

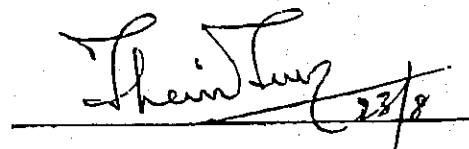
**MINUTES OF MEETING
FOR
THE CONSULTATION STUDY
ON
STUDY ON INTRODUCTION OF RENEWABLE ENERGIES
TO RURAL AREAS
IN
THE UNION OF MYANMAR**

**AGREED UPON BETWEEN
JAPAN INTERNATIONAL COOPERATION AGENCY
AND
THE MINISTRY OF ELECTRIC POWER**

YANGON, THE UNION OF MYANMAR, AUGUST 23, 2002



Mr. KURAKATA Hiroshi
Leader, Consultation Study Team
Japan International Cooperation Agency
Japan



Dr. Thein Tun
Director General
Department of Electric Power
Ministry of Electric Power
The Union of Myanmar

The Consultation Study Team (hereinafter referred to as "the Team") sent by the Japan International Cooperation Agency (hereinafter referred to as "JICA"), headed by Mr. KURAKATA Hiroshi, had a series of discussions for "the Study on introduction of renewable energies in rural areas in Myanmar" (hereinafter referred to as "the Study") with the officials of the Department of Electric Power, the Ministry of Electric Power (hereinafter referred to as "DEP"), Myanmar Electric Power Enterprise (hereinafter referred to as "MEPE"), a state owned utility responsible for generation, transmission and distribution of electric power in Myanmar from August 22 to August 23, 2002. Discussions were conducted in a friendly and cordial atmosphere, and both sides agreed to record the following points as summarized conclusion of the discussions.

1. Basic agreement on the plan for the Study phase 2

The Team proposed the following alternatives for the future plan of the Study phase 2 and both sides agreed to choose the alternative (1) which will be agreeable to the Ministry.

(Alternatives proposed by the Team)

- (1) To prepare a manual for proper operation, maintenance, organization, and tariff system by monitoring of existing Small Hydropower Plant
- (2) To prepare a manual for proper operation, maintenance, organization, and tariff system by implementing a pilot project of Rice Husk Gas Engine Generator
- (3) To terminate the Study

2. Purpose of the Study phase 2

Both sides agreed that the main purpose of the Study phase 2 is to prepare a manual for proper operation and maintenance of Small Hydropower Plant by monitoring the existing Small Hydropower plant.

3. Criteria for the choice of target site

Both sides agreed to choose the target site for monitoring among those, which meet every criteria, described below.

(Criteria for the choice of target site)

- (1) Capacity of the plant should be less than approximately 1MW.
- (2) The plant should be operated in a proper condition without any disorder.
- (3) The plant should not be connected to the Interconnected Grid.

4. Selection of target site for monitoring

The Myanmar side submitted the list of the existing Small Hydropower plants. (Appendix 1), and explained that the following plants should be prioritized. The Team took note of the suggestion regarding the priority.

- | | |
|------------------------|-----------|
| ● Hhopin Ga Lang Chung | (1,260KW) |
| ● Zi Chaung | (1,260KW) |
| ● Ba Htu Tut Kyi | (1,200KW) |

The Team explained that the target site for monitoring should be selected taking into account the result of the socioeconomic survey of the area around the site.

5. Revised tentative schedule

Both sides draw up the Table for the Revised Tentative Schedule (Appendix 2) in unanimous cooperation.

6. Request for Equipment

Myanmar side requested to provide necessary equipment for maintenance and inspection of the Plant. The Team replied that the issue would be considered in the process of the Study considering the budgetary allocation.

Small Hyder Installed Capacity (2002 - 2003)

Sr. No.	Name of Power Stations	Installed Capacity (KW)
1	Kheng Kharan Kha	2520.00
2	Nam Khan Kha	5000.00
3	Putao	160.00
4	Hhopin Ga Lang Chaung	1260.00
5	Pha Saung	108.00
6	Pha Pon	49.00
7	Chi Chaung	200.00
8	Nga Sit Bar	1000.00
9	Za Lwei	400.00
10	Htwi Chaung	200.00
11	Daung Bar	400.00
12	Nam Laung	200.00
13	Line Bar	600.00
14	Thin Thwel	50.00
15	Zi Chaung	1260.00
16	La Hei	50.00
17	Kotalu	150.00
18	Mali	192.00
19	Mogok	4000.00
20	Wet Wun	450.00
21	Zin Kyaik	198.00
22	Kun Hein	150.00
23	Ba Htu Tut Kyi	1200.00
24	Nam Latt	480.00
25	Nam Wok	3000.00
26	Nam Kham	200.00
27	Nam San Chaung	500.00
28	Nam Sam Ngaung	4000.00
29	Nam Mhaw	4000.00
30	Tone Kham	225.00
31	Pa Chet Haw	300.00
32	Mae Pan	1200.00
33	Se Lu	12.00
34	Mine Lar	30.00
Total		33744.00



List of the Members

(JICA Consultation Study Team)

Mr. KURAKATA, Hiroshi

Team Leader, Director, the Energy and Mining Development Study Div., JICA

Mr. TATEMATSU, Shingó

Study Planning, Program Officer, Energy and Mining Development Study Div., JICA

(JICA Myanmar Office)

Mr. SATO, Toshiya

Assistant Resident Representative

U Maung Maung Than

Programme Officer

(DEP)

Dr. Thein Tun

Director General

U Saw Win

Deputy Director General

U Aung Khaing

Superintending Engineer

U Kyaw Tin

Deputy Director

(MEPE)

U Soe Myint Lwin

Deputy Chief Engineer (Planning)

U Cho Aye

Deputy Chief Engineer (Planning)

