16.	702.24	60.00								
17.	701.54	50.00								
18.	640.00	120.00		15.0	15.0	15.0	15.0	15.0	15.0	1.0568
19.	660.00	118.50		08.0	08.0	08.0	08.0	08.0	08.0	1.9815
20.	670.00	123.00								
21.	697.00	100.00								
22.	703.00	90.00								
23.	700.00	100.00								
24.	720.00	120.00								
25.										
26.										
27.										
28.										
29.										

rain-bird water

Reservoir water

AT THE SIDE OF

NO READING COULD BE TAKEN DUE TO _____

*** HOLE BEING DRILLED

FIELD SHEET SLOPE INDICATOR DATA

BOREHOLE NO. DUI - A
LOCATION above road level; near the grout curtain.

SHEET 1 OF 5

CASING (TOP) ELEVATION 771.85 M.

COORDINATES:
NORTHING 98,500.64
EASTING 105,262.53

TIME STARTED 0945 HRS.
TIME FINISHED _____ HRS.

TOTAL DEPTH (BOREHOLE) 398.53'

WEATHER _____

TOTAL DEPTH (CASING) 354.00'

RAINFALL WIS - 217.77

DATE 17 July '78

RESERVOIR LEVEL _____

INSTR. Inclinometer READ 11111 REC. 11111 CALC. 11111 CHKD. _____

DEPTH		A COMPONENT					B COMPONENT				
		INITIAL READING	READING		DIFF	CHANGE XXX mm	INITIAL READING	READING		DIFF	CHANGE XXX mm
FT.	M.		U/S	D/S					U/S		
354	107.90	+677	1380	-40	+790	+1.5677	+836	1256	-370	+726	-0.1769
352	107.30	+662	1352	-366	+718	+0.1834	+764	1244	-361	+705	-0.1791
350	106.68	+683	1360	-373	+733	+0.762	+772	1271	-394	+765	-0.1067
348	106.07	+931	1466	-484	+750	+0.2895	+917	1442	-477	+729	+0.1828
346	105.46	+1017	1506	-524	+1030	+0.1781	+970	1471	-473	+964	-0.0119
344	104.85	+1060	1521	-543	+1064	+0.0609	+920	1448	-471	+919	-0.0152
342	104.24	+958	1467	-481	+955	-0.0417	+1083	1543	-560	+1103	+0.3048
340	103.63	+820	1402	-423	+823	+0.0957	+1141	1558	-573	+1131	-0.1124
338	102.02	+777	1375	-399	+774	-0.0457	+1078	1523	-544	+1067	-0.1371
336	102.41	+688	1231	-353	+694	-0.0305	+1021	1498	-526	+1022	+0.0152
334	101.80	+587	1279	-301	+590	-0.1067	+1018	1500	-513	+1113	-0.0762
332	101.19	+540	1265	-281	+546	+0.0714	+916	1447	-460	+907	-0.1371
330	100.58	+543	1222	-288	+554	+0.1671	+844	1403	-422	+825	-0.2815
328	99.87	+541	1262	-278	+540	-0.0152	+662	1321	-334	+655	-0.1067
326	99.38	+546	1270	-284	+554	+0.1219	+609	1298	-307	+607	-0.0105
324	98.75	+455	1215	-232	+447	-0.1219	+687	1236	-357	+693	+0.0714
322	98.14	+475	1232	-253	+485	+0.1124	+762	1274	-394	+768	+0.0914
320	97.53	+435	1196	-215	+411	-0.0617	+897	1442	-460	+902	+0.0762
318	96.92	+151	1061	-82	+143	-0.1219	+937	1418	-473	+931	-0.0914
316	96.31	+36	107	-27	+34	-0.0305	+822	1402	-413	+815	-0.1067
314	95.70	-205	-117	+106	-223	-0.2743	+770	1377	-394	+771	+0.0112
312	95.09	-277	-140	+124	-264	+0.1981	+723	1348	-368	+716	-0.1067
310	94.48	-113	-42	+32	-74	+0.2543	+615	1353	-346	+679	+0.1067
308	93.87	+226	1105	-122	+227	+0.0152	+756	1368	-344	+759	+0.0417
306	93.27	+164	1073	-90	+163	-0.0152	+782	1379	-406	+785	+0.1417
304	92.68	+237	1120	-142	+262	+0.381	+809	1387	-414	+801	-0.1219
302	92.05	+482	1259	-249	+498	+0.2138	+754	1361	-357	+749	-0.0314
300	91.44	+652	1320	-356	+656	+0.0609	+755	1368	-392	+760	+0.0762
298	90.83	+554	1267	-288	+553	-0.0152	+896	1438	-462	+900	+0.0609
296	90.23	+526	1255	-276	+531	+0.0762	+940	1465	-484	+949	+0.1371
294	89.61	+378	1119	-193	+367	-0.2438	+982	1481	-473	+976	-0.1067

