Annex –3 Format of Action Plan

Division and Position	Name
Group Member Operator of O'Romis P/S	Toch Phally

1st Interview for setting Action Plan	2nd Interview for Interim	3rd Interview for Final
Date: 24th May 2010	Date: 24th Sep 2010	Date: 9th Dec 2010
Sign: 及川 隆仁	Sign: 及川 隆仁	Sign: 及川 隆仁

○ **Action Plan**

C/P						JICA Advisor Team	
Objective item	Achievement Level: Current Level	Achievement Level: Target Level	Measures	Interim Result	Final Result	Rating	Evaluation
Task Code: TR6 Patrol, Checking	I do not know the contents of O & M manual because it was not yet distributed to all of the staff.	**What?** Periodical patrol and checking **By When?** By the end of September **Achievement Level** To be able to conduct by myself based on O & M (manual).	**How?** - To explain the checking items and the importance of daily patrol to keep the civil facilities good condition by JICA Advisor - To read through O & M manual	- I have already read through O & M manual - I can do patrol with check sheet		(A) B C D E	He can conduct a periodical patrol properly by himself. Result was recorded on the check sheet with certainty.
Task Code: TR7 Repairing	I cannot make repairing plan	**What?** Repairing Plan **By When** By the end of December **How Far?** To make small plan by myself	**How?** - To watch another repairing work and study		I can make a plan for small repairing.	A (B) C D E	He did some small repairing work through his work, but he does not have enough experience.
		What? **By When** **How Far?**	**How?**			A B C D E	

Annex -3 Format of Action Plan

Division and Position	Name
Sub Group Chief of O'Romis P/S	Heng Sokhon

1st Interview for setting Action Plan	2nd Interview for Interim	3rd Interview for Final
Date: 24th May 2010	Date: 24th Sep 2010	Date: 9th Dec 2010
Sign: 及川 隆仁	Sign: 及川 隆仁	Sign: 及川 隆仁

○ **Action Plan**

C/P						JICA Advisor Team	
Objective item	Achievement Level: Current Level	Achievement Level: Target Level	Measures	Interim Result	Final Result	Rating	Evaluation
Task Code : TR6 Patrol, Checking	I do not know the contents of O & M manual because it was not yet distributed to all of the staff.	**What?** Periodical patrol and checking **By When?** By the end of September **Achievement Level** To be able to conduct by myself based on O & M manual.	**How?** - To explain the checking items and the importance of daily patrol to keep the civil facilities good condition by JICA Advisor - To read through O & M manual	- I have already read through O&M manual - I can do patrol with check sheet		(A) B C D E	He can conduct a periodical patrol properly by himself. Result was recorded on the check sheet with certainty.
Task Code: TR7 Repairing	I cannot make repairing plan	**What?** Repairing Plan **By When** By the end of December **How Far?** To make small plan by myself	**How?** - To watch another repairing work and study		I can make a plan for small repairing.	A (B) C D E	He did some small repairing work through his work, but he does not have enough experience.
		What? **By When** **How Far?**	**How?**			A B C D E	

Annex -3 Format of Action Plan

Division and Position	Name
Group Member Operator of O'Romis P/S	Sin Siemeng

1st Interview for setting Action Plan	2nd Interview for Interim	3rd Interview for Final
Date: 24th May 2010	Date: 24th Sep 2010	Date: 9th Dec 2010
Sign: B.M 隆仁	Sign: B.M 隆仁	Sign: B.M 隆仁

○ Action Plan

C/P						JICA Advisor Team	
Objective item	Achievement Level: Current Level	Achievement Level: Target Level	Measures	Interim Result	Final Result	Rating	Evaluation
Task Code : TR6 Patrol Checking	I do not know the contents of O & M manual because it was not yet distributed to all of the staff.	**What?** Periodical patrol and checking **By When?** By the end of September **Achievement Level** To be able to conduct by myself based on O & M manual	**How?** - To explain the checking items and the importance of daily patrol to keep the civil facilities good condition by JICA Advisor - To read through O & M manual	-I have already read through O&M manual -I can do patrol with check sheet		(A) B C D E	He can conduct a periodical patrol properly by himself. Result was recorded on the check sheet with certainty.
Task Code: TR7 Repairing	I cannot make repairing plan	**What?** Repairing Plan **By When** By the end of December **How Far?** To make small plan by myself	**How?** -To watch another repairing work and study		I can make a plan for small repairing.	A (B) C D E	He did some small repairing work through his work, but he does not have enough experience.
		What? **By When** **How Far?**	**How?**			A B C D E	

Annex -3 Format of Action Plan

Division and Position	Name
Group Member Operator of O'Romis P/S	Sor Soranda

1st Interview for setting Action Plan	2nd Interview for Interim	3rd Interview for Final
Date: 24th May 2010	Date: 24th Sep 2010	Date: 9th Dec 2010
Sign:	Sign:	Sign:

○ Action Plan

OP						JICA Advisor Team	
Objective item	Achievement Level		Measures	Interim Result	Final Result	Rating	Evaluation
	Current Level	Target Level					
Task Code : TR6 Patrol, Checking	I do not know the contents of O & M manual because it was not yet distributed to all of the staff.	What? Periodical patrol and checking By When? By the end of September Achievement Level To be able to conduct by myself based on O & M manual.	How? - To explain the checking items and the importance of daily patrol to keep the civil facilities good condition by JICA Advisor - To read through O & M manual	- I have already read through O & M manual - I can do patrol with check sheet		A (B) C D E	He can conduct a periodical patrol properly by himself, but he does not seem to have enough confidence because he is a new comer.
Task Code: TR7 Repairing	I cannot make repairing plan	What? Repairing Plan By When By the end of December How Far? To make small plan by myself	How? - To watch another repairing work and study		I can make a plan for small repairing but I don't have enough confidence.	A B (C) D E	He may be able to make a small repairing plan. As he is new comer, some assistance from his colleague is necessary.
		What? By When How Far?	How?			A B C D E	

Division and Position	Name
Group Member Operator of O'Moleng P/S	Um Monychettra

1st Interview for setting Action Plan	2nd Interview for Interim	3rd Interview for Final
Date: 24th May 2010 Sign: [illegible]	Date: 23th Sep 2010 Sign: [illegible]	Date: 8th Dec 2010 Sign: [illegible]

○ Action Plan

C/P						JICA Advisor Team	
Objective item	Achievement Level: Current Level	Achievement Level: Target Level	Measures	Interim Result	Final Result	Rating	Evaluation
Task Code : TM6 Patrol, Checking	I do not know the contents of O & M manual because it was not yet distributed to all of the staff.	What? Periodical patrol and checking By When? By the end of September Achievement Level To be able to conduct by myself based on O & M manual	How? - To explain the checking items and the importance of daily patrol to keep the civil facilities good condition by JICA Advisor - To read through O & M manual	- I have already read through O&M manual - I can do patrol with check sheet		(A) B C D E	He can conduct a periodical patrol properly by himself. Result was recorded on the check sheet with certainty.
Task Code: TM7 Repairing [illegible]	I cannot make repairing plan [illegible]	What? [illegible] Repairing Plan By When [illegible] By the end of [illegible] December How Far? To make small plan by myself	How? - To watch another repairing work and study - [illegible]	- [illegible] - [illegible]	I can make a small repairing plan if necessary, but I don't have enough experience.	A (B) C D E	I think that he can make a small repairing plan. More experience is necessary for upskilling.
		What? [illegible] By When How Far?	How?			A B C D E	

Annex -3 Format of Action Plan

Division and Position	Name
Group Member Operator of O'Moleng P/S	Cheoum Kosal

1st Interview for setting Action Plan	2nd Interview for Interim	3rd Interview for Final
Date: 24th May 2010	Date: 23th Sep 2010	Date: 8th Dec 2010
Sign: 及川 隆仁	Sign: 及川 隆仁	Sign: 及川 隆仁

○ Action Plan

C/P						JICA Advisor Team	
Objective item	Achievement Level: Current Level	Achievement Level: Target Level	Measures	Interim Result	Final Result	Rating	Evaluation
Task Code : TM6 Patrol, Checking	I do not know the contents of O & M manual because it was not yet distributed to all of the staff.	**What?** Periodical patrol and checking **By When?** By the end of September **Achievement Level** To be able to conduct by myself based on O & M manual.	**How?** - To explain the checking items and the importance of daily patrol to keep the civil facilities good condition by JICA Advisor - To read through O & M manual	- I have already read through O&M manual - I can do patrol with check sheet		(A) B C D E	He can conduct a periodical patrol properly by himself. Result was recorded on the check sheet with certainty.
Task Code: TM7 Repairing	I cannot make repairing plan	**What?** Repairing Plan **By When** By the end of December **How Far?** To make small plan by myself	**How?** - To watch another repairing work and study		I can make a small repairing plan if necessary, but I don't have enough experience.	A (B) C D E	I think that he can make a small repairing plan. More experience is necessary for upskilling.
		What? **By When** **How Far?**	**How?**			A B C D E	

A-3-30

Annex -3 Format of Action Plan

Division and Position	Name
Group Chief of O'Moleng P/S	Yang Soyen

1st Interview for setting Action Plan	2nd Interview for Interim	3rd Interview for Final
Date: 24th May 2010	Date: 23th Sep 2010	Date: 8th Dec 2010
Sign: 陈 隆仁	Sign: 陈 隆仁	Sign: 陈 隆仁

○ Action Plan

C/P						JICA Advisor Team	
Objective item	Achievement Level: Current Level	Achievement Level: Target Level	Measures	Interim Result	Final Result	Rating	Evaluation
Task Code : TM6 Patrol, Checking	I do not know the contents of O & M manual because it was not yet distributed to all of the staff.	**What?** Periodical patrol and checking **By When?** By the end of September **Achievement Level** To be able to conduct by myself based on O & M manual	**How?** - To explain the checking items and the importance of daily patrol to keep the civil facilities good condition by JICA Advisor - To read through O & M manual	- I have already read through O&M manual - I can do patrol with check sheet		(A) B C D E	He can conduct a periodical patrol properly by himself. Result was recorded on the check sheet with certainty.
Task Code : TM7 Repairing	I cannot make repairing plan	**What?** Repairing Plan **By When** By the end of December **How Far?** To make small plan by myself	**How?** - To watch another repairing work and study.		I can make a small repairing plan if necessary, but I don't have enough experience.	A (B) C D E	I think that he can make a small repairing plan. More experience is necessary for upskilling.
		What? **By When** **How Far?**	**How?**			A B C D E	

A-3-31

Division and Position	Name
Sub Group chief of O'Moleng P/S	Eng Rithy

1st Interview for setting Action Plan	2nd Interview for Interim	3rd Interview for Final
Date: 24th May 2010 Sign: 及川 隆仁	Date: 23th Sep 2010 Sign: 及川 隆仁	Date: 8th Dec 2010 Sign: 及川 隆仁

○ Action Plan

C/P						JICA Advisor Team	
Objective Item	Achievement Level: Current Level	Achievement Level: Target Level	Measures	Interim Result	Final Result	Rating	Evaluation
Task Code: TM6 Patrol, Checking	I do not know the contents of O & M manual because it was not yet distributed to all of the staff.	**What?** Periodical patrol and checking **By When?** By the end of September **Achievement Level** To be able to conduct by myself based on O & M manual.	**How?** - To explain the checking items and the importance of daily patrol to keep the civil facilities good condition by JICA Advisor - To read through O & M manual	- I have already read through O & M manual - I can do patrol with check sheet		(A) B C D E	He can conduct a periodical patrol properly by himself. Result was recorded on the check sheet with certainty.
Task Code: TM7 Repairing [illegible]: TM7 [illegible]	I cannot make repairing plan [illegible]	**What?** Repairing Plan [illegible] **By When** By the end of December [illegible] **How Far?** To make small plan by myself	**How?** - To watch another repairing work and study - [illegible]	- [illegible] - [illegible]	I can make a small repairing plan if necessary, but I don't have enough experience.	A (B) C D E	I think that he can make a small repairing plan. More experience is necessary for upskilling.
		What? [illegible] **By When** **How Far?**	**How?**			A B C D E	

AP-S-II-06

តារាងត្រួតពិនិត្យលើមធ្យោបាយសំណង់ស៊ីវិលសំរាប់ការល្បាតមើលប្រចាំថ្ងៃ

(ស្ថានីយ៍វារីអគ្គិសនីអូរម៉ាស)

ថ្ងៃទី 14 ខែ 02 ឆ្នាំ 2011

ឈ្មោះ [illegible]