U Ye Win

Superintending Engineer

U Ba Ngwe

Superintending Engineer

U Myo Aung

Executive Engineer

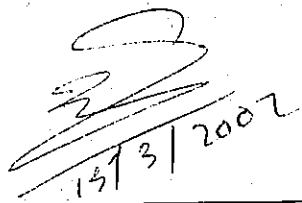
Daw Hnin Hnin Aye

Executive Engineer

Introduction of Renewable Energies in Rural Areas in Myanmar

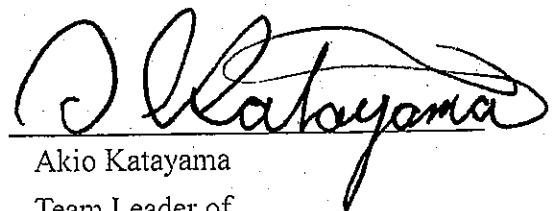
**Minutes of Meeting
in
5th Assignment in Myanmar**

Yangon, Mar. 13, 2002



13/3/2002

U Soe Myint Lwin
Leader of Counterpart,
Deputy Chief Engineer of
Planning Department
Myanma Electric Power Enterprise



Akio Katayama
Team Leader of
JICA Study Team

Minutes of Meeting
in
5th Assignment in Myanmar

Date : Mar. 08, 2002
Time : 14:00 - 20:30
Place : MEPE Headquarters and Mandalay Room at Hotel Nikkou

1. Workshop in Yangon

The JICA Study Team held the Workshop in Yangon to explain and discuss the Guidelines and the three priority Development Projects described in the Interim Report that was submitted in February 2002. The presentation was made by the Study Team for the following items:

- (1) The Guidelines
- (2) Development Plan of Heho Small Hydro Scheme
- (3) Development Plan of Nam Lan Mini Hydro Scheme
- (4) Development Plan of Rice Husk Gas Engine

2. Discussion

The discussion between the Counterpart Team and the Study Team is summarized below:

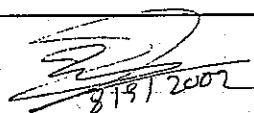
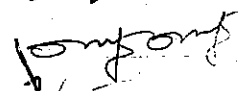

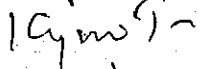

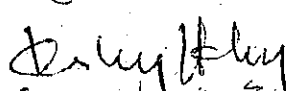
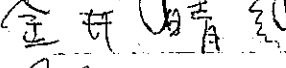
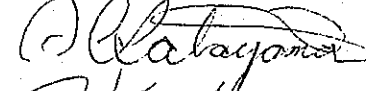
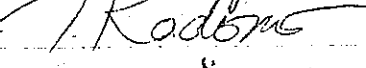


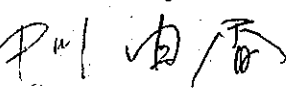



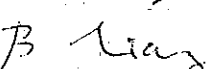


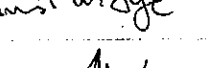
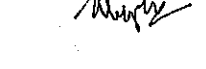
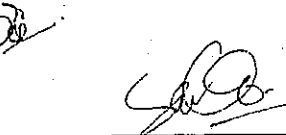
- (1) The Counterpart Team agreed with all the contents in the Guidelines and the Development Plans presented in the Interim Report except the implementation of the pilot project.
- (2) Both parties agreed that the RE section would be established under the Planning Department of MEPE to promote the rural electrification.
- (3) The Counterpart Team stated that he wishes to implement a pilot project anyhow. Also he requested it would be supervised by the JICA Study Team by stationing the responsible resident engineer in order to transfer knowledge especially in the civil design fields through the project implementation. MEPE would not be able to dispatch respective engineers who have sufficient experience to supervise the construction since experienced MEPE engineers have been assigned to ongoing Generation Expansion Project except for junior staff who need intensive on-the-job training and knowledge transfer by JICA Team when a pilot project is commenced.

- (4) The Counterpart Team requested the Study Team to submit 1,000 copies of the Visual Guide to deliver them to the Township Engineers and the relevant organizations for spreading of the rural electrification.

ATTENDANCE LIST

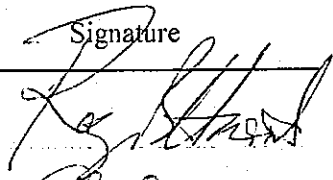


Date : 08 March 2002

Place : MEPE Headquarters /
Hotel NikkouSubject : Workshop for Guidelines and Priority Projects

No.	Name	Title	Signature
1	U SOB MYINT LWIN	DYCB (Planning)	
2	U Kyaw Kyaw	Dy. Director	
3	U Su Bin	Dy Director (Finance)	
4	U Kyaw Tin	Dy Director	
5	Daw Min Min Aung	E.E (Planning)	
6	U Khin Maung Hly	Resident Director	
7	H. KANA I	JICA Study Team	
8	A. Katayama	JICA Team Leader	
9	T. Kadono	JICA Study Team	
10	U Win Kyi	MEPE. (EE)	
11	U Naing Win	SE (Hydel)	
12	Y. Nakagawa	JICA Study Team	
13	Dr. Thein Tun	D.G, DEP	
14	U Yan Naing	MD, MEPE	
15	U Win Kyaw	DG, DHP	
16	U Bi Liang San	SE, DHP	
17	U Ba Si	SE, DHP.	
18	Daw Hnin Hnin Aye	EE(b), Planning.	
19	U Myint Than	Asl. Director, DEP	
20	U Wan Kyi	SE, DHP.	
21	Dr. Sam Ob	C-E	

ATTENDANCE LIST

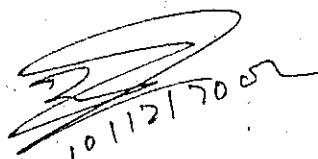
Date : 08 March 2002Place : MEPE Headquarters/Hotel NikkoSubject : Workshop for Guidelines & Pilot Projects.