NOTE: CHANGE IS DIFFERENCE MINUS THE INITIAL READING MULTIPLIED BY 0.01524
DISTRIBUTIONS:
1. WHITE - Board of Consultants 2. BLUE - Dr. H. Kalla 3. GREEN - Ambuklao
4. YELLOW - Manila 5. PINK - L.R.O.

UTILITY OPERATIONS
APPROVED WORK ORDER BUDGET, BY CATEGORY
BY 1986 (IN MILLIONS)

PAGE 16
SCHEDULE VI

	TOTAL	EXPANSION	MAINTENANCE	REHABILITATION	INVENTORY SPARES	SUPPORT FACILITIES	P G I
1. NORTHERN LUZON REGIONAL CENTER	P 81.205	28.936	7.700	41.474 a/ 0.000	0.687 3.670	2.408 0.000	0.000 0.000
2. SOUTHERN LUZON REGIONAL CENTER	P 160.000	7.353	8.486	17.437 0.300	32.354 2.676	7.370 0.000	87.000 4.000
3. METRO MANILA REGIONAL CENTER	P 80.070	6.948	8.205	61.502 50.641 b/	0.715 3.670	2.700 0.000	0.000 0.000
4. VISAYAS REGIONAL CENTER	P 119.660	3.100	38.580	22.830 8.000 d/	53.900 3.670	1.250 0.000	0.000 0.000
5. MINDANAO REGIONAL CENTER	P 68.700	29.118 e/	15.682	12.180 1.800	10.200 9.400 f/	1.520 0.000	0.000 0.000
TOTAL	P 509.635	75.455	78.653	155.423 60.741	97.856 23.086	15.248 0.000	87.000 4.000

- a/ Includes budgetary provision for Angat overhauling in the amount of P18M.
b/ Includes budgetary provision for Malaya rehabilitation in the amount of \$45M.
c/ Budgetary provision for Pielstick engines.
d/ Budgetary provision for Tongonan rehabilitation.
e/ Includes budgetary provision for the purchase & installation of power transformer for Agus I and Agus II in the amount of P20M.
f/ Budgetary provision for Pulangui IV spares.

添付資料 - VI

PROBLEMS/PROBABLE IMPACT	APPLICABILITY			RECOMMENDATIONS
	MTP	STP	MLA	
5. Confinement of Certain Operating Crew at the Control Room Most of the Time - This practice results to limited patrol implementation which may subsequently affect early detection of physical equipment abnormalities.	X	X	X	<p>a. Explore feasibility of establishing additional work stations at different strategic areas outside the control room.</p> <p>b. Effective utilization of personnel in patrol operation and correction of minor abnormalities.</p>