ឈ្មោះមធ្យោបាយ	ចំណុច	លក្ខខណ្ឌ		ស្ថានភាព ប្រសិនបើ " មិនល្អ "	កំណត់សំគាល់
ផ្លូវចូល	ការលេចចេញរូបរាងក្រៅ	☑ OK	☐ មិនល្អ		
ទំនប់យកទឹក	របារសំណាញ់ទ្វារបញ្ចូលទឹក	☑ OK	☐ មិនល្អ		
	ការបិទ	☑ OK	☐ មិនល្អ		
	ការលេចចេញរូបរាងក្រៅ	☑ OK	☐ មិនល្អ		
អាងរងកករ	របារសំណាញ់	☑ OK	☐ មិនល្អ		
	ការលេចចេញរូបរាងក្រៅ	☑ OK	☐ មិនល្អ		
ផ្លូវលំហូរទឹក	ការលេចចេញរូបរាងក្រៅ	☑ OK	☐ មិនល្អ		
ធុង/អាងសំរួលសម្ពាធទឹក	របារសំណាញ់	☑ OK	☐ មិនល្អ		
	ការលេចចេញរូបរាងក្រៅ	☑ OK	☐ មិនល្អ		
ផ្លូវបង្ហៀរទឹក	ការលេចចេញរូបរាងក្រៅ	☑ OK	☐ មិនល្អ		
បំពង់សម្ពាធខ្ពស់	ការលេចចេញរូបរាងក្រៅ	☑ OK	☐ មិនល្អ		
រោងម៉ាស៊ីនផលិតអគ្គិសនី	ការលេចចេញរូបរាងក្រៅ	☑ OK	☐ មិនល្អ		[illegible] G/V 2, 3 Vibration occur while change V-1
ច្រកទឹកចេញពីទួរប៊ីន	ការលេចចេញរូបរាងក្រៅ	☑ OK	☐ មិនល្អ		[illegible]

តារាងត្រួតពិនិត្យលើរបៀបរាយសំណង់ស៊ីវិលសំរាប់ការល្បាតមើលប្រចាំថ្ងៃ

(ស្ថានីយ៍វារីអគ្គិសនីអូរម្លែង)

ថ្ងៃទី 14 ខែ Feb ឆ្នាំ 2011

ឈ្មោះ Um Moneychetra

ឈ្មោះបរិក្ខារ	ចំណុច	ល័ក្ខខ័ណ្ឌ		ស្ថានភាព ប្រសិនបើ " មិនល្អ "	ប្រព្រឹត្តកម្ម
ថ្មវិថ្លុល	ការលេចចេញរបាំងក្រៅ	☑ OK	☐ មិនល្អ		
ទំនប់យកទឹក	របារសំណាញ់ទ្វារបញ្ចូលទឹក	☑ OK	☐ មិនល្អ		
	ការបិទ	☑ OK	☐ មិនល្អ		
	ការលេចចេញរបាំងក្រៅ	☑ OK	☐ មិនល្អ		
អាងរងកករ	របារសំណាញ់	☑ OK	☐ មិនល្អ		
	ការលេចចេញរបាំងក្រៅ	☑ OK	☐ មិនល្អ	[illegible] Some Small Crack	
បំពង់សម្ពាធខ្ពស់	ការលេចចេញរបាំងក្រៅ	☑ OK	☐ មិនល្អ		
រោងម៉ាស៊ីនផលិតអគ្គិសនី	ការលេចចេញរបាំងក្រៅ	☑ OK	☑ មិនល្អ	[illegible]	[illegible]
ប្រឡាយទឹកចេញពីទួរប៊ីន	ការលេចចេញរបាំងក្រៅ	☑ OK	☐ មិនល្អ	The corner near the window of power house has Some Small Crack	

Appendix 4 Generation Facilities

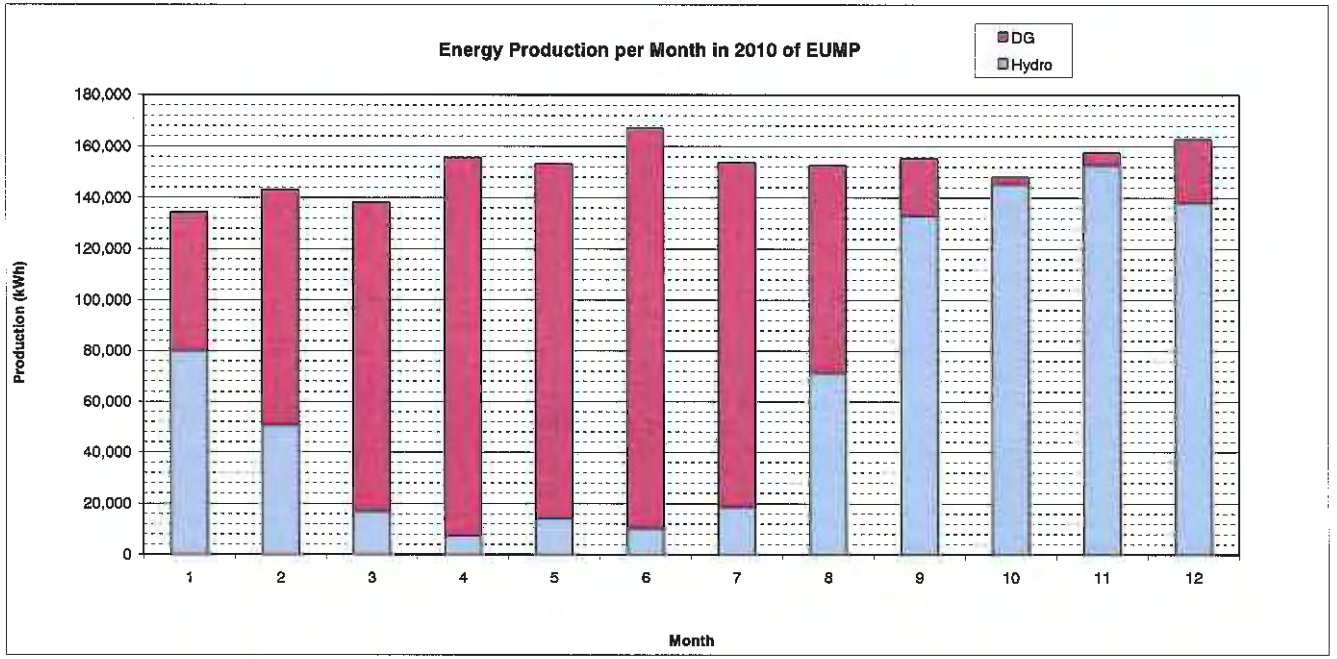
Appendix 4-1 : Energy consumption graph (year 2010)
Daily load curves (rainy and dry seasons)
Appendix 4-2 : Energy consumption records (year 2010)
Appendix 4-3 : Monthly energy consumption Balance (dry and rainy seasons in 2010)
Appendix 4-4 : Daily operation records (maximum load in 2010)
Appendix 4-5 : Event and fault records (year 2010)
Appendix 4-6 : Periodic Inspection plan (3rd and 4th in 2010)
Appendix 4-7 : Periodic Inspection report (3rd and 4th in 2010)
Appendix 4-8 : Self-evaluation sheets for generation section (February 2011)
Appendix 4-9 : Seminar for small hydropower (February 2011)
Appendix 4-10 : Disaster prevention plan (February 2011)
Appendix 4-11 : Memo for Viet Nam interconnection plan (No. 1, 2 & 3 in 2010)
Appendix 4-12 : Specifications for Viet Nam interconnection plan

Energy production per Month in 2010 of EUMP

	kWh	kWh	kWh	Total Running Hours		
	Hydro	DG	Load	O'Moleng	O'Romis	D/G
1	80,034	54,310	134,344	482	741	124.3
2	50,569	92,427	142,996	317.6	758.9	587.4
3	16,822	121,319	138,141	177.6	284.1	643.0
4	7,238	148,293	155,531	132.9	27.2	738.7
5	14,153	139,035	153,188	214.7	72.5	707.0
6	10,126	156,904	167,030	190.7	15.1	720.0
7	18,584	135,136	153,720	169	155.5	706.7
8	71,277	81,332	152,609	474.4	567.2	465.9
9	132,957	22,394	155,351	688.3	744.1	177.9
10	145,302	2,865	148,167	719	720.8	59.9
11	152,743	4,884	157,627	736	730.9	88.1
12	138,083	24,758	162,841	664	719.8	194.5
Total	837,888	983,657	1,821,545	4966.2	5537.1	5213.4

Accumulated energy production of EUMP during 2008–2010

	kWh	kWh	kWh	Total Running Hours		
Year	Hydro	DG	Load	O'Moleng	O'Romis	D/G
2008-09	1,211,535	214,630	1,426,165	8,454.9	9,666.3	1,785.9
2010	837,888	983,657	1,821,545	4966.2	5537.1	5213.4
2011						
2012						
2013						
2014						
2015						
2016						
2017						
2018						
2019						
2020						
Accumulated	2,049,423	1,198,287	3,247,710	13,421	15,203	6,999



Month	Date	Number of Costumer	Demand			Daily Load Factor %	Energy Daily Consumption (kwh)	per Costumer (kwh)	Cumulative Energy (MWh)	Assumed Monthly Energy (MWh)	per Costumer (kwh/Month)
			Max (kw)	Min (kw)	Ave (kw)						
Jan. 2010	21-Dec	1188	327	85	173	53%	4,146	3.490	1,428.76	124.38	105
	22-Dec	1189	320	90	173	54%	4,141	3.483	1,432.91	124.23	104
	23-Dec	1189	312	80	171	55%	4,103	3.451	1,437.01	123.08	104
	24-Dec	1190	303	95	172	57%	4,128	3.469	1,441.14	123.84	104
	25-Dec	1190	303	90	173	57%	4,163	3.498	1,445.30	124.88	105
	26-Dec	1190	313	85	170	54%	4,090	3.437	1,449.39	122.70	103
	27-Dec	1190	344	90	176	51%	4,231	3.555	1,453.62	126.93	107
	28-Dec	1191	326	85	178	55%	4,271	3.586	1,457.89	128.12	108
	29-Dec	1191	338	80	175	52%	4,189	3.517	1,462.08	125.67	106
	30-Dec	1191	330	80	171	52%	4,096	3.439	1,466.18	122.88	103
	31-Dec	1191	355	85	186	52%	4,469	3.752	1,470.64	134.06	113
	1-Jan	1191	342	110	199	58%	4,785	4.018	1,475.43	143.55	121
	2-Jan	1194	390	100	202	52%	4,856	4.067	1,480.29	145.68	122
	3-Jan	1194	324	110	193	60%	4,642	3.888	1,484.93	139.26	117
	4-Jan	1194	319	100	181	57%	4,336	3.631	1,489.26	130.08	109
	5-Jan	1194	329	100	183	56%	4,399	3.684	1,493.66	131.97	111
	6-Jan	1194	320	90	178	56%	4,266	3.573	1,497.93	127.98	107
	7-Jan	1194	325	90	188	58%	4,501	3.770	1,502.43	135.03	113
	8-Jan	1196	302	85	185	61%	4,449	3.720	1,506.88	133.47	112
	9-Jan	1197	296	90	185	63%	4,442	3.711	1,511.32	133.26	111
	10-Jan	1197	302	110	184	61%	4,415	3.688	1,515.73	132.44	111
	11-Jan	1198	312	100	182	58%	4,366	3.644	1,520.10	130.98	109
	12-Jan	1198	316	95	187	59%	4,478	3.738	1,524.58	134.34	112
	13-Jan	1200	370	90	194	52%	4,648	3.873	1,529.23	139.44	116
	14-Jan	1200	327	100	193	59%	4,634	3.862	1,533.86	139.02	116
	15-Jan	1200	353	90	193	55%	4,622	3.852	1,538.48	138.66	116
	16-Jan	1200	350	100	191	54%	4,577	3.814	1,543.06	137.30	114
	17-Jan	1200	365	100	197	54%	4,727	3.939	1,547.79	141.80	118
	18-Jan	1200	320	105	192	60%	4,608	3.840	1,552.39	138.24	115
	19-Jan	1201	343	90	196	57%	4,710	3.922	1,557.10	141.30	118
	20-Jan	1201	319	95	186	58%	4,472	3.723	1,561.58	134.16	112