No.	Name	Title	Signature
22	R HARRIS	JKA STUDY TEAM INSTITUTIONAL EXPERT	
23	Moe Shwe Syn Nang	JKA Study Team	
24	U NAINH MOE	GAS TURBINE, MEPE	
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Introduction of Renewable Energies in Rural Areas in Myanmar

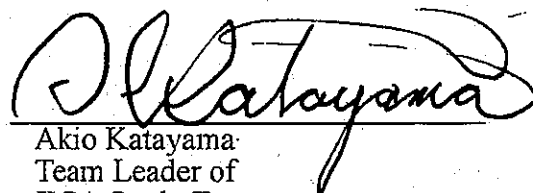
**Minutes of Meeting
on
Site Selection for Monitoring**

Yangon, December 3, 2002



10/12/2002

U Soe Myint Lwin
Leader of Counterpart,
Deputy Chief Engineer of
Planning Department
Myanma Electric Power Enterprise



Akio Katayama
Team Leader of
JICA Study Team

Minutes of Meeting
in
6th Assignment in Myanmar

Date : December 3, 2002
Time : 14:00 – 15:00
Place : DyCE's office in MEPE

1. Site Selection for Monitoring

The JICA Study Team and the MEPE Counterpart Team discussed the results of the field inspection of the following sites together with their findings obtained through inspection of the 4 more existing small hydros of MEPE visited in 2001.

Small Hydros of MEPE

- (1) Hopin (1,260 kW), Hopin, Kachin State
- (2) Nam Khan Kha (1,250 kW x 4), Moe Gaung, Kachin State
- (3) Zi Chaung (1,260 kW), Kalaymyo, Sagaing Division

As presented in the paper attached, the following sites are jointly selected for the forthcoming Monitoring, by the JICA Study Team and the MEPE Counterpart Team:

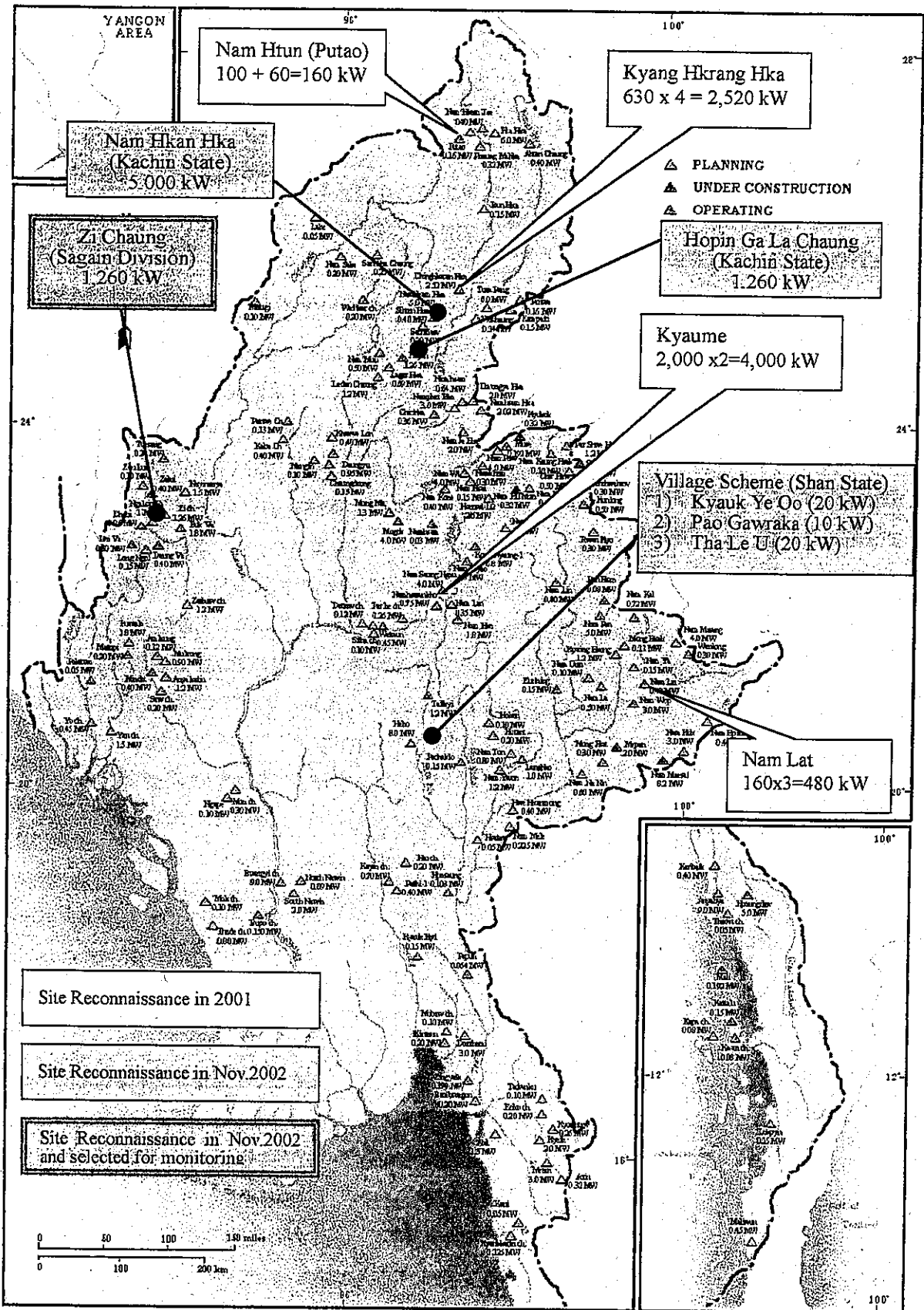
- Zi Chaung Small Hydro (1,260 kW) of MEPE in Kalaymyo, Sagaing Division

The MEPE Counterpart Team strongly requested that the measures found necessary to improve the present operation and maintenance be implemented as part of the Monitoring in addition to preparation of the Manual including such measures. The JICA Study Team took note.

Also it is agreed not to monitor, under the JICA Study, the micro hydros of Village Schemes since these are private sector activities and not under the administration and control by MEPE at the present time.