QUARTERLY WORK ORDER BUDGET
CY 1986

CENTRAL MAINTENANCE DIVISION

NORTHERN LUZON REGIONAL CENTER

COST CENTER NO. 5111011

W.O. NO.	D E T A I L S	TOTAL	1ST Q	2ND Q	3RD Q	4TH Q
	NEW					
	OVERHAULING OF TURBINE UNIT I, RECONDITIONING OF TURBINE RUNNER & MAINTENANCE OF MAIN GENERATOR EXCITER, SWITCHGEARS, OCB'S POT-HEADS AND POWER CABLES (AMBUKLAD)***	P 1,029,000	-	400,000	400,000	229,000
	REPLACEMENT OF TURBINE SHAFT FOLLOWER AND CARBON SEAL OF UNITS II & III***	P 640,000	-	200,000	200,000	240,000
	OVERHAULING OF UNIT I (BINGA)***	P 1,635,000	-	300,000	500,000	635,000
	GENERAL INSPECTION OF MASIWAY UNIT***	P 526,000	-	326,000	200,000	-
	GENERAL INSPECTION OF UNIT I (PANTABANGAN)***	P 641,000	-	200,000	200,000	241,000
	GENERAL INSPECTION OF UNIT II (PANTABANGAN)***	P 471,000	-	-	271,000	200,000
	OVERHAULING OF UNIT I (ANGAT)***	P 18,029,000	-	6,000,000	6,000,000	6,029,000
	CONVERSION OF DYNAMIC AVR TO STATIC TYPE (UNIT IV - ANGAT)***	P 68,000	-	38,000	30,000	-
	TOTAL	P 25,014,000	-	8,939,000	8,501,000	7,574,000

OK

RATES85
11/14/85

D. REVENUES

NATIONAL POWER CORPORATION
AVERAGE RATE ASSUMPTIONS
OCT. - DEC, 1985

	BASIC RATES*	FCA	SCA	CCA	FOREX	TOTAL SELLING RATE	DISC.	NET REVENUE
PHILIPPINES	.9388	-.0014	.0006	.0037	.1734	1.1151	.0155	1.0996
LUZON	1.0606	.0066	.0009		.1734	1.2415	.0129	1.2286
VISAYAS	.9477	-.0615		.0514	.1734	1.1111	.0377	1.0733
CEBU	1.0307	-.0923		.1516	.1734	1.2634	.0389	1.2245
NEGROS	.9696	.0008			.1734	1.1438	.0365	1.1073
PANAY	1.0202	-.1523			.1734	1.0413	.0386	1.0027
BOHOL	1.04	-.5641			.1734	.6493	.0391	.6102
LEYTE	.8273	.0047			.1734	1.0054	.0312	.9742
MINDANAO	.4277**	-.0117			.1734	.5894	.0125	.5769

* Basic rates used were based on actual rates for August, 1985.

** With sales above allocation in Mindanao.

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FP80-tm9

A. ECONOMIC PARAMETERS

- 1. GNP Growth - 1.0 %
- 2. Inflation Rate - 15 %
- 3. Exchange Rate

3.1. P to US\$

1st Quarter - P20/\$1
2nd Quarter - P21/\$1
3rd Quarter - P21.50/\$1
4th Quarter - P21.50/\$1

3.2. Japanese Yen to US\$

Jap Yen - ¥ .0050

4. Interest Rates

- 4.1. LIBOR - 8.5% p.a.
- 4.2. Local Interest Rates - 17% p.a.

5. Fuel Oil Price

5.1. - International Oil Price - \$24.50/barrel

5.2 Cost to NPC:	Quarter	P/barrel	P/liter
	1st	668.49	4.207
	2nd	702.66	4.422
	3rd/4th	720.29	4.533

- 6. Business Climate - NPC energy sales is projected to be 2.5% above the level in 1985.