Month	Date	Number of Costumer	Demand			Daily Load Factor %	Energy Daily Consumption (kwh)	per Costumer (kwh)	Cumulative Energy (MWh)	Assumed Monthly Energy (MWh)	per Costumer (kwh/Month)
			Max (kw)	Min (kw)	Ave (kw)						
Feb. 2010	21-Jan	1201	310	85	187	60%	4,490	3.738	1,566.07	134.70	112
	22-Jan	1203	303	90	182	60%	4,368	3.631	1,570.43	131.04	109
	23-Jan	1203	339	95	185	55%	4,438	3.689	1,574.87	133.13	111
	24-Jan	1203	331	100	194	59%	4,656	3.870	1,579.53	139.68	116
	25-Jan	1203	337	95	182	54%	4,367	3.630	1,583.89	131.00	109
	26-Jan	1204	347	85	188	54%	4,510	3.746	1,588.40	135.30	112
	27-Jan	1204	325	100	191	59%	4,594	3.815	1,593.00	137.82	114
	28-Jan	1204	322	90	188	58%	4,503	3.740	1,597.50	135.09	112
	29-Jan	1204	316	105	192	61%	4,612	3.830	1,602.11	138.36	115
	30-Jan	1204	337	100	196	58%	4,697	3.901	1,606.81	140.90	117
	31-Jan	1204	330	100	192	58%	4,617	3.835	1,611.43	138.51	115
	1-Feb	1204	320	105	184	58%	4,426	3.676	1,615.85	132.78	110
	2-Feb	1204	321	100	190	59%	4,564	3.791	1,620.42	136.92	114
	3-Feb	1204	324	100	186	57%	4,464	3.708	1,624.88	133.92	111
	4-Feb	1205	350	110	195	56%	4,682	3.885	1,629.56	140.46	117
	5-Feb	1205	319	100	189	59%	4,540	3.768	1,634.10	136.20	113
	6-Feb	1205	330	95	195	59%	4,678	3.882	1,638.78	140.34	116
	7-Feb	1205	335	100	193	58%	4,638	3.849	1,643.42	139.14	115
	8-Feb	1205	346	95	194	56%	4,647	3.856	1,648.06	139.41	116
	9-Feb	1206	325	105	194	60%	4,651	3.857	1,652.72	139.53	116
	10-Feb	1207	330	110	194	59%	4,658	3.859	1,657.37	139.74	116
	11-Feb	1207	329	110	192	58%	4,607	3.817	1,661.98	138.20	115
	12-Feb	1207	342	105	192	56%	4,616	3.824	1,666.60	138.48	115
	13-Feb	1207	320	115	192	60%	4,612	3.821	1,671.21	138.36	115
	14-Feb	1207	402	105	202	50%	4,842	4.012	1,676.05	145.26	120
	15-Feb	1207	376	145	219	58%	5,258	4.356	1,681.31	157.74	131
	16-Feb	1207	355	140	217	61%	5,197	4.306	1,686.50	155.91	129
	17-Feb	1207	355	126	212	60%	5,087	4.214	1,691.59	152.60	126
	18-Feb	1208	336	120	203	60%	4,860	4.023	1,696.45	145.80	121
	19-Feb	1209	327	110	199	61%	4,786	3.959	1,701.24	143.58	119
	20-Feb	1209	326	100	201	62%	4,831	3.996	1,706.07	144.93	120

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			Max (kw)	Min (kw)	Ave (kw)						
Mar. 2010	21-Feb	1209	325	128	188	58%	4,505	3.726	1,710.57	135.14	112
	22-Feb	1209	336	120	184	55%	4,425	3.660	1,715.00	132.75	110
	23-Feb	1209	322	112	193	60%	4,637	3.835	1,719.63	139.10	115
	24-Feb	1209	334	100	194	58%	4,645	3.842	1,724.28	139.35	115
	25-Feb	1209	315	110	200	64%	4,805	3.974	1,729.08	144.14	119
	26-Feb	1209	321	108	197	61%	4,733	3.915	1,733.82	141.98	117
	27-Feb	1209	332	105	190	57%	4,570	3.780	1,738.39	137.10	113
	28-Feb	1209	319	123	193	61%	4,632	3.831	1,743.02	138.96	115
	1-Mar	1210	340	105	198	58%	4,748	3.924	1,747.77	142.44	118
	2-Mar	1212	326	110	202	62%	4,836	3.990	1,752.60	145.08	120
	3-Mar	1212	336	130	204	61%	4,905	4.047	1,757.51	147.15	121
	4-Mar	1213	325	115	214	66%	5,132	4.231	1,762.64	153.96	127
	5-Mar	1213	334	130	213	64%	5,120	4.221	1,767.76	153.60	127
	6-Mar	1214	381	130	225	59%	5,395	4.444	1,773.15	161.85	133
	7-Mar	1214	376	160	240	64%	5,760	4.745	1,778.91	172.80	142
	8-Mar	1215	364	157	229	63%	5,485	4.514	1,784.40	164.55	135
	9-Mar	1215	343	125	206	60%	4,954	4.077	1,789.35	148.62	122
	10-Mar	1215	355	109	206	58%	4,934	4.061	1,794.29	148.02	122
	11-Mar	1215	342	110	209	61%	5,012	4.125	1,799.30	150.36	124
	12-Mar	1215	308	113	204	66%	4,889	4.024	1,804.19	146.66	121
	13-Mar	1215	328	119	212	65%	5,078	4.179	1,809.27	152.34	125
	14-Mar	1215	339	135	213	63%	5,105	4.201	1,814.37	153.14	126
	15-Mar	1215	330	131	212	64%	5,096	4.194	1,819.47	152.88	126
	16-Mar	1215	346	134	216	62%	5,189	4.271	1,824.66	155.66	128
	17-Mar	1215	341	129	210	62%	5,041	4.149	1,829.70	151.23	124
	18-Mar	1215	339	125	209	62%	5,027	4.137	1,834.72	150.80	124
	19-Mar	1216	333	122	214	64%	5,147	4.233	1,839.87	154.40	127
	20-Mar	1217	350	130	219	62%	5,248	4.312	1,845.12	157.44	129

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			Max (kw)	Min (kw)	Ave (kw)						
Apr. 2010	21-Mar	1220	351	138	210	60%	5,028	4.121	1,850.15	150.84	124
	22-Mar	1220	370	141	232	63%	5,560	4.557	1,855.71	166.80	137
	23-Mar	1220	367	153	237	65%	5,696	4.669	1,861.40	170.88	140
	24-Mar	1220	337	152	223	66%	5,349	4.384	1,866.75	160.47	132
	25-Mar	1220	315	140	214	68%	5,145	4.217	1,871.90	154.35	127
	26-Mar	1221	308	140	220	72%	5,290	4.332	1,877.19	158.70	130
	27-Mar	1222	315	104	194	62%	4,650	3.805	1,881.84	139.50	114
	28-Mar	1222	320	110	199	62%	4,785	3.916	1,886.62	143.55	117
	29-Mar	1222	332	117	202	61%	4,853	3.971	1,891.47	145.58	119
	30-Mar	1222	376	113	214	57%	5,131	4.199	1,896.60	153.93	126
	31-Mar	1223	351	133	226	65%	5,434	4.443	1,902.04	163.02	133
	1-Apr	1224	333	133	216	65%	5,184	4.235	1,907.22	155.52	127
	2-Apr	1225	312	137	211	68%	5,059	4.130	1,912.28	151.77	124
	3-Apr	1225	300	130	193	64%	4,639	3.787	1,916.92	139.17	114
	4-Apr	1226	315	119	190	60%	4,557	3.717	1,921.48	136.71	112
	5-Apr	1226	315	119	199	63%	4,770	3.891	1,926.25	143.10	117
	6-Apr	1228	344	127	209	61%	5,018	4.086	1,931.27	150.54	123
	7-Apr	1228	353	134	216	61%	5,175	4.214	1,936.44	155.25	126
	8-Apr	1228	339	132	213	63%	5,116	4.166	1,941.56	153.48	125
	9-Apr	1229	333	140	216	65%	5,177	4.212	1,946.73	155.30	126
	10-Apr	1230	341	135	208	61%	5,001	4.066	1,951.73	150.03	122
	11-Apr	1231	329	133	208	63%	4,982	4.047	1,956.72	149.46	121
	12-Apr	1231	334	143	209	63%	5,020	4.078	1,961.74	150.60	122
	13-Apr	1231	356	137	208	58%	4,983	4.048	1,966.72	149.49	121
	14-Apr	1232	400	148	198	50%	4,759	3.863	1,971.48	142.77	116
	15-Apr	1233	375	174	234	62%	5,610	4.550	1,977.09	168.30	136
	16-Apr	1233	349	170	226	65%	5,433	4.406	1,982.52	162.99	132
	17-Apr	1234	331	159	208	63%	5,003	4.054	1,987.52	150.09	122
	18-Apr	1234	312	148	194	62%	4,660	3.776	1,992.18	139.80	113
	19-Apr	1234	314	124	190	61%	4,562	3.697	1,996.75	136.86	111
	20-Apr	1234	301	108	186	62%	4,473	3.625	2,001.22	134.19	109

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			Max (kw)	Min (kw)	Ave (kw)						
May. 2010	21-Apr	1234	332	112	195	59%	4,684	3.796	2,005.90	140.52	114
	22-Apr	1234	336	125	203	60%	4,866	3.943	2,010.77	145.98	118
	23-Apr	1235	320	130	205	64%	4,913	3.978	2,015.68	147.38	119
	24-Apr	1235	348	125	204	58%	4,885	3.955	2,020.57	146.55	119
	25-Apr	1236	341	132	209	61%	5,027	4.067	2,025.59	150.80	122
	26-Apr	1237	335	142	218	65%	5,223	4.222	2,030.82	156.69	127
	27-Apr	1237	336	139	220	66%	5,291	4.277	2,036.11	158.72	128
	28-Apr	1237	347	142	215	62%	5,169	4.179	2,041.28	155.07	125
	29-Apr	1237	311	144	208	67%	4,985	4.030	2,046.26	149.54	121
	30-Apr	1239	328	122	200	61%	4,795	3.870	2,051.06	143.85	116
	1-May	1240	338	118	204	60%	4,890	3.944	2,055.95	146.70	118
	2-May	1240	344	130	207	60%	4,978	4.014	2,060.92	149.34	120
	3-May	1240	305	120	196	64%	4,712	3.800	2,065.64	141.36	114
	4-May	1240	314	120	201	64%	4,824	3.890	2,070.46	144.72	117
	5-May	1241	330	110	205	62%	4,926	3.969	2,075.39	147.78	119
	6-May	1241	352	126	211	60%	5,061	4.078	2,080.45	151.83	122
	7-May	1242	306	110	200	65%	4,799	3.864	2,085.25	143.96	116
	8-May	1242	358	124	205	57%	4,924	3.964	2,090.17	147.72	119
	9-May	1242	367	148	219	60%	5,251	4.228	2,095.42	157.53	127
	10-May	1242	360	139	215	60%	5,170	4.163	2,100.59	155.10	125
	11-May	1242	376	132	209	56%	5,016	4.039	2,105.61	150.48	121
	12-May	1242	361	135	218	60%	5,237	4.216	2,110.84	157.10	126
	13-May	1242	380	147	235	62%	5,634	4.536	2,116.48	169.02	136
	14-May	1242	421	181	249	59%	5,982	4.816	2,122.46	179.46	144
	15-May	1242	371	150	237	64%	5,680	4.573	2,128.14	170.40	137
	16-May	1242	353	149	223	63%	5,353	4.310	2,133.49	160.59	129
	17-May	1243	335	140	208	62%	4,985	4.010	2,138.48	149.54	120
	18-May	1244	382	135	217	57%	5,199	4.179	2,143.68	155.97	125
	19-May	1244	387	139	225	58%	5,399	4.340	2,149.07	161.96	130
	20-May	1244	390	146	235	60%	5,636	4.530	2,154.71	169.08	136

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			Max (kw)	Min (kw)	Ave (kw)						
June. 2010	21-May	1244	381	155	228	60%	5,474	4.400	2,160.18	164.22	132
	22-May	1244	330	142	216	65%	5,178	4.162	2,165.36	155.34	125
	23-May	1244	389	150	130	33%	3,123	2.510	2,168.48	93.69	75
	24-May	1245	393	155	237	60%	5,685	4.566	2,174.17	170.55	137
	25-May	1245	382	157	225	59%	5,400	4.337	2,179.57	162.00	130
	26-May	1245	351	138	215	61%	5,165	4.148	2,184.73	154.94	124
	27-May	1245	355	124	214	60%	5,138	4.127	2,189.87	154.14	124
	28-May	1245	347	130	212	61%	5,091	4.089	2,194.96	152.73	123
	29-May	1245	375	134	215	57%	5,150	4.136	2,200.11	154.50	124
	30-May	1245	364	109	222	61%	5,333	4.283	2,205.45	159.98	129
	31-May	1245	360	144	223	62%	5,351	4.298	2,210.80	160.52	129
	1-Jun	1247	367	136	216	59%	5,184	4.157	2,215.98	155.52	125
	2-Jun	1247	370	137	227	61%	5,448	4.369	2,221.43	163.44	131
	3-Jun	1248	375	145	224	60%	5,376	4.308	2,226.80	161.28	129
	4-Jun	1249	361	138	222	61%	5,328	4.266	2,232.13	159.84	128
	5-Jun	1249	393	141	216	55%	5,184	4.151	2,237.32	155.52	125
	6-Jun	1249	333	144	213	64%	5,112	4.093	2,242.43	153.36	123
	7-Jun	1249	383	132	220	57%	5,280	4.227	2,247.71	158.40	127
	8-Jun	1249	350	142	224	64%	5,376	4.304	2,253.08	161.28	129
	9-Jun	1249	357	126	216	61%	5,184	4.151	2,258.27	155.52	125
	10-Jun	1250	352	135	216	61%	5,184	4.147	2,263.45	155.52	124
	11-Jun	1250	371	146	229	62%	5,496	4.397	2,268.95	164.88	132
	12-Jun	1250	405	153	233	58%	5,592	4.474	2,274.54	167.76	134
	13-Jun	1250	350	159	228	65%	5,472	4.378	2,280.01	164.16	131
	14-Jun	1250	376	144	223	59%	5,352	4.282	2,285.36	160.56	128
	15-Jun	1250	350	134	221	63%	5,304	4.243	2,290.67	159.12	127
	16-Jun	1250	311	134	214	69%	5,136	4.109	2,295.80	154.08	123
	17-Jun	1250	361	131	223	62%	5,352	4.282	2,301.16	160.56	128
	18-Jun	1251	345	137	217	63%	5,208	4.163	2,306.36	156.24	125
	19-Jun	1251	414	140	225	54%	5,400	4.317	2,311.76	162.00	129
	20-Jun	1251	345	138	213	62%	5,112	4.086	2,316.88	153.36	123