Attachments:

1. Location Map
2. Project Brief Sheet of Zi Chaung Small Hydro
3. A paper on "Selection of Monitoring Site for Preparation of Manual"
4. Project Brief Sheets of the other 6 projects of MEPE



Location Map of Candidates for Existing Power Stations as Monitoring Sites

Zi Chaung Existing Hydropower Station

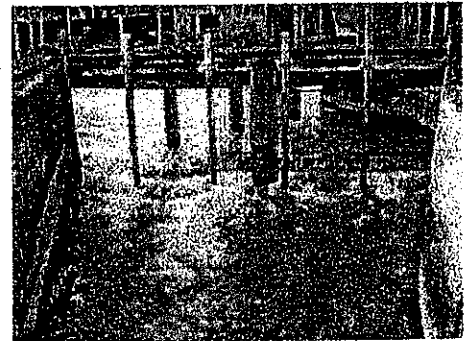
Inspection date	28-29 Nov 2002	
Location	Kalaymyo Township, Sagain Division	
Commissioning	Sep. 1996	
Waterway	2.0 m(B) x 1.5 m(H) x 3,581 m(L)	
Regulating Pond	<u>9,600</u> m ³	
Penstock	ϕ 1.2 m x <u>90</u> m x 1 line	
Installed capacity	630 kW x 2 units = 1,2600 kW	
Head	H = 39.6 m	
Discharge	Q = 2.12 x 2 = 4.24 m ³ /sec	
Turbine	Francis type with horizontal shaft, made in China	
Transmission line	11 kV - <u>14.5</u> km	
Project cost	115 x 10 ⁶ Kyats	
Present conditions	<ul style="list-style-type: none"> (1) Water leakage through holes of casing of No. 1 unit (2) Meters for generating equipment are malfunctioning (3) Severe corrosion on spiral casings (4) Sediment problem due to high velocity in the waterway 	



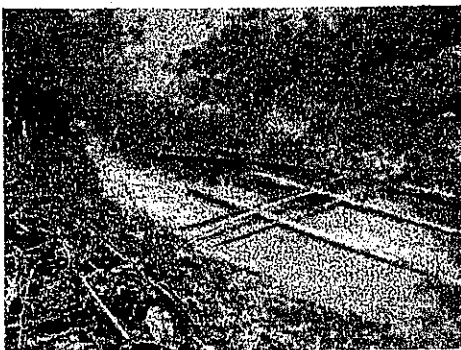
Forebay



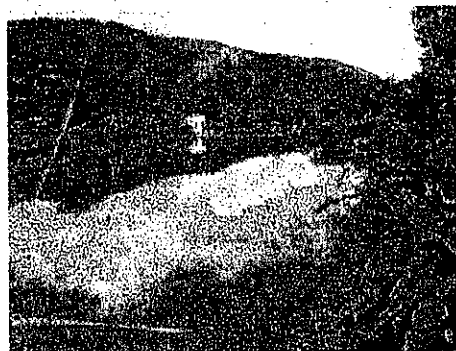
Intake & Weir



Trashracks



De-silting Basin



Regulating Pond



Generating Equipment

Selection of Monitoring Site for Preparation of Manual

3.12.2002

1. The target users of the Manual are MEPE engineers and administrators while potential users would include independent hydro experts, NGOs, and villagers who are interested and engaged in survey, planning, design, and operation & maintenance of small hydros (<10 MW).
2. The Manual will be prepared through monitoring of one of the existing small hydros of MEPE. The key criteria for selection are:
 - The installed capacity is in an order of 100 kW to MW class.
 - The station is not connected to the nationwide grid of MEPE.
 - The station is in operation.
 - There is no security issue.
 - The station may have some issues in design and O&M that would be common to many of the small hydros in Myanmar.
3. Through comparison of the three sites (Hopin, Nam Khan Kha, and Zi Chaung) as presented in Table 1, the JICA Study Team and MEPE Counterpart Team have jointly selected the Zi Chaung Hydro for monitoring and preparing the Manual. The Zi Chaung Hydro has the following themes in operation and maintenance:
 - Intake needs design review for reducing sediment inflow.
 - Headtank needs water level gauge for peak power generation during the dry season.
 - Governors need some adjustments and improvement.
 - Parallel operation with diesel generators is needed and essential to save fuel consumption while reinforcing the supply capacity.

The first three issues above are almost common to all the small hydros in Myanmar as observed and identified through the inspection of 7 small hydros of MEPE since January 2001. The last issue is observed also in many places in Myanmar and will, if achieved, contribute to saving fuel expenditures of MEPE for rural electrification.

3. Conclusion

The following will be monitored and reported to MEPE:

- Zi Chaung Small Hydro (1,260 kW) in Kalaymyo, Sagaing Division

Table 1 Comparison of Three Small Hydros of MEPE

No.	Items	Unit	Hopin	Nam Khan Kha	Zi Chaung
1.	Location		Hopin, Kachin	Moe Gaung, Kachin	Kalaymyo, Sagaing
2.	Installed capacity	kW	1,260	1,250 x 4	1,260
3.	Specifications	-	Horizontal axis Pelton turbine with 1 nozzle, H = 190.5 m, Q = 0.4 m ³ /s per turbine	Horizontal axis Francis turbine, H = 128 m, Q = 1.35 m ³ /s per turbine	Horizontal axis Francis turbine, H = 41.0 m, Q = 2.12 m ³ /s per turbine
4.	Commissioned in	year	September 1991	September 1996	July 1996
5.	Diesel generators if any	kVA	None	None	320, 860 & 608 kVA, 1 unit each These are operated only for evening 3 hours, separately to each other also independently from Zi Chaung hydro.
6.	Peak supply capacity	kW	1,260 kW	2,500 kW at max. since Unit 3 requires spare parts for thirister and Unit 4 have been out of order for more than 1 year.	900 kW at Zi Chaung hydro only. 1,300 kW including 3 diesel generators
7.	Nos. of consumers	h.h.	3,147	3,100	3,000
8.	Peak load	kW	1,300	1,400 kW at 18:15 on 26.11.2002	900 kW on 7 August 2002 1,800 kW in potential load
9.	Present conditions		<ul style="list-style-type: none"> Unit 1 in automatic operation while Unit 2 in manual operation. 	<ul style="list-style-type: none"> Units 1 & 2 are in manual operation. Units 3 & 4 are out of order. 	<ul style="list-style-type: none"> Unit 1 turbine has water leakage from casing.
10.	Remarks		<ul style="list-style-type: none"> Inspected on 26.11.2002 6 hour driving from Mitkyina 	<ul style="list-style-type: none"> Inspected on 10.3.2001 and 26.11.2002 3 hour driving from Mitkyina 	<ul style="list-style-type: none"> Inspected on 28-29.11.2002 1 hour driving from Kalaymyo
11.	Judgement		<ul style="list-style-type: none"> Civil works are in good conditions. Governors need some modifications. 	<ul style="list-style-type: none"> Intake and desander need design review to prevent sediment inflow. Rehabilitation of turbine-generators by manufacturer is needed. 	<ul style="list-style-type: none"> Intake and desander need design review in relation to sedimentation around intake. Turbines need rehabilitation.