TABLE II
NATIONAL POWER CORPORATION
APPROVED QUARTERLY/SEMESTRAL OPERATING EXPENSE BUDGET
FOR 1966

LINE	DESCRIPTION	TOTAL	1ST QTR	2ND QTR	3RD QTR	4TH QTR	2ND SEM
14	510001 - OVP-MARC						
15	EXPENSE ACCOUNTS						
16	812 SECURITY SVCS	1,642,000	177,000	177,000	2,169,250	912,750	3,297,000
17	814 RENTAL	1,200,000	315,000	315,000	315,000	515,000	650,000
18	816 OTHER SVCS	57,000	1,425	1,425	1,425	1,425	5,700
19	820 SUPPLIES	2,862,000	677,000	657,000	657,000	657,000	1,314,000
20	822 STAFF/OT SUP	55,000	9,750	17,500	67,500	8,750	17,500
21	820 MATLS & SUPPLS	2,807,000	667,250	1,279,500	689,500	648,750	1,296,500
22	821/822/823/824	17,432,000	4,358,116	4,358,117	4,358,116	4,358,117	8,716,233
23	825 R/M-PROP	5,700	1,425	1,425	1,425	1,425	5,700
24	826 R/M-PROP	17,417,400	4,354,366	4,354,367	4,354,366	4,354,367	8,708,733
25	827 POSTAGE/TELE	10,000	2,500	2,500	2,500	2,500	10,000
26	828 VEHICLES/OPER/MNT	1,300,000	325,107	325,106	325,105	325,106	650,213
27	816 R/M-MOTOR VEH	1,210,000	305,107	305,106	305,105	305,106	610,213
28	827 G D L	90,000	20,000	20,000	20,000	20,000	80,000
29	829 INSURANCE	9,000	2,250	2,250	2,250	2,250	9,000
30	822 INSURANCE	4,000	1,000	1,000	1,000	1,000	4,000
31	821 TAXES/FEES	700	175	175	175	175	700
32	830 FINES/CONTRIBUTN	90,000	22,500	22,500	22,500	22,500	90,000
33	841 CONTRS/CONTR	50,000	12,500	12,500	12,500	12,500	50,000
34	844 FIN'L ASSTY	50,000	12,500	12,500	12,500	12,500	50,000
35	841 INJURIES/DMG	50,000	12,500	12,500	12,500	12,500	50,000
36	862 DAMAGES	50,000	12,500	12,500	12,500	12,500	50,000
37	800 OFFICE	103,000	25,750	25,750	25,750	25,750	103,000
38	8-3 CULTURAL XP	50,000	12,500	12,500	12,500	12,500	50,000
39	871 ADVERTISING	50,000	12,500	12,500	12,500	12,500	50,000
40	890 MISCELLANEOUS	3,000	750	750	750	750	3,000
41	GRAND TOTAL	2,830,652	6,384,651	6,355,186	8,550,723	7,072,092	15,622,415

41

RATES
11/08/85

D. REVENUES

NATIONAL POWER CORPORATION
AVERAGE RATE ASSUMPTIONS
CY 1986

CASE 2: W/ PNPP
CO OCT. '85

	BASIC RATES*	FCA	SCA	CCA	FOREX	TOTAL SELLING RATE	DISC.	N E T REVENUE
PHILIPPINES	.9244	.014	.0026	.0051	.2935	1.2396	.0139	1.2257
LUZON	1.0606	.0198	.0034		.2935	1.3773	.0122	1.3651
VISAYAS	.9542	-.0126		.0742	.2935	1.3093	.036	1.2733
CEBU	1.0307	-.0286		.1931	.2935	1.4887	.0389	1.4498
NEGROS	.9696	.0077			.2935	1.2708	.0366	1.2342
PANAY	1.0202	-.0637			.2935	1.25	.0384	1.2116
BOHOL	1.04	-.0331			.2935	1.3004	.0393	1.2611
LEYTE	.8273	.0158			.2935	1.1366	.0312	1.1054
MINDANAO	.3381	.0002			.2935	.6318	.0125	.6193

* Basic rates used were based on actual rates for October, 1985.

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FP8D-tms

RATES
11/08/85

D. REVENUES

NATIONAL POWER CORPORATION
AVERAGE RATE ASSUMPTIONS
CY 1986

CASE 1: W/O PNPP

	BASIC RATES*	FCA	SCA	CCA	FOREX	TOTAL SELLING RATE	DISC.	NET REVENUE
PHILIPPINES	.9244	.0216	.0026	.0051	.238	1.1912	.0139	1.1773
LUZON	1.0606	.0291	.0034		.238	1.3311	.0122	1.3189
VISAYAS	.9542	-.0101		.0742	.238	1.2563	.036	1.2203
CEBU	1.0307	-.0286		.1931	.238	1.4332	.0389	1.3943
NEGROS	.9696	.0077			.238	1.2153	.0366	1.1787
PANAY	1.0202	-.0637			.238	1.1945	.0384	1.1561
BOHOL	1.04	-.0331			.238	1.2449	.0393	1.2056
LEYTE	.8273	.0234			.238	1.0887	.0312	1.0575
MINDANAO	.3381	.0002			.238	.5763	.0125	.5638

* Basic rates used were based on actual rates for October, 1985.