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			Max (kw)	Min (kw)	Ave (kw)						
July. 2010	21-Jun	1251	323	122	208	64%	4,992	3.990	2,321.87	149.76	120
	22-Jun	1251	340	121	207	61%	4,968	3.971	2,326.84	149.04	119
	23-Jun	1252	325	120	209	64%	5,016	4.006	2,331.85	150.48	120
	24-Jun	1253	345	120	213	62%	5,112	4.080	2,336.96	153.36	122
	25-Jun	1253	362	137	221	61%	5,304	4.233	2,342.27	159.12	127
	26-Jun	1253	350	140	216	62%	5,184	4.137	2,347.45	155.52	124
	27-Jun	1253	381	133	219	57%	5,256	4.195	2,352.71	157.68	126
	28-Jun	1253	363	139	227	63%	5,448	4.348	2,358.16	163.44	130
	29-Jun	1253	380	139	231	61%	5,544	4.425	2,363.70	166.32	133
	30-Jun	1253	363	148	234	64%	5,616	4.482	2,369.32	168.48	134
	1-Jul	1253	340	142	217	64%	5,208	4.156	2,374.52	156.24	125
	2-Jul	1254	313	125	206	66%	4,944	3.943	2,379.47	148.32	118
	3-Jul	1254	338	119	203	60%	4,872	3.885	2,384.34	146.16	117
	4-Jul	1254	329	130	203	62%	4,872	3.885	2,389.21	146.16	117
	5-Jul	1254	320	125	203	63%	4,872	3.885	2,394.08	146.16	117
	6-Jul	1254	319	110	207	65%	4,968	3.962	2,399.05	149.04	119
	7-Jul	1254	326	125	211	65%	5,064	4.038	2,404.12	151.92	121
	8-Jul	1254	408	129	231	57%	5,544	4.421	2,409.66	166.32	133
	9-Jul	1254	350	140	232	66%	5,568	4.440	2,415.23	167.04	133
	10-Jul	1254	370	134	223	60%	5,352	4.268	2,420.58	160.56	128
	11-Jul	1255	371	135	225	61%	5,400	4.303	2,425.98	162.00	129
	12-Jul	1256	375	126	221	59%	5,304	4.223	2,431.28	159.12	127
	13-Jul	1256	353	117	214	61%	5,136	4.089	2,436.42	154.08	123
	14-Jul	1256	343	119	219	64%	5,256	4.185	2,441.68	157.68	126
	15-Jul	1258	348	132	216	62%	5,184	4.121	2,446.86	155.52	124
	16-Jul	1259	305	119	210	69%	5,040	4.003	2,451.90	151.20	120
	17-Jul	1259	327	123	205	63%	4,920	3.908	2,456.82	147.60	117
	18-Jul	1259	386	115	212	55%	5,088	4.041	2,461.91	152.64	121
	19-Jul	1259	360	100	215	60%	5,160	4.098	2,467.07	154.80	123
	20-Jul	1259	322	128	202	63%	4,848	3.851	2,471.92	145.44	116

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			Max (kw)	Min (kw)	Ave (kw)						
Aug-10	21-Jul	1259	369	110	215	58%	5,160	4.098	2,477.08	154.80	123
	22-Jul	1259	352	120	219	62%	5,256	4.175	2,482.33	157.68	125
	23-Jul	1259	350	115	213	61%	5,112	4.060	2,487.44	153.36	122
	24-Jul	1259	373	130	211	57%	5,064	4.022	2,492.51	151.92	121
	25-Jul	1259	363	110	204	56%	4,896	3.889	2,497.40	146.88	117
	26-Jul	1259	346	110	198	57%	4,752	3.774	2,502.16	142.56	113
	27-Jul	1259	362	110	204	56%	4,896	3.889	2,507.05	146.88	117
	28-Jul	1260	336	115	204	61%	4,896	3.886	2,511.95	146.88	117
	29-Jul	1260	334	100	204	61%	4,896	3.886	2,516.84	146.88	117
	30-Jul	1260	341	105	206	60%	4,944	3.924	2,521.79	148.32	118
	31-Jul	1260	341	100	202	59%	4,848	3.848	2,526.64	145.44	115
	1-Aug	1261	345	130	201	58%	4,819	3.822	2,531.46	144.57	115
	2-Aug	1261	342	110	206	60%	4,948	3.924	2,536.40	148.44	118
	3-Aug	1261	375	120	215	57%	5,166	4.097	2,541.57	154.98	123
	4-Aug	1262	374	60	174	47%	4,184	3.315	2,545.75	125.52	99
	5-Aug	1262	389	90	182	47%	4,369	3.462	2,550.12	131.07	104
	6-Aug	1263	350	75	177	51%	4,246	3.362	2,554.37	127.38	101
	7-Aug	1263	372	130	210	56%	5,036	3.987	2,559.40	151.08	120
	8-Aug	1263	350	125	204	58%	4,905	3.884	2,564.31	147.15	117
	9-Aug	1263	364	100	213	59%	5,122	4.055	2,569.43	153.66	122
	10-Aug	1263	346	115	210	61%	5,039	3.990	2,574.47	151.16	120
	11-Aug	1266	316	105	203	64%	4,880	3.855	2,579.35	146.40	116
	12-Aug	1266	375	110	220	59%	5,283	4.173	2,584.63	158.49	125
	13-Aug	1266	369	130	228	62%	5,460	4.313	2,590.09	163.80	129
	14-Aug	1268	371	130	224	60%	5,371	4.236	2,595.46	161.13	127
	15-Aug	1269	382	130	220	57%	5,268	4.151	2,600.73	158.04	125
	16-Aug	1269	353	120	214	61%	5,131	4.043	2,605.86	153.93	121
	17-Aug	1269	384	105	213	55%	5,104	4.022	2,610.97	153.12	121
	18-Aug	1270	372	110	212	57%	5,082	4.002	2,616.05	152.46	120
	19-Aug	1271	362	125	212	59%	5,088	4.003	2,621.14	152.64	120
	20-Aug	1271	364	115	213	58%	5,104	4.016	2,626.24	153.12	120
	21-Aug	1271	374	125	215	57%	5,149	4.051	2,631.39	154.47	122

Month	Date	Number of Costumer	Demand			Daily Load Factor %	Energy Daily Consumption (kwh)	per Costumer (kwh)	Cumulative Energy (MWh)	Assumed Monthly Energy (MWh)	per Costumer (kwh/Month)
			Max (kw)	Min (kw)	Ave (kw)						
Sep-10	22-Aug	1271	355	110	200	56%	4,798	3.775	2,636.19	143.94	113
	23-Aug	1271	332	120	206	62%	4,952	3.896	2,641.14	148.56	117
	24-Aug	1271	372	120	206	55%	4,947	3.892	2,646.09	148.41	117
	25-Aug	1272	346	130	215	62%	5,150	4.049	2,651.24	154.50	121
	26-Aug	1272	365	110	211	58%	5,069	3.985	2,656.31	152.06	120
	27-Aug	1273	356	125	216	61%	5,195	4.081	2,661.50	155.84	122
	28-Aug	1273	362	125	208	57%	4,984	3.915	2,666.48	149.52	117
	29-Aug	1273	342	120	204	60%	4,889	3.840	2,671.37	146.66	115
	30-Aug	1273	365	110	209	57%	5,010	3.936	2,676.38	150.30	118
	31-Aug	1275	345	125	213	62%	5,106	4.005	2,681.49	153.18	120
	1-Sep	1275	355	125	221	62%	5,311	4.165	2,686.80	159.33	125
	2-Sep	1275	334	130	215	64%	5,162	4.049	2,691.96	154.86	121
	3-Sep	1275	345	125	220	64%	5,283	4.144	2,697.24	158.49	124
	4-Sep	1275	365	135	213	58%	5,116	4.012	2,702.36	153.48	120
	5-Sep	1275	370	150	218	59%	5,227	4.100	2,707.59	156.81	123
	6-Sep	1275	323	130	213	66%	5,109	4.007	2,712.70	153.27	120
	7-Sep	1275	345	130	214	62%	5,134	4.027	2,717.83	154.02	121
	8-Sep	1275	349	135	221	63%	5,315	4.168	2,723.14	159.44	125
	9-Sep	1275	359	140	220	61%	5,288	4.147	2,728.43	158.64	124
	10-Sep	1275	350	125	216	62%	5,189	4.070	2,733.62	155.66	122
	11-Sep	1275	372	130	209	56%	5,013	3.932	2,738.63	150.39	118
	12-Sep	1275	374	140	216	58%	5,185	4.067	2,743.82	155.55	122
	13-Sep	1275	370	130	218	59%	5,220	4.094	2,749.04	156.60	123
	14-Sep	1275	375	140	232	62%	5,559	4.360	2,754.60	166.77	131
	15-Sep	1276	356	130	217	61%	5,206	4.080	2,759.80	156.18	122
	16-Sep	1278	385	130	222	58%	5,332	4.172	2,765.14	159.96	125
	17-Sep	1278	370	130	223	60%	5,350	4.186	2,770.49	160.50	126
	18-Sep	1278	395	130	219	55%	5,247	4.106	2,775.73	157.41	123
	19-Sep	1278	370	125	215	58%	5,170	4.045	2,780.90	155.10	121
	20-Sep	1278	370	130	221	60%	5,308	4.154	2,786.21	159.25	125

Month	Date	Number of Costumer	Demand			Daily Load Factor %	Energy Daily Consumption (kwh)	per Costumer (kwh)	Cumulative Energy (MWh)	Assumed Monthly Energy (MWh)	per Costumer (kwh/Month)
			Max (kw)	Min (kw)	Ave (kw)						
Oct-10	21-Sep	1280	365	140	224	61%	5,368	4.194	2,791.58	161.04	126
	22-Sep	1280	349	125	222	64%	5,328	4.163	2,796.91	159.84	125
	23-Sep	1281	359	130	222	62%	5,328	4.159	2,802.23	159.84	125
	24-Sep	1281	365	130	219	60%	5,256	4.103	2,807.49	157.68	123
	25-Sep	1282	390	130	227	58%	5,448	4.250	2,812.94	163.44	127
	26-Sep	1282	350	145	210	60%	5,040	3.931	2,817.98	151.20	118
	27-Sep	1282	365	120	215	59%	5,160	4.025	2,823.14	154.80	121
	28-Sep	1282	362	125	221	61%	5,304	4.137	2,828.44	159.12	124
	29-Sep	1284	385	135	216	56%	5,184	4.037	2,833.63	155.52	121
	30-Sep	1284	387	120	214	55%	5,136	4.000	2,838.76	154.08	120
	1-Oct	1284	370	110	211	57%	5,064	3.944	2,843.83	151.92	118
	2-Oct	1286	355	125	203	57%	4,872	3.788	2,848.70	146.16	114
	3-Oct	1286	384	120	199	52%	4,776	3.714	2,853.47	143.28	111
	4-Oct	1286	360	125	205	57%	4,920	3.826	2,858.39	147.60	115
	5-Oct	1286	342	115	194	57%	4,656	3.621	2,863.05	139.68	109
	6-Oct	1286	345	115	198	57%	4,752	3.695	2,867.80	142.56	111
	7-Oct	1286	380	125	214	56%	5,136	3.994	2,872.94	154.08	120
	8-Oct	1286	412	160	238	58%	5,712	4.442	2,878.65	171.36	133
	9-Oct	1286	385	183	244	63%	5,856	4.554	2,884.51	175.68	137
	10-Oct	1286	365	135	209	57%	5,016	3.900	2,889.52	150.48	117
	11-Oct	1286	361	130	202	56%	4,848	3.770	2,894.37	145.44	113
	12-Oct	1286	361	115	207	57%	4,968	3.863	2,899.34	149.04	116
	13-Oct	1286	380	115	203	53%	4,872	3.788	2,904.21	146.16	114
	14-Oct	1286	405	125	209	52%	5,016	3.900	2,909.23	150.48	117
	15-Oct	1286	392	115	207	53%	4,968	3.863	2,914.19	149.04	116
	16-Oct	1287	384	110	210	55%	5,040	3.916	2,919.23	151.20	117
	17-Oct	1288	383	120	206	54%	4,944	3.839	2,924.18	148.32	115
	18-Oct	1289	380	120	208	55%	4,992	3.873	2,929.17	149.76	116
	19-Oct	1289	380	125	212	56%	5,088	3.947	2,934.26	152.64	118
	20-Oct	1289	390	115	217	56%	5,208	4.040	2,939.47	156.24	121