4. Monitoring Schedule

- (1) First Monitoring in December 2002
- (2) Second Monitoring in February 2003
- (3) Third Monitoring in May 2003 (subject to minor change)

5. Reporting Schedule

- (1) Progress Report 2 in March 2003 (sent to MEPE in April)
- (2) Draft Final Report in August 2003 (presented and discussed on workshop)
- (3) Final Report in September 2003 (sent to MEPE by JICA)

Hopin Existing Hydropower Station

Inspection date	26-Nov-2002
Location	13 km northeast of Hopin Township, Kachin State
Commissioning	Sep. 1991
Catchment area	23.3 km ²
Intake Weir	9.1 m (L) x 2.1 m (H)
Siphon	167.6 m (L) x ϕ 0.6 m
Headrace channel	0.91 m(B) x 0.76 m(H) x 701 m(L)
Head Tank	739 m(L) x 15.2m(B) x 2.0m(D) 3,058 m ³
Penstock	ϕ 0.61 m x 579 m
Installed capacity	630 kW x 2 units = 1,260 kW
Head	H = 190.5 m
Discharge	Q = 0.425 x 2 units = 0.85 m ³ /sec
Turbine	Pelton type
Distribution line	11kV line, 14km between Station and Hopin + 32km in Hopin, Nammar, and Moe Nyin = 46km in total
Project cost	28,400,000 Kyats



Intake Weir



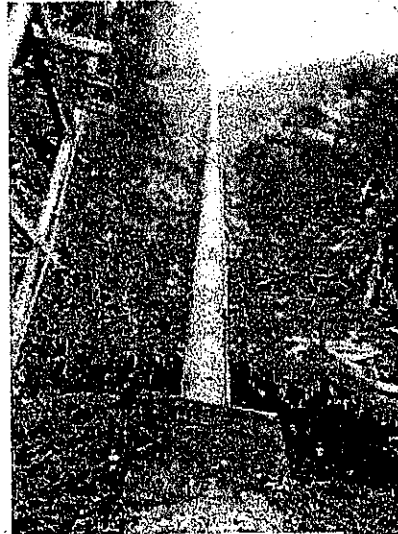
Intake Weir and Siphon



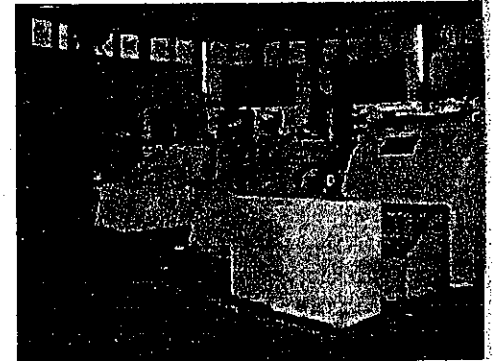
Headrace Channel



Head Tank



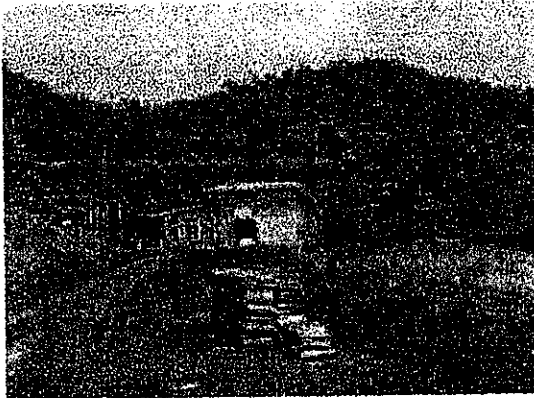
Penstock



Generating Equipment

Nam Hkam Hka Existing Hydropower Station

Inspection date	10 March 2001
Location	22 km from Mogaung, 30 km west of Myitkyina, Kachin State
Commissioning	Sep. 1996
Installed capacity	1,250 kW x 4 units = 5,000 kW
Head	H = 128 m
Discharge	Q = 5.3 m ³ /sec
Penstock	φ1.52m x 335m, φ1.30m x 31m
Turbine	Francis type with horizontal shaft, made in China
Transmission line	33 kV line to Mogaung via Nam Ti for power supply to 3,000 h.h.
Present conditions	(1) Governor No.3 only is available, others are operated manually. (2) Turbine No.4 is under repairing, others are available. (3) No load operation on Mar.10, 2001. (4) Penstock pipe was stuffed with sand in Dec. 2000 due to no sand flushing at Intake and Pond