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FPED-tms

REPAIR & MAINTENANCE-PLANTS LINES & SUBSTATIONS
(ACCOUNT NO 625)

Ambuklao HE Plant CC#5141101

SUMMARY-		DETAILS IN THOUSANDS				QUARTERLY BREAKDOWN				
		JOB DESCRIPTION	MATERIAL	LABOR	OTHERS	TOTAL BUDGET	1st. QTR	2nd QTR	3rd QTR	4th QTR
1	Clearing of Failrace Outlet Channel	241.94	34.0	10.0	285.94	285.94				
2	Revamp of Control wirings of Control Room	16.5	8.25	2.5	27.25	27.25				
	TOTAL									
3	Improvement of Cooling System of Generating Units I, II & III	1,008.12	28.5	10.0	1,046.62	1,046.62				
4	Replacement of high pressure rater pipings of cutterfly valves	145.2	8.0	4.0	157.2	157.2				
5	Replacement of Five(5) Deteriorated music note Rubber Seal of Spillway Gates	403.05	30.96	10.2	444.21		444.21			
6	Replacement of Four(4) Unwatering sump purps TOTAL	1,049.3	5.0	9.0	1,063.3		1,063.3			
	TOTAL				3,024.52	1,517.01	1,507.51			

E. OPERATING EXPENSES

1. Fuel oil, steam and coal prices - Attachment 1
2. Depreciation/depletion/rate base - Generating plants put in commercial operation on or after January 1, 1984 were depreciated using the Sum-of-Years Digit Method; old generating plants and other assets were depreciated using the existing composite group (Straight Line) approach.
3. Other operating expenses
 - 3.1 Includes provision for Inflation at the rate of 15% on non-manpower related expenses based on Actual as of September 1985 plus estimates on October to December expenses.
 - 3.2 Includes 5% provision for shifting to new pay plan, 10% provision for salary increase effective July 1986, and 5% provision for promotions.
 - 3.3 Includes provision for new plants and substations which are assumed to be operational in 1986: PNPP, Cebu Thermal, Pulangui IV, Power Barge 3 & 4, 8th power.
 - 3.4 Includes provision for increase in insurance premiums.

- F. OTHER INCOME/OTHER EXPENSES - includes income/incidental expenses of test-run plants.

REPAIR & MAINTENANCE-PLANTS LINES & SUBSTATIONS
(ACCOUNT NO. 625)

SUMMARY-OFFICE OF THE VICE PRESIDENT-NLR 5100001		DETAILS IN THOUSANDS					QUARTERLY BREAKDOWN				
		J.O NO	JOB DESCRIPTION	MATERIAL	LABOR	OTHERS	TOTAL BUDGET	1st QTR	2nd QTR	3rd QTR	4th QTR
	TOTAL IN P										
	\$										
	P										
New	Repair & maintenance-Plants lines & Substation - Regional Contingency					2,084,876		1,042,438	1,042,438		
	TOTAL IN P										
	\$										
	P										
	TOTAL IN P										
	\$										
	P										
	TOTAL TO BPS FORM NO.300 IN P							1,042,438	1,042,438		
	\$										
	P										

Schedule II

NATIONAL POWER CORPORATION
 COMPARATIVE GWH SALES
 CY 1984 -1986

	CY1986 CASE 1-2 (1)	CY 1985 (2)	CY 1984 (3)	%Increase/ (Decrease) (1/2)	(2/3)
Total Sales	17320	16902	17006	2.47%	-0.61%
Luzon	13030	12904	13245	0.98%	-2.57%
Visayas	1200	1168	1020	2.74%	14.51%
Negros	186	186	174	0.00%	6.90%
Panay	134	133	122	0.75%	9.02%
Cebu	461	440	464	4.77%	-5.17%
Leyte	390	383	236	1.83%	67.29%
Bohol	29	26	24	11.54%	8.33%
Mindanao	3090	2830	2741	9.19%	3.25%

JICA