Month	Date	Number of Costumer	Demand			Daily Load Factor %	Energy Daily Consumption (kwh)	per Costumer (kwh)	Cumulative Energy (MWh)	Assumed Monthly Energy (MWh)	per Costumer (kwh/Month)
			Max (kw)	Min (kw)	Ave (kw)						
Nov-10	21-Oct	1289	380	115	218	57%	5,232	4.059	2,944.70	156.96	122
	22-Oct	1289	380	125	212	56%	5,088	3.947	2,949.79	152.64	118
	23-Oct	1289	390	125	207	53%	4,968	3.854	2,954.75	149.04	116
	24-Oct	1289	393	115	208	53%	4,992	3.873	2,959.75	149.76	116
	25-Oct	1289	403	115	218	54%	5,232	4.059	2,964.98	156.96	122
	26-Oct	1289	400	120	217	54%	5,208	4.040	2,970.19	156.24	121
	27-Oct	1289	385	115	214	56%	5,136	3.984	2,975.32	154.08	120
	28-Oct	1289	382	110	213	56%	5,112	3.966	2,980.43	153.36	119
	29-Oct	1289	410	110	217	53%	5,208	4.040	2,985.64	156.24	121
	30-Oct	1289	410	130	235	57%	5,640	4.375	2,991.28	169.20	131
	31-Oct	1290	415	110	218	53%	5,232	4.056	2,996.51	156.96	122
	1-Nov	1291	415	110	218	53%	5,232	4.053	3,001.75	156.96	122
	2-Nov	1291	463	125	242	52%	5,808	4.499	3,007.55	174.24	135
	3-Nov	1291	405	115	237	59%	5,688	4.406	3,013.24	170.64	132
	4-Nov	1291	295	120	195	66%	4,680	3.625	3,017.92	140.40	109
Nov-10	5-Nov	1291	275	80	189	69%	4,536	3.514	3,022.46	136.08	105
	6-Nov	1291	300	110	201	67%	4,824	3.737	3,027.28	144.72	112
	7-Nov	1291	305	125	208	68%	4,992	3.867	3,032.27	149.76	116
	8-Nov	1291	415	130	222	53%	5,328	4.127	3,037.60	159.84	124
	9-Nov	1291	405	120	217	54%	5,208	4.034	3,042.81	156.24	121
	10-Nov	1293	425	110	213	50%	5,112	3.954	3,047.92	153.36	119
	11-Nov	1293	430	115	222	52%	5,328	4.121	3,053.25	159.84	124
	12-Nov	1293	405	120	210	52%	5,040	3.898	3,058.29	151.20	117
	13-Nov	1293	404	120	222	55%	5,328	4.121	3,063.62	159.84	124
	14-Nov	1293	414	125	230	56%	5,520	4.269	3,069.14	165.60	128
	15-Nov	1293	405	115	235	58%	5,640	4.362	3,074.78	169.20	131
	16-Nov	1293	440	120	224	51%	5,376	4.158	3,080.15	161.28	125
	17-Nov	1293	420	115	232	55%	5,568	4.306	3,085.72	167.04	129
	18-Nov	1293	423	130	222	52%	5,328	4.121	3,091.05	159.84	124
	19-Nov	1294	415	120	224	54%	5,376	4.155	3,096.43	161.28	125
	20-Nov	1294	480	120	244	51%	5,856	4.526	3,096.91	175.68	136

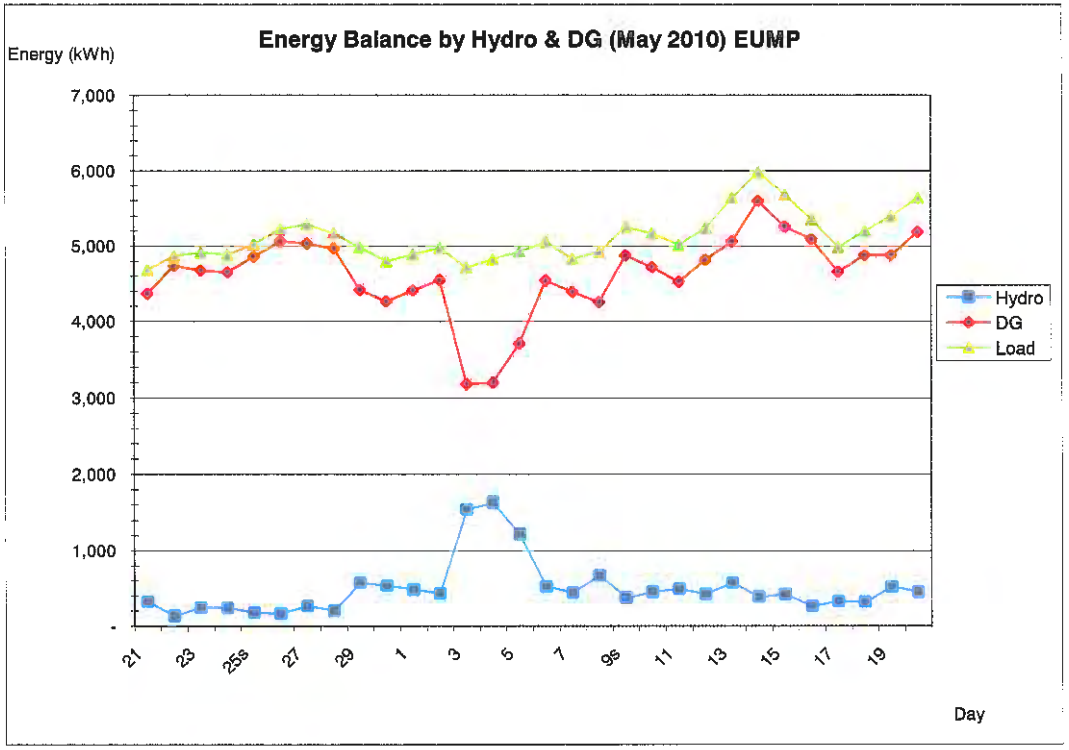
Month	Date	Number of Costumer	Demand			Daily Load Factor %	Energy Daily Consumption (kwh)	per Costumer (kwh)	Cumulative Energy (MWh)	Assumed Monthly Energy (MWh)	per Costumer (kwh/Month)
			Max (kw)	Min (kw)	Ave (kw)						
Dec-10	21-Nov	1294	490	165	274	56%	6,576	5.082	3,103.00	197.28	152
	22-Nov	1295	451	170	249	55%	5,976	4.615	3,102.88	179.28	138
	23-Nov	1295	410	140	224	55%	5,376	4.151	3,108.38	161.28	125
	24-Nov	1295	415	120	231	56%	5,976	4.615	3,108.86	179.28	138
	25-Nov	1295	395	110	221	55%	5,376	4.151	3,113.75	161.28	125
	26-Nov	1295	427	120	224	56%	5,544	4.281	3,114.40	166.32	128
	27-Nov	1296	420	130	223	56%	5,304	4.093	3,119.06	159.12	123
	28-Nov	1296	435	120	235	52%	5,376	4.148	3,119.78	161.28	124
	29-Nov	1297	420	125	231	53%	5,352	4.126	3,124.41	160.56	124
	30-Nov	1297	420	125	231	54%	5,640	4.348	3,125.42	169.20	130
	1-Dec	1297	445	125	227	55%	5,544	4.274	3,129.95	166.32	128
Dec-10	2-Dec	1297	412	125	227	55%	5,544	4.274	3,130.96	166.32	128
	3-Dec	1297	404	135	235	51%	5,448	4.200	3,135.40	163.44	126
	4-Dec	1297	427	135	234	55%	5,448	4.200	3,136.41	163.44	126
	5-Dec	1297	415	130	227	58%	5,640	4.348	3,141.04	169.20	130
	6-Dec	1297	405	130	236	58%	5,664	4.367	3,142.07	169.92	131
	7-Dec	1301	412	125	230	56%	5,520	4.243	3,146.56	165.60	127
	8-Dec	1301	417	125	223	53%	5,352	4.114	3,147.43	160.56	123
	9-Dec	1301	403	120	220	55%	5,280	4.058	3,151.84	158.40	122
	10-Dec	1303	450	120	236	52%	5,664	4.347	3,153.09	169.92	130
	11-Dec	1303	440	130	251	57%	6,024	4.623	3,157.87	180.72	139
	12-Dec	1305	440	130	245	56%	5,880	4.506	3,158.97	176.40	135
	13-Dec	1305	456	130	245	54%	5,880	4.506	3,163.75	176.40	135
	14-Dec	1305	420	130	244	58%	5,856	4.487	3,164.83	175.68	135
	15-Dec	1305	440	125	248	56%	5,952	4.561	3,169.70	178.56	137
	16-Dec	1305	433	110	241	56%	5,784	4.432	3,170.61	173.52	133
	17-Dec	1305	440	140	240	55%	5,760	4.414	3,175.46	172.80	132
	18-Dec	1306	440	140	240	55%	5,760	4.410	3,176.37	172.80	132
	19-Dec	1307	425	135	235	55%	5,640	4.315	3,181.10	169.20	129
	20-Dec	1307	425	135	236	56%	5,664	4.334	3,182.03	169.92	130

Month	Date	Number of Costumer	Demand			Daily Load Factor %	Energy Daily Consumption (kwh)	per Costumer (kwh)	Cumulative Energy (MWh)	Assumed Monthly Energy (MWh)	per Costumer (kwh/Month)
			Max (kw)	Min (kw)	Ave (kw)						
	21-Dec	1307	410	125	240	59%	5,760	4.407	3,186.86	172.80	132
Jan-11	22-Dec	1309	445	130	240	54%	5,760	4.400	3,187.79	172.80	132
	23-Dec	1309	406	130	251	62%	6,024	4.602	3,192.88	180.72	138
	24-Dec	1309	435	145	245	56%	5,880	4.492	3,193.67	176.40	135
	25-Dec	1309	413	150	241	58%	5,784	4.419	3,198.67	173.52	133
	26-Dec	1309	420	135	231	55%	5,544	4.235	3,199.22	166.32	127
	27-Dec	1309	416	135	242	58%	5,808	4.437	3,204.47	174.24	133
	28-Dec	1310	450	135	245	54%	5,880	4.489	3,205.10	176.40	135
	29-Dec	1311	445	130	250	56%	6,000	4.577	3,210.47	180.00	137
	30-Dec	1311	440	140	254	58%	6,096	4.650	3,211.19	182.88	139
	31-Dec	1311	442	135	252	57%	6,048	4.613	3,216.52	181.44	138
	1-Jan	1311	431	150	260	60%	6,243	4.762	3,217.44	187.29	143
	2-Jan	1311	438	145	251	57%	6,031	4.600	3,222.55	180.93	138
	3-Jan	1311	422	140	241	57%	5,791	4.417	3,223.23	173.73	133
	4-Jan	1312	412	135	244	59%	5,860	4.466	3,228.41	175.80	134
	5-Jan	1312	435	135	253	58%	6,083	4.636	3,229.31	182.49	139
	6-Jan	1312	413	130	242	59%	5,811	4.429	3,234.22	174.33	133
	7-Jan	1312	471	130	249	53%	5,975	4.554	3,235.29	179.25	137
	8-Jan	1312	450	170	267	59%	6,403	4.880	3,240.63	192.09	146
	9-Jan	1312	405	130	251	62%	6,013	4.583	3,241.30	180.39	137
Jan-11	10-Jan	1312	420	120	247	59%	5,922	4.514	3,246.55	177.66	135
	11-Jan	1312	420	125	243	58%	5,820	4.436	3,247.12	174.60	133
	12-Jan	1312	442	130	257	58%	6,176	4.707	3,252.73	185.28	141
	13-Jan	1313	401	125	249	62%	5,967	4.545	3,253.09	179.01	136
	14-Jan	1313	412	125	243	59%	5,829	4.439	3,258.55	174.87	133
	15-Jan	1313	450	125	244	54%	5,854	4.458	3,258.94	175.62	134
	16-Jan	1313	428	135	249	58%	5,970	4.547	3,264.52	179.10	136
	17-Jan	1313	415	135	241	58%	5,776	4.399	3,264.72	173.28	132
	18-Jan	1314	429	130	238	56%	5,722	4.355	3,270.25	171.66	131
	19-Jan	1314	440	136	250	57%	6,005	4.570	3,270.72	180.15	137
	20-Jan	1314	420	135	253	60%	6,066	4.616	3,276.31	181.98	138

Month	Date	Number of Costumer	Demand			Daily Load Factor %	Energy Daily Consumption (kwh)	per Costumer (kwh)	Cumulative Energy (MWh)	Assumed Monthly Energy (MWh)	per Costumer (kwh/Month)
			Max (kw)	Min (kw)	Ave (kw)						
Feb-11	21-Jan	1314	414	137	243	59%	5,832	4.438	3,276.55	174.96	133
	22-Jan	1314	419	130	245	59%	5,887	4.480	3,282.20	176.61	134
	23-Jan	1314	417	140	250	60%	6,000	4.566	3,282.55	180.00	137
	24-Jan	1314	431	120	244	57%	5,864	4.463	3,288.06	175.92	134
	25-Jan	1314	417	130	245	59%	5,874	4.470	3,288.43	176.22	134
	26-Jan	1314	390	130	246	63%	5,894	4.486	3,293.96	176.82	135
	27-Jan	1314	412	147	247	60%	5,917	4.503	3,294.34	177.51	135
	28-Jan	1314	426	134	251	59%	6,012	4.575	3,299.97	180.36	137
	29-Jan	1314	399	140	241	60%	5,775	4.395	3,300.12	173.25	132
	30-Jan	1314	416	138	244	59%	5,864	4.463	3,305.83	175.92	134
	31-Jan	1314	415	134	244	59%	5,855	4.456	3,305.97	175.65	134