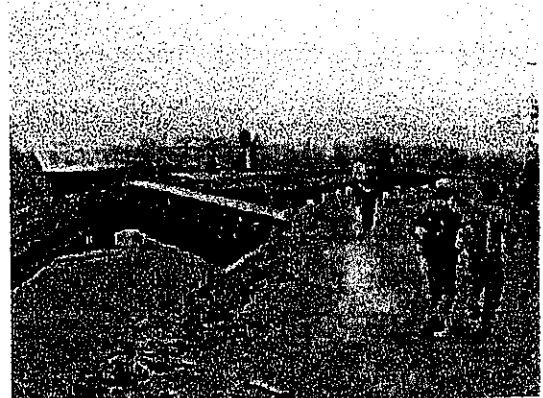
Powerhouse



Turbine & Generator



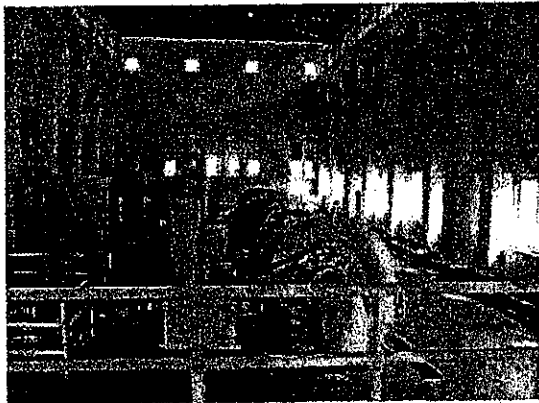
Turbine



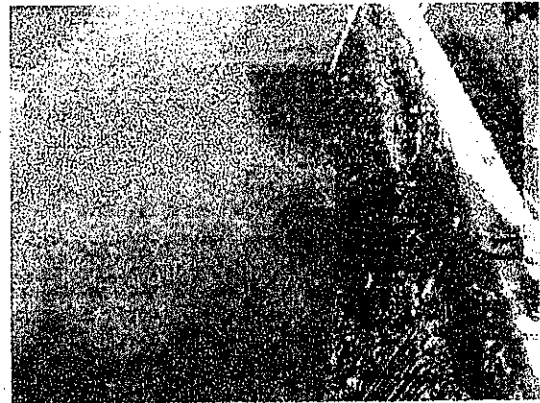
Pond

Kyaume (Nam Saung Gaung) Existing Hydropower Station

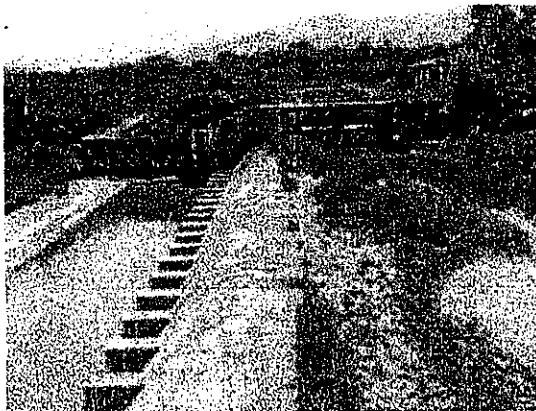
Inspection date	9 February 2001
Location	10 km east of Kyaume, Northern Shan State
Commissioning	Sep. 1996
Installed capacity	2,000 kW x 2 units = 4,000 kW
Head	$H_{max} = 149.5m$, $H_j = 149.0m$
Discharge	$Q_{rated} = 1.75m^3/sec$
Penstock	LPPL $\phi 1.52$ m, Penstock $\phi 1.22$ m x 480m
Turbine	Francis type with horizontal shaft, made in China
Main transformer	2,500 kVA, 33kV, made in China
Present conditions	<ol style="list-style-type: none"> (1) One unit of turbines is in trouble (2) Electric governors are out of order (3) Being operated at 200kW with one turbine in Feb. 2001 (4) It appears that sand flushing operations at Intake and Pond are not being operated properly, seeing from the sediments at Intake and Pond. Penstock pipe was once clogged by sand. (5) Pond is not being operated for daily regulation of river water, with full of water plant inside.