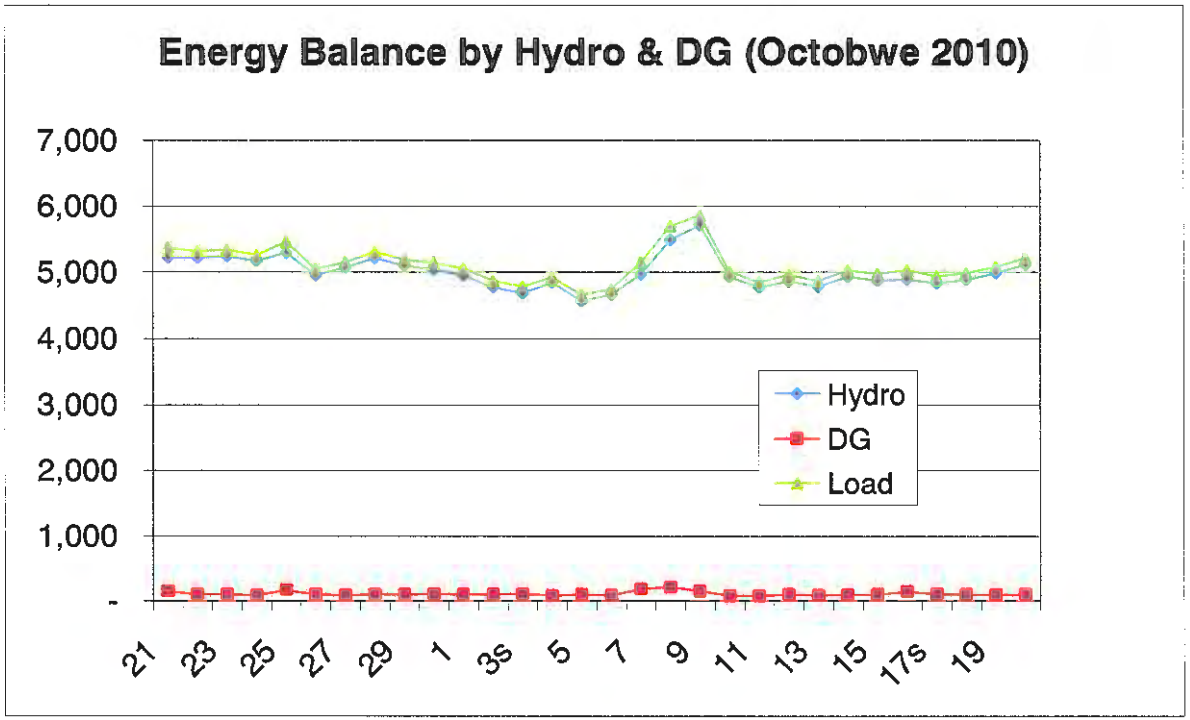
Energy Consumption for Mondul Kiri Power System May 2010

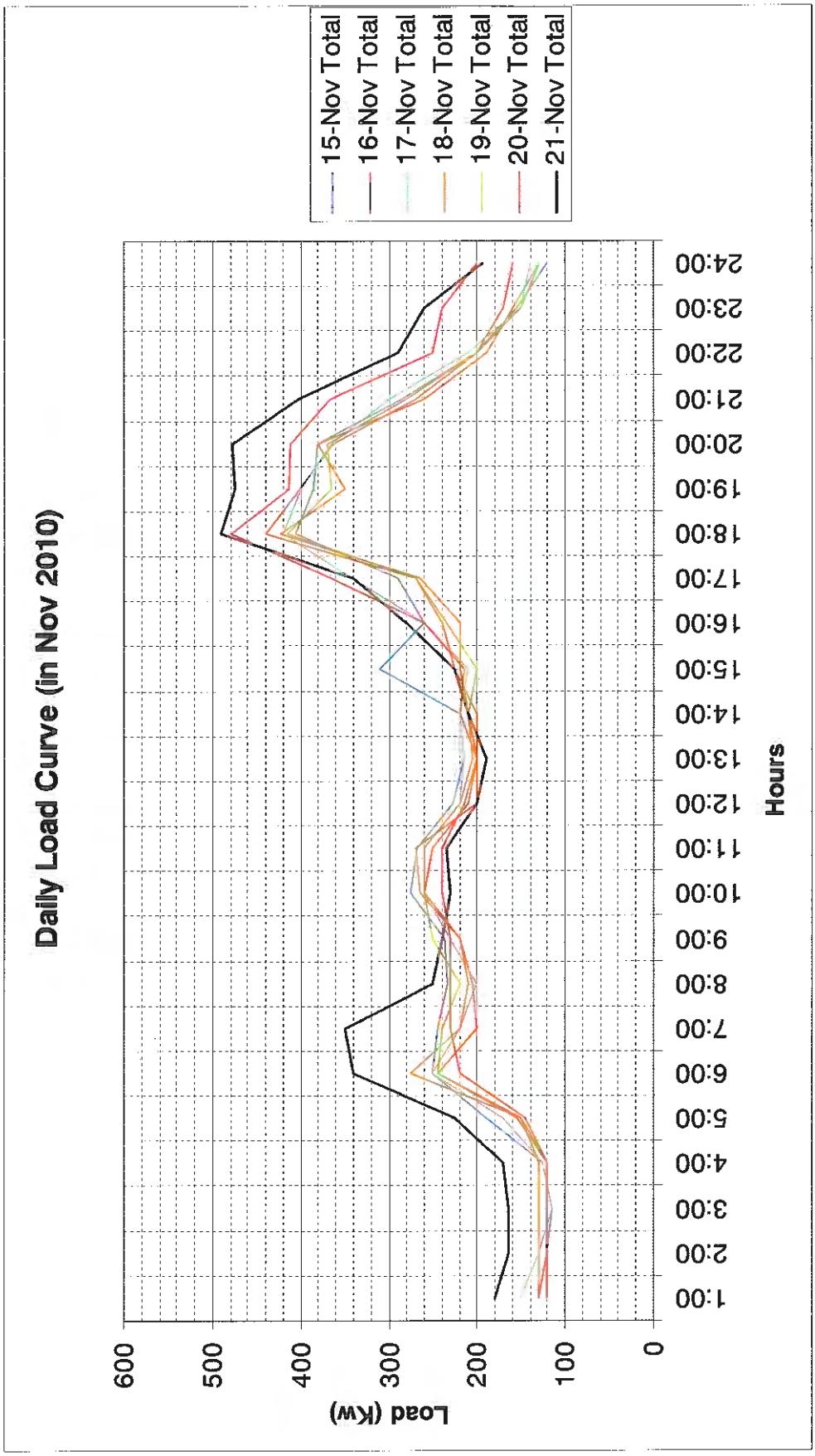
	kWh Hydro	kWh DG	kWh Load
21	320	4,364	4,684
22	130	4,736	4,866
23	240	4,673	4,913
24	235	4,650	4,885
25s	170	4,857	5,027
26	160	5,063	5,223
27	260	5,031	5,291
28	200	4,969	5,169
29	570	4,415	4,985
30	530	4,265	4,795
1	480	4,410	4,890
2s	430	4,548	4,978
3	1,535	3,177	4,712
4	1,625	3,199	4,824
5	1,215	3,711	4,926
6	520	4,541	5,061
7	440	4,390	4,830
8	670	4,254	4,924
9s	375	4,876	5,251
10	450	4,720	5,170
11	490	4,526	5,016
12	420	4,817	5,237
13	570	5,064	5,634
14	385	5,597	5,982
15	420	5,260	5,680
16s	260	5,093	5,353
17	330	4,655	4,985
18	320	4,879	5,199
19	520	4,879	5,399
20	450	5,186	5,636
Total	14,720	138,805	153,525
Average	491	4,627	5,118



Energy Consumption for Mondul Kiri Power System October 2010

	kWh Hydro	kWh DG	kWh Load
21	5,220	148	5,368
22	5,215	102	5,317
23	5,235	99	5,334
24	5,165	89	5,254
25	5,285	171	5,456
26s	4,950	99	5,049
27	5,060	90	5,150
28	5,205	99	5,304
29	5,090	100	5,190
30	5,030	107	5,137
1	4,950	102	5,052
2	4,765	105	4,870
3s	4,675	109	4,784
4	4,835	85	4,920
5	4,555	102	4,657
6	4,655	90	4,745
7	4,960	185	5,145
8	5,485	212	5,697
9	5,708	152	5,860
10s	4,925	80	5,005
11	4,765	81	4,846
12	4,855	101	4,956
13	4,775	90	4,865
14	4,930	95	5,025
15	4,870	102	4,972
16	4,885	146	5,031
17s	4,830	103	4,933
18	4,880	100	4,980
19	4,980	96	5,076
20	5,110	99	5,209
Total	149,848	3,339	153,187
Average	4,995	111	5,106




Daily Load Curve (in Nov 2010)
15-Nov Total
16-Nov Total
17-Nov Total
18-Nov Total
19-Nov Total
20-Nov Total
21-Nov Total
Load (Kw)
0
100
200
300
400
500
600
Hours
1:00
2:00
3:00
4:00
5:00
6:00
7:00
8:00
9:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
17:00
18:00
19:00
20:00
21:00
22:00
23:00
24:00

Daily Load Curve,report In November 2010

	15-Nov			16-Nov			17-Nov			18-Nov			19-Nov			20-Nov			21-Nov		
	Hydro	D/G	Total	Hydro	D/G	Total	Hydro	D/G	Total	Hydro	D/G	Total	Hydro	D/G	Total	Hydro	D/G	Total	Hydro	D/G	Total
1:00	120		**120**	120		**120**	150		**150**	130		**130**	130		**130**	130		**130**	180		**180**
2:00	120		**120**	120		**120**	130		**130**	130		**130**	120		**120**	120		**120**	165		**165**
3:00	115		**115**	120		**120**	115		**115**	130		**130**	120		**120**	120		**120**	165		**165**
4:00	125		**125**	120		**120**	125		**125**	130		**130**	120		**120**	120		**120**	170		**170**
5:00	190		**190**	155		**155**	170		**170**	150		**150**	150		**150**	145		**145**	225		**225**
6:00	250		**250**	245		**245**	250		**250**	275		**275**	245		**245**	220		**220**	340		**340**
7:00	245		**245**	200		**200**	220		**220**	220		**220**	240		**240**	230		**230**	320	30	**350**
8:00	110	123	**233**	205		**205**	200		**200**	210		**210**	220		**220**	230		**230**	250		**250**
9:00	170	67	**237**	220		**220**	230		**230**	220		**220**	250		**250**	230		**230**	240		**240**
10:00	170	105	**275**	260		**260**	260		**260**	265		**265**	260		**260**	240		**240**	230		**230**
11:00	170	98	**268**	250		**250**	260		**260**	270		**270**	260		**260**	240		**240**	235		**235**
12:00	170	57	**227**	210		**210**	220		**220**	200		**200**	220		**220**	215		**215**	200		**200**
13:00	160	55	**215**	200		**200**	215		**215**	200		**200**	205		**205**	200		**200**	190		**190**
14:00	170	50	**220**	200		**200**	220		**220**	210		**210**	210		**210**	220		**220**	210		**210**
15:00	310		**310**	225		**225**	210		**210**	220		**220**	200		**200**	215		**215**	225		**225**
16:00	260		**260**	240		**240**	260		**260**	220		**220**	235		**235**	260		**260**	280		**280**
17:00	290		**290**	270		**270**	290	52	**342**	265		**265**	270		**270**	290	75	**365**	290	50	**340**
18:00	355	50	**405**	360	80	**440**	355	65	**420**	355	68	**423**	350	65	**415**	340	140	**480**	345	145	**490**
19:00	345	40	**385**	350	51	**401**	355	45	**400**	310	40	**350**	320	45	**365**	340	73	**413**	345	130	**475**
20:00	340	40	**380**	320	43	**363**	320	45	**365**	345	35	**380**	340	30	**370**	340	72	**412**	345	133	**478**
21:00	285		**285**	270		**270**	300		**300**	260		**260**	280		**280**	310	56	**366**	325	77	**402**
22:00	200		**200**	200		**200**	210		**210**	190		**190**	200		**200**	250		**250**	290		**290**
23:00	155		**155**	170		**170**	150		**150**	160		**160**	150		**150**	240		**240**	260		**260**
24:00	120		**120**	160		**160**	140		**140**	130		**130**	130		**130**	200		**200**	195		**195**
Maximum		123	405	360	80	440	355	65	420	355	68	423	350	65	415	340	140	480	345	145	490
Minimum	110	40	115	120	43	120	115	45	115	130	35	130	120	30	120	120	56	120	165	30	165
Average	206	69	235	216	0	224	223	0	232	216	48	222	218	47	224	227	83	244	251	94	274
Energy	4945	685	5630	5190	174	5364	5355	207	5562	5195	143	5338	5225	140	5365	5445	416	5861	6020	565	6585
	88%	12%	100%	97%	3%	100%	96%	4%	100%	97%	3%	100%	97%	3%	100%	93%	7%	100%	91%	9%	100%
Daily Load Factor			58%			51%			55%			53%			54%			51%			56%
User No			1293			1293			1293			1293			1294			1294			1294
Monthly Assumed /C			131			124			129			124			124			136			153
Monthly Assumed Total			94,051			89,607			92,915			89,173			89,555			97,834			109,920

Electricite du Cambodge
Electricity of Mondulkiri

Fualt Record of 2010 (Power station & Line)

No.	Date	Trouble (what kind of)	Reason	Countermeasure	Duration of stopping time	Remarks	Stop(H)
1	22-Feb-10	External trouble on 22kV lines	The building constructor take wood to draged the MV cable to be separate to put the stair for concreting the new building	To provide a protection cover on the MV cable and confirm no damage the MV cable	14:00 ~15:00		1.0
2	24-Mar-10	External trouble on 22kV lines	EUMP staffs saw the Chinese constructor tight the MV cable together with Optic cable, and then EUMP staff reported to their director to cut off the feeder for take out the tight of those cable.	Repairing of cables	10:00 ~14:00		2.0
3	25-Mar-10	External trouble on 22kV lines	The group of T&D staffs go to the scene on 24-Mar-10 to cut MV cable over the national road due to the big truck could not have a trip across the road	Change of the 22kV line	10:00 ~14:00		4.0
4	14-Apr-10	DG trouble	DG Starting air valve (failure) was not operated. During national fesival, the load has rapidly increased and power stations could not control the load, then power system was blackout.	To clean and adjust the DG Starting air valve.	20:30 ~22:30	Re-start of the power system	2.0
5	18-Apr-10	Failure of 22kV transmission line	The main meter at P-01 broken due to the thunder	Replacement of parts	14:00 ~15:00		1.0
6	27-Jun-10	External trouble on 22kV lines	The people who are rental the land for build the small cottage at O'Klong restaurant (near O'Romis restaurant) has been through his cable across the MV 22kv at pole OR-047, and cause the serious injured to whole body	Inspection of trouble point	10:00 ~11:00		1.0
7	29-Jun-10	Failure of 400V distribution line	Some peoples was cut the tree drop on LV cable, make the LV cable drop out from the pole No. P07-120 to P07-121	Replacement of parts	14:00 ~15:00		1.0
8	16-Dec-10	DG trouble	Release of Exhaust-Temperature Measurement of DG	Checking exhaust pipe line	10:08-10:30	Re-start of the power system	0..3
9	19-Dec-10	DG trouble	Fuel oil flow meter trouble	Checking flow meter and request spare parts	9:00-10:30	Change bypass line	0
					Total Stappage		12.3

Electricite du Cambodge
Electricity of Mondulkiri

Fualt Record of 2009 (Power station & Line)

No.	Date	Trouble (what kind of)	Reason	Countermeasure	Duration of stopping time	Remarks
1	29-Jan-09		The Pin of P15-107 broken cause by the thunder at O'Romis		15:25 ~16:30	55 mns
2	13-Feb-09		Both hydropower generator stop automatically. After line and transformer inspection, it's has been found that, the fuse of P-25 was broken.		15:25 ~08:00	Repairing on 14-Feb-09
3	7-Mar-09		Both hydropower generator stop automatically due to there was a big truck crush to the pole number P17-115 and it cause the metter box was broken		8:30 ~9:45	Repairing on 8-Mar-09
4	18/20-Mar-09		Replacement of transformer capacity 10kVA to 25 kVA at P-12			Date of replacement work 18-Mar to 20-Mar (2days)
5	20/23-Mar-09		Installation a new transformer 10kVA at Lay Sokkha's house along the road to O'Romis			Date of Installation work 20-Mar to 23-Mar (3days)
6	24-Mar-09		LV cable suspension assembly at P19-103		15:15 ~16:30	1.15hrs
7	25-Mar-09		LV cable suspension assembly at P19-103		8:30 ~9:30	1 hr
8	1-Apr-09		LV cable suspension assembly at P19-103		14:30 ~15:20	0.50hrs

9	4-Apr-09		Both hydropower shutdown automatically by the thunder, it cause the Pin at P OR-071 was broken		15:30 ~17:50	
10	24-Apr-09		Both hydropower shutdown automatically by the thunder. it cause the Pin at P OR-097 was broken		15:10 ~16:50	1.50hrs
11	5-May-09		LV cable suspension assembly at P25-105		10:00 ~10:50	0.50hrs
12	1-Jun-09		The fuse of transformer at DG broken cause both hydropower stop		17:20 ~18:30	1.10hrs
13	20-Aug-09		Ground cable of MV droped on Cross Arm cause both hydro generator stop		14:50 ~16:20	1.30hrs
14	20-Aug-09		The main metter at P20 broken by the thunder of the veavy rain		13:00 ~14:30	1.30hrs
15	29-Sep-09		The under ground cable of MV and sub-station near Market was burned.	Temporary repaired by disconnection overhead line of MV under ground wire and wait for supporting of repairation from JICA team	11:20	
16	13-Oct-09		LV cable suspension assembly at P23-203		09:00 ~10:30	1.30hrs
17	25/27-10-2009		Repairing of MV under ground cable at sub-station			Date of repairing work from 25-May to 27-Oct (2days)
18	7-Dec-09		P19 F03, LV cable was suspension assembly, cause short curcuit and N phase touch with A phase		8:00 ~8:40	0.40hr

Yearly Inspection Plan in 2010

Director	Deputy Director	Chief	Prepared

Name: **EUMP** **Date:** **2010/6/1**

No.	Station Name	Budget (US$)	Work Priority	Work Order	Work Category	Number of Worker	Work Leader	Super Visor	Work Schedule												Note
									1	2	3	4	5	6	7	8	9	10	11	12	
1	O'Moleng	300	1	O'M	P.I	4	Mr. Heng Sokhorn	Tanaka Suiryoku													
2	O'Romis	300	1	O'R	P.I	4	Mr. Pen Pidu	Tanaka Suiryoku													
3	Diesel	500	1	DG	P.I	4	Mr. Yeb Thav	Daihatsu													
4	T/L	0	1	TL	P.I	3	Mr. Savuth	EM													
5	D/L	0	1	TL	P.I	3	Mr. Savuth	EM													
	Total	1,100																			

Regend: 1) P.I: Periodic Inspection 2)Work Priority: 1-Periodic , 2-Emergency, 3-After fault
3) Budget is requested and provided by financial section.

Instruction:

1)
2)
3)
4)
5)
6)

Work Plan

O'Moleng P.S/'Romis P.S	Work No. OM-G001/OR-001	Approval (Signeture)			
		Director	Deputy Director	Chief	Work Manager
Preparation:	2010/6/1	K. Pisith	C. Sokhun	T. Khin	Y. Soyen
Work Name	Periodic inspection for turbine		Slip No.		
Equipment	Hydropower generating equipment		Shutdown	No.	
Purpose	Periodic inspection for htdropower station		Work	No.	
Schedule	2010/6/2 at 8:00 - 2010/6/8 by 16:00 (56 Hrs)		Grounding	No.	
Shutdown	2010/6/4 at 8:00 - 2010/6/5 by 16:00 (7 Hrs, every day)		Daily: at 8:30 by 15:30		

Work Items	Relative Work
1)Disassembly inspection of turbine and bearing 2)Runner inside inspection 3)Generator inspection 4)Dummy load inspection 5)Contorol panel inspection	1)Waterway and intake inspection 2)Transmision line inspection and others

Safety Measure			
Prohavited operation	#1 Control SW, #52-1,2 CB, Inlet valve	Grounding	Non
Locking	Inlet valve	Protection	Pad lock key for Control panel

Work Organization			
Work order	1) Own work 2) Contract 3) Consignment	Safety manager	Mr. Chin Sokhun
Work manager	Mr. Thai Khin	Site manager	Mr. Yang Soyen
Work praparator	Mr. Thai Khin	Assitant	Mr. Eng Rithy
Assistant	Mr. Yang Soyen	Operator	Mr. Um Monichetra
Work leader	Mr. Yang Soyen	Workers	Mr. Um Monichetra
Safety inspector	Mr. Eng Rithy	Workers	Mr. Chheoum Kosal
Maker' SV	Tnaka Hydro	Total worker	(9)
Praparatory meeting	Date: 2010/6/2 at 8:00 Place: Technical Devision	Attendants	1)K. Pisith 2)Se 3)Khin 4)Sokhom 5)Other staff

Work Standards (Print numbers of (1, 2, 3 ----) are attached.)		
( )	Work contents	Instruction
( )	Work manage sheet	1)
( )	Shutdown, Locking & Grounding area	2)
( )	Work organization	3)
( )	Work schedule	4)
( )	Work safety procedure	5)
( )	Tools and Material list	
( )	Safety indicators	
( )	Safety check list	

General Work Plan

O'Moleng P.S/O'Romis P.S	Work No. OM-G001/OR-001	Approval (Signeture)			
		Director	Deputy Director	Chief	Work Manager
Preparation:	2010/6/1	K. Pisith	C. Sokhun	T. Khin	Y. Soyen
Work Name	Periodic inspection for turbine				
Equipment	Hydropower generating equipment				
Total Work	2010/6/4 at 8:00 - 2010/6/5 by 16:00 (Daily 8 Hrs X 2 dys · continous)				

	Work Item	Work Content	Method	Schedule	Actual	Name of Leader	Confirmed
1	Periodic inspection for turbine	1)Inspection of turbine & generator, inletvalve, control panel 2)Dummy load, etc.	Contrct	Frm: 6/4 To: 6/5		Mr. Thai Khin	
2	Inspection of civil facilities	Inspection of waterway and intake	EUMP	Frm: 6/4 To: 6/5		Mr. Chin Sokhun	
3	Inspection of transmission line	1)Inspection of 22kV T/L 2)Inspection of 400V D/L, etc.	EUMP	Frm: 6/4 To: 6/5		Mr. Thai Khin	
4				Frm: To:			
5				Frm: To:			

Head of wok	Work manager	Safety manager	Lock & Grounding	Leader	Worker	Confirmed

Meeting	Schedule	2010/6/2 at 8:00	Place	EUPM room	Atendant	1)K. Pisith 2)Se
	Actual					3)Khin 4)Other staff

Remarks	**Scope of work**	**Instruction**
	1) Refer to Single diagram 2) Refer to Block diagram	1) 2) 3) 4) 5)

Confirmation Table of Locking and Grounding

Work Name:	Periodic Inspection for Turbine						Name of P.S: O'Moleng/O'Romis		
Work Period	2010/6/2 at 8:00 - 2010/6/8 by 16:00 (56 Hrs)						Date: 2010/6/1		Approved
Shutdown Date:	2010/6/4 at 8:00 - 2010/6/5 by 16:00 (7 Hrs, ever						OM-G001/OR-001		Mr. Thai Khin
No.	Lock operation for Parts	Condition before lock	Lock date	Unlock date	Lock lavel No. and Place				Remark
					Panel	Local	Common	Lavel No.	
1	Turbine Stop #1	Stop	6/4	6/4	O			1	
2	InletValve CLOSED	Closed	6/4	6/4		O		2	
3	52-1 OFF	Off	6/4	6/4	O			3	
4	52-2 OFF	Off	6/4	6/4	O			4	
5	NFB-1 & 1A OFF	On	6/4	6/4	O			5	
6	NFB-2 OFF	On	6/4	6/4	O			5	
7	NFB-3 OFF	On	6/4	6/4	O			5	
8	Servo Moter MCCB OFF	On	6/4	6/4	O			5	
9									
10									
11									
12									
13									
14									
15									

Scope of Shutdown and Work ares

1) Refer to Single diagram
2) Refer to Block diagram
3)Lock lavel shall be provided at power ststion.