Powerhouse



Trashrack at Pond



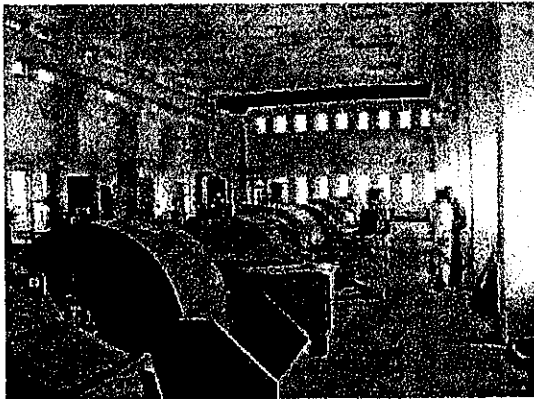
Sediment at Intake



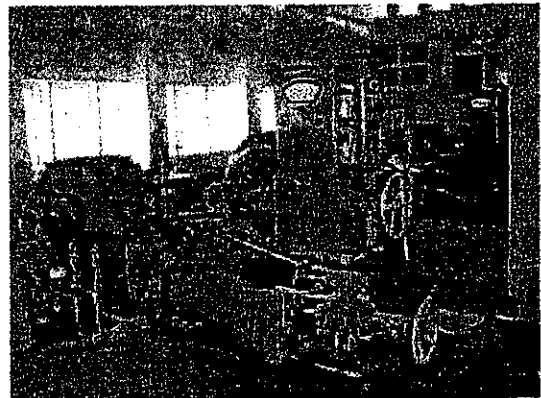
Sediment and Water Plant in Pond

Kyang Hkrang Hka Existing Hydropower Station

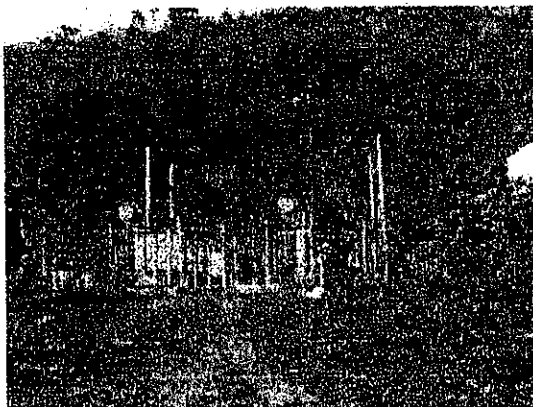
Inspection date	9 March 2001
Location	34 km north of Myitkyina, Kachin State
Commissioning	Apr. 1993
Installed capacity	630 kW x 4 units = 2,520 kW
Head	H = 164 m
Discharge	Q = 0.53 m ³ /sec
Penstock	Penstock ϕ 0.91 m(3') x 420 m
Turbine	Pelton type, made in China
Transmission line	33 kV line, 34 km to Myitkyina and 6 villages
Present conditions	(1) Unit No.3 only was being operated with about 300 kW. (2) Tabak Hydropower Station(8 MW x 3 units = 24 MW, 72km southwest of Myitkyina) and Mali Hydropower Station(3.5 MW x 3 units = 10.5MW, 75km from Myitkyina) are under construction for power supply to Myitkyina.



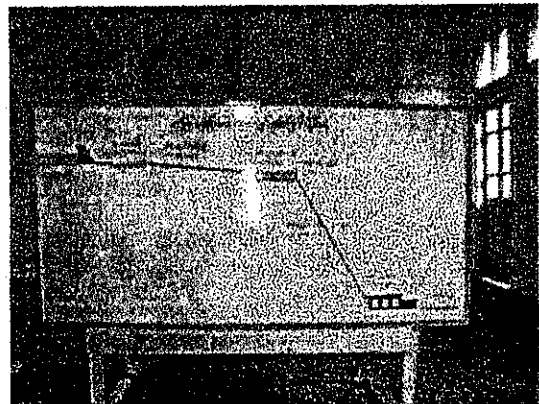
Powerhouse



Turbine & Governor



Switchyard



Waterway Profile

Nam Htun (Putao) Existing Hydropower Station

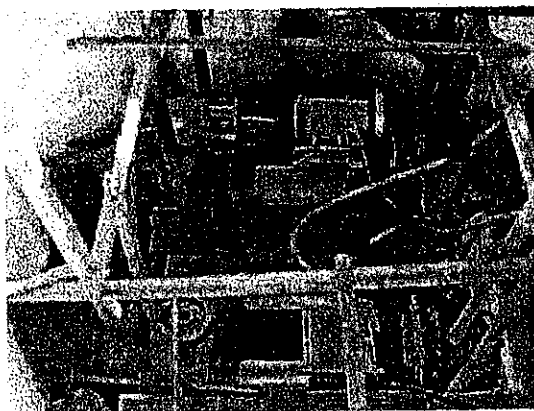
Inspection date	12 March 2001
Location	11 km from Putao, Kachin State
Commissioning	Mar. 1987
Installed capacity	100kW + 60kW
Head	H = 6.1 m (100kW), 4.3m (60kW)
Discharge	?
Penstock	?
Turbine	Kaplan-split type, Voest Alpine (Austria)
Transmission line	11 kV
Present conditions	(1) Being operated at 25kW with one turbine on 12 March. (2) One unit of turbine is under repairing. (3) Synchronized problem between 100kW and 60kW. (4) Generating equipment may be transferred from somewhere. (installed somewhere at first in 1983, and commissioned at Putao in 1987)



Intake



Powerhouse



Turbine



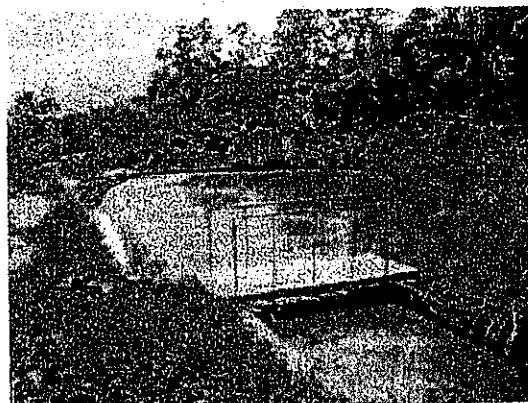
Tailrace

Nam Lat Existing Hydropower Station

Inspection date	28 May 2001
Location	13 km east of Kyaing Ton, Eastern Shan State
Commissioning	Nov. 1991
Waterway	1.17 m(B) x 1.52 m(H) x 689 m(L)
Head Tak	357 m ³
Penstock	φ0.6 m x 415 m x 3 lines
Installed capacity	160 kW x 3 units = 480 kW
Head	H = 38 m
Discharge	Q = 2.55 m ³ /sec
Turbine	Francis type with horizontal shaft, made in China
Transmission line	11 kV – 13 km
Project cost	15,551,000 Kyats
Present conditions	(1) Two units of turbines are in trouble (2) Electric governors are out of order (3) Being operated at 200kW with one turbine in Feb. 2001 (4) It appears that sand flushing operations at Intake and Head Tank are not being operated properly, seeing from the sediments at Intake. Muddy water is entering the turbine.



Intake



Head Tank



Penstock and Powerhouse



Turbines and Generators

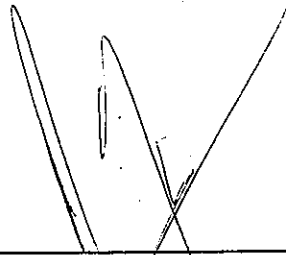
Introduction of Renewable Energies in Rural Areas in Myanmar

Minutes of Meeting

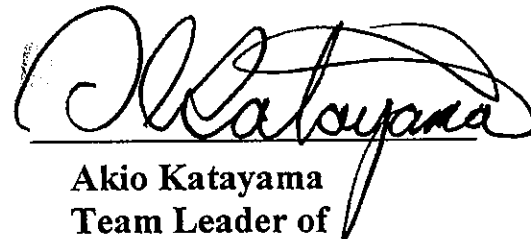
on

26 February 2003

Yangon



U Tun Aye
Leader of Counterpart,
Deputy Chief Engineer of
Planning Department
Myanma Electric Power Enterprise



Akio Katayama
Team Leader of
JICA Study Team

Minutes of Meeting
in
7th Assignment in Myanmar

Date : 26 February 2003
Time : 10:00 – 12:00
Place : Meeting Room, LDC, MEPE

1. Findings on Second Monitoring of Zi Chaung Power Station

The JICA Study Team and the MEPE Counterpart Team discussed on the outputs of the Second Monitoring of the Zi Chaung Power Station, Kalaymyo, Sagaing Division, made on 16-22 February 2003. Both parties recognized and appreciated the roles and performance of Air-Activated Water Level Gauge and Saxophone for Sand-Flushing in the Operation and Maintenance of a Small Hydro. Both Parties agreed that the main issues to be monitored and studied in the forthcoming Third Monitoring would be:

- (1) Methods of maintenance of civil structures around Intake;
- (2) Detailed inspection and hydraulic design of the waterway system, including discharge measurements on the waterway;
- (3) Practical application method of Saxophone and Flute to sand flushing of Regulating Pond;
- (4) Sustainability of Air-Activated Water Level Gauge by looking for a high powered pump but with a small air-discharge;

2. List of Tools for Monitoring

JICA Team again explained that Attachment-1 showed a List of Tools for Monitoring. The prices, and specifications were tentative and subject to modification. These would be purchased and provided to MEPE in the next fiscal year, subject to final decision by JICA Tokyo.

The Counterpart Team expressed his concurrence to the List. The agreement of MEPE was also conveyed to the JICA Study Team vide its Letter No. 1525/Sa Ma Ya (3)2002 dated 31 December, 2002.

3. Number of Copies of Visual Guides

The JICA Study Team and the MEPE Counterpart Team discussed on the distribution of Visual Guides. The Visual Guide will be translated into Myanmar language. The Visual Guide will include not only Guidelines but also Manual for Rural Electrification with Micro/Pico hydros.

Both parties discussed and agreed on Draft Distribution Plan as follows:

- Staff of DOEP, MEPE and new RE Section
- Staff of 14 Divisional Engineer Offices
- Trainees of DOEP School (newly assigned Township Engineers, etc.)
- Staff of Township Offices of MEPE
- VECs, NGOs, others who wish to have copy. to be distributed mainly through RE Section and Township Offices

Total about 1,000 copies

Then the MEPE Counterpart Team expressed its desire that the Visual Guides be printed and submitted in 1,000 copies.

4. Others

- The MEPE Counterpart Team expressed its desire to receive also computer set that JICA Study Team were using, at the time when the Database would be handed over to them. JICA Study Team took note.

Attachments:

1. List of Tools for Monitoring
2. List of Participants

LIST OF PROPOSED ELECTRICAL TOOLS AND INSTRUMENTS FOR MONITORING

1 US\$=120Yen

No.	Description	Quantity (set)	Unit Price (1,000 Yen)	Amount (1,000 Yen)	Remarks
Testing and Measuring Devices					
1	Digital AC power meter for V, A, and W	1	266	266	
2	Megger (1000V, 2000Mohm)	3	20	60	
3	Megger (500V, 1000Mohm)	5	20	100	
4	Universal circuit tester	5	30	150	
5	Clip tester	5	70	350	
6	Vibration meter	1	200	200	振動計
7	Thickness meter	1	150	150	厚み計
8	Dye check	5	30	150	
9	Defect sounder with magnetic powder	1	200	200	磁粉探傷器
10	Stopwatch	10	3	30	
11	Pressure calibrator	1	320	320	圧力校正器
12	Photo-voltaic revolution meter	3	100	300	光電回転計
13	One set of tools	10	75	750	
14	Digital frequency meter	2	25	50	
Sub-total for Testing and Measuring Devices				3,076	
Maintenance Tools and Equipment					
1	Engine electric welder (240 A, 20 hp)	1	360	360	3,000\$ in Yangon
2	Gas welder	1	13	13	
3	Portable electric drill, 20 mm	1	41	41	
4	Portable electric grinder	1	35	35	
5	Micrometer caliper	1	46	46	
6	Extensible inside micro-meter	1	70	70	
7	Tool for drilling screw hole (tap & dice) and primary-hole drill)	3	80	240	ねじ立て工具、(タップ、ダイス)と下ドリル
8	Box spanner set	3	60	180	組ボックススパナ
9	Spanner set	5	36	180	組スパナ
10	Dial indicator with magnetic stand	5	36	180	
11	Engine generator, 5 kW	-			included in item 1
Sub-total for Turbine				1,345	
Total				4,421	
Tax in Japan (5%)				221	
Grand Total				4,642	

ATTENDANCE LIST

Date : 26 Feb 2003

Place : Meeting Room, LDC

Subject : Joint Meeting on Second Monitoring

If you would like to have handouts of today's material, please check.

No.	Name	Title	Signature	Handout
1	U SAW LWIN	Adviser MOEP		
2	U NAING WIN	S.E (mech)		✓
3	U TUN NAING	Assit. Director		(DEP) ✓
4	U MYO AUNG	E.E		
5	U Thein Faw	S.A.E		
6	Daw Stella Kyne	E.E		✓
7	Saw Nay Paing	S.A.E		✓
8	U Htay Win	SAE		
9	Daw Shwe War Win	S.A.E		
10	U BA Ngwe	SE		
11	Kaoru Yamaguchi	JICA Mission (Finance)		
12	Roger Harris	JICA Study Team		
13	Cloro MAIUE	Nippon Koei JICA Study Team		
14	Ryozaku Sudo	- " -		
15	Hnin Hin Aye	EE		
16	May Phyu Win	Secretary, JICA Study Team		
17	Kyaw Non Kheing	I.D.		
18	Akio Katayama	JICA Study Team Coordinator		
19	Yuka Nakagawa	JICA Study Team		
20				+4 (Planning Dept.)