Work Plan

Appendix 4-6

Diesel P.S		**Work No.** DG-001	Approval (Signeture)			
			Director	Deputy Director	Chief	Work Manager
Preparation:	2010/8/2		Chin Sokhun	Khin	Setha	Setha
Work Name	Periodic inspection for Diesel Power Station			Slip No.		
Equipment	Diesel generating equipment			Shutdown	No.	
Purpose	Periodic inspection for Diesel Power Station			Work	No.	
Schedule	2010/8/3 at 8:00 - 2010/8/9 by 16:00 (48 Hrs)			Grounding	No.	
Shutdown	2010/8/3 at 8:00 - 2010/8/9 by 17:00 (8 Hrs, every day)			Daily:	at 8:30	by 16:30

Work Items	Relative Work
1)Disassembly inspection of Diesel engin 2)Engin body inside inspection 3)Generator inspection 4)Auxiliary equipment inspection 5)Contorol panel inspection	1)Step up Transformer (400kVA) 2)Zero phase (Vo) Transformer and others

Safety Measure			
Prohavited operation	#3-1E Engine Control SW, #52G CB, #88E Start prepartion SW	Grounding	Non
Locking	DC 24V Control source"OFF", 43A "MANUAL", Air Tank Valve "CLOSE"	Protection	Pad lock key for Control panel

Work Organization			
Work order	1) Own work 2) Contract 3) Consignment	Safety manager	Mr. Chin Sokhun
Work manager	Mr. Thai Khin	Site manager	Mr. Yim Thav
Work praparator	Mr. Thai Khin	Assitant	Mr. Som Dara
Assistant	Mr. Then Setha	Operator	Mr. Eng Tola
Work leader	Mr. Yim Thav	Workers	Mr. Nol Nin
Safety inspector	Mr. Then Setha	Workers	Mr. Hang Vuthy
Maker' SV	Daihatsu (Mr. Bono & Hojo)	Total worker	(9)

Praparatory meeting	Date	2010/8/3 at 8:00	Attendants	1) Se 2)Khin 3)Setha
	Place	Technical Devision		4)Thav 5)Other staff 6) SV

Work Standards (Print numbers of (1, 2, 3 ----) are attached.)		
( )	Work contents	Instruction
( )	Work manage sheet	1)
( )	Shutdown, Locking & Grounding area	2)
( )	Work organization	3)
( )	Work schedule	4)
( )	Work safety procedure	5)
( )	Tools and Material list	
( )	Safety indicators	
( )	Safety check list	

General Work Plan

Diesel P.S		Work No. DG-001		Approval (Signeture)			
				Director	Deputy Director	Chief	Work Manager
Preparation:	2010/8/2			Chin Sokhun	Khin	Setha	Setha
Work Name	Periodic inspection for Diesel Power Station						
Equipment	Diesel generating equipment						
Total Work	2010/8/3 at 8:00 - 2010/8/9 by 17:00 (Daily 8 Hrs X 7 dys · every day)						

	Work Item	Work Content	Method	Schedule	Actual	Name of Leader	Confirmed
1	Periodic inspection for Diesel Power Station	1)Disassembly inspection of Diesel engin 2)Engin body inside inspection 3)Generator inspection 4)Auxiliary equipment inspection 5)Contorol panel	Contrct	From: 8/3 To: 8/9		Mr. Thai Khin	
2	Inspection of transmission line	1)Step up Transformer (400kVA) 2)Zero phase (Vo) Transformer and others	Own work	From: 8/3 To: 8/3		Mr. Savuth Sothea	
3		Postponed to next inspection					
4				Frm: To:			

Head of wok	Work manager	Safety manager	Lock & Grounding	Leader	Worker	Confirmed

Meeting						
	Schedule	2010/6/2 at 8:00	Place	EUPM room	Atendant	1)K. Pisith 2)Se 3)Khin 4)Other staff
	Actual					

a	**Scope of work**	**Instruction**
	1) Refer to Single diagram 2) Refer to Block diagram	1) 2) 3) 4) 5)

Confirmation Table of Locking and Grounding

Work Name:	Periodic inspection for Diesel Power Station			Name of P.S: Diesel				
Work Period	2010/8/3 at 8:00 - 2010/8/9 by 17:00 (48 Hrs)			Date: 2010/8/2		Approved		
Shutdown Date:	2010/8/3 at 8:00 - 2010/8/9 by 17:00 (8 Hrs, every			DG-001		Mr. Thai Khin		
No.	Lock operation for Parts	Status	Lock date	Unlock date	Lock lavel No. and Place				Status before lock
					Panel	Local	Common	Lavel No.	
1	Diesel Engine	Stop	8/4	8/4		O		1	Stop
2	Air tank valve "CLOSED	Closed	8/4	8/4		O		2	Open
3	Fuel oil valve "CLOSED"	Closed	8/4	8/4		O		3	Open
4	52G CB " OFF"	Off	8/4	8/4	O			4	Off
5	DC24V "OFF"	Off	8/4	8/4	O			5	On
6	43A "MANUAL"	Manual	8/4	8/4	O			6	AUTO
7	All NFB "OFF"	Off	8/4	8/4	O			7	On
	Relative Work								
8	Step up Transformer	No Charge	8/3	8/3		O		8	Charge
9	Vo Transformer	No Charge	8/3	8/3		O		8	Charge
10	Cut out power fuse	Off	8/3	8/3		O		8	On
11									
12									
13									
14									

Postponed to next inspection

Scope of Shutdown and Work ares

1) Refer to Single diagram
2) Refer to Block diagram
3)Lock lavel shall be provided at power ststion.

OUTAGE SCHEDULE

	DATE OF WORK		8/4/2010 to 8/6/2010	
	WORK Number DG-001		Diesel inspection	
	Place		Diesel	
	Purpose		Diesel inspection	
	Responsible person at the site		Mr THENG SETHA	
	Deenergized MV Line	From	LBS 2	
		To	PMT29, PMT30, PMT31,PMT33,PMT34,PMT35	
	Outage PMT		PMT29, PMT30, PMT31,PMT33,PMT34,PMT35	

	PROCEDURE		Outage PMT	TIME	
				Scheduled	Result
1	O'Romis P/S MCB	Operation		7:30	
2	O'Moleng P/S MCB	Operation		7:30	
3	Diesel P/S MCB	Stop Operation		8:00	
4	LBS 2	Open for reducing load			
5	PMT-16	Off for reducing load			
	Result of outage period**				

Work Plan

Form 3

O'Moleng P.S/'Romis P.S	Work No. OM-001	Approval (Signeture)			
		Director	Deputy Director	Chief	Work Manager
Preparation:	2010/6/1	K. Pisith	C. Sokhun	T. Khin	Y. Soyen
Work Name	Periodic inspection for turbine	Slip No.			
Equipment	Hydropower generating equipment	Shutdown	No.		
Purpose	Periodic inspection for htdropower station	Work	No.		
Schedule	2010/6/2 at 8:00 - 2010/6/8 by 16:00 (56 Hrs)	Grounding	No.		
Shutdown	2010/6/4 at 8:00 - 2010/6/5 by 16:00 (7 Hrs, every day)	Daily:	at 8:30	by 15:30	

Work Items	Relative Work
1)Disassembly inspection of turbine and bearing 2)Runner inside inspection 3)Generator inspection 4)Dummy load inspection 5)Contorol panel inspection	1)Waterway and intake inspection 2)Transmision line inspection and others

Safety Measure			
Prohavited operation	#1 Control SW, #52-1,2 CB, Inlet valve	Grounding	Non
Locking	Inlet valve	Protection	Pad lock key for Control panel

Work Organization			
Work order	1) Own work 2) Contract 3) Consignment	Safety manager	Mr. Chin Sokhun
Work manager	Mr. Thai Khin	Site manager	Mr. Yang Soyen
Work praparator	Mr. Thai Khin	Assitant	Mr. Eng Rithy
Assistant	Mr. Yang Soyen	Operator	Mr. Um Monichetra
Work leader	Mr. Yang Soyen	Workers	Mr. Um Monichetra
Safety inspector	Mr. Eng Rithy	Workers	Mr. Chheoum Kosal
Maker' SV	Tnaka Hydro	Total worker	(9)

Praparatory meeting			Attendants	
	Date	2010/6/2 at 8:00		1)K. Pisith 2)Se 3)Khin
	Place	Technical Devision		4)Sokhom 5)Other staff

Work Standards (Print numbers of (1, 2, 3 ----) are attached.)

( )	Work contents	Instruction
( )	Work manage sheet	1)
( )	Shutdown, Locking & Grounding area	2)
( )	Work organization	3)
( )	Work schedule	4)
( )	Work safety procedure	5)
( )	Tools and Material list	
( )	Safety indicators	
( )	Safety check list	

General Work Plan

Form-4

O'Moleng P.S/O'Romis P.S	Work No. OM-G001	Approval (Signeture)			
		Director	Deputy Director	Chief	Work Manager
Preparation:	2010/6/1	K. Pisith	C. Sokhun	T. Khin	Y. Soyen
Work Name	Periodic inspection for turbine				
Equipment	Hydropower generating equipment				
Total Work	2010/6/4 at 8:00 - 2010/6/5 by 16:00 (Daily 8 Hrs X 2 dys · continous)				

	Work Item	Work Content	Method	Schedule	Actual	Name of Leader	Confirmed
1	Periodic inspection for turbine	1)Inspection of turbine & generator, inletvalve, control panel 2)Dummy load, etc.	Contrct	Frm: 6/4 To: 6/5		Mr. Thai Khin	
2	Inspection of civil facilities	Inspection of waterway and intake	EUMP	Frm: 6/4 To: 6/5		Mr. Chin Sokhun	
3	Inspection of transmission line	1)Inspection of 22kV T/L 2)Inspection of 400V D/L, etc.	EUMP	Frm: 6/4 To: 6/5		Mr. Thai Khin	
4				Frm: To:			
5				Frm: To:			

Head of wok	Work manager	Safety manager	Lock & Grounding	Leader	Worker	Confirmed

Meeting						
	Schedule	2010/6/2 at 8:00	Place	EUPM room	Atendant	1)K. Pisith 2)Se 3)Khin 4)Other staff
	Actual					

Remarks	**Scope of work**	**Instruction**
	1) Refer to Single diagram 2) Refer to Block diagram	1) 2) 3) 4) 5)

Confirmation Table of Locking and Grounding

Form-5

Work Name:	Periodic Inspection for Turbine				Name of P.S: O'Moleng				
Work Period	2010/6/2 at 8:00 - 2010/6/8 by 16:00 (56 Hrs)				Date: 2010/6/1				Approved
Shutdown Date:	2010/6/4 at 8:00 - 2010/6/5 by 16:00 (7 Hrs, ever				OM-G001/OR-001				Mr. Thai Khin
No.	Lock operation for Parts	Condition before lock	Lock date	Unlock date	Lock lavel No. and Place				Remark
					Panel	Local	Common	Lavel No.	
1	Turbine Stop #1	Stop	6/4	6/4	O			1	
2	InletValve CLOSED	Closed	6/4	6/4		O		2	
3	52-1 OFF	Off	6/4	6/4	O			3	
4	52-2 OFF	Off	6/4	6/4	O			4	
5	NFB-1 & 1A OFF	On	6/4	6/4	O			5	
6	NFB-2 OFF	On	6/4	6/4	O			5	
7	NFB-3 OFF	On	6/4	6/4	O			5	
8	Servo Moter MCCB OFF	On	6/4	6/4	O			5	
9									
10									
11									
12									
13									
14									
15									

Scope of Shutdown and Work ares

1) Refer to Single diagram
2) Refer to Block diagram
3)Lock lavel shall be provided at power ststion.

Work Plan

Form-3

Diesel P.S	Work No. DG-002	Approval (Signeture)			
		Director	Deputy Director	Chief	Work Manager
Preparation:	2010/8/2	Chin Sokhun	Khin	Setha	Setha
Work Name	Periodic inspection for Diesel Power Station	Slip No.			
Equipment	Diesel generating equipment	Shutdown	No.		
Purpose	Periodic inspection for Diesel Power Station	Work	No.		
Schedule	2010/8/3 at 8:00 - 2010/8/9 by 16:00 (48 Hrs)	Grounding	No.		
Shutdown	2010/8/3 at 8:00 - 2010/8/9 by 17:00 (8 Hrs, every day)	Daily:	at 8:30	by 16:30	

Work Items	Relative Work
1)Disassembly inspection of Diesel engin 2)Engin body inside inspection 3)Generator inspection 4)Auxiliary equipment inspection 5)Contorol panel inspection	1)Step up Transformer (400kVA) 2)Zero phase (Vo) Transformer and others

Safety Measure			
Prohavited operation	#3-1E Engine Control SW, #52G CB, #88E Start prepartion SW	Grounding	Non
Locking	DC 24V Control source"OFF", 43A "MANUAL", Air Tank Valve "CLOSE"	Protection	Pad lock key for Control panel

Work Organization			
Work order	1) Own work 2) Contract 3) Consignment	Safety manager	Mr. Chin Sokhun
Work manager	Mr. Thai Khin	Site manager	Mr. Yim Thav
Work praparator	Mr. Thai Khin	Assitant	Mr. Som Dara
Assistant	Mr. Then Setha	Operator	Mr. Eng Tola
Work leader	Mr. Yim Thav	Workers	Mr. Nol Nin
Safety inspector	Mr. Then Setha	Workers	Mr. Hang Vuthy
Maker' SV	Daihatsu (Mr. Bono & Hojo)	Total worker	(9)
Praparatory meeting	Date 2010/8/3 at 8:00 Place Technical Devision	Attendants	1) Se 2)Khin 3)Setha 4)Thav 5)Other staff 6) SV

Work Standards (Print numbers of (1, 2, 3 ----) are attached.)

		Instruction
( )	Work contents	1)
( )	Work manage sheet	2)
( )	Shutdown, Locking & Grounding area	3)
( )	Work organization	4)
( )	Work schedule	5)
( )	Work safety procedure	
( )	Tools and Material list	
( )	Safety indicators	
( )	Safety check list	

General Work Plan

Form-4

Diesel P.S	Work No. DG-002	Approval (Signeture)			
		Director	Deputy Director	Chief	Work Manager
Preparation: 2010/8/2		Chin Sokhun	Khin	Setha	Setha
Work Name	Periodic inspection for Diesel Power Station				
Equipment	Diesel generating equipment				
Total Work	2010/8/3 at 8:00 - 2010/8/9 by 17:00 (Daily 8 Hrs X 7 dys · every day)				

	Work Item	Work Content	Method	Schedule	Actual	Name of Leader	Confirmed
1	Periodic inspection for Diesel Power Station	1)Disassembly inspection of Diesel engin 2)Engin body inside inspection 3)Generator inspection 4)Auxiliary equipment inspection 5)Contorol panel	Contrct	From: 8/3 To: 8/9		Mr. Thai Khin	
2	Inspection of transmission line	1)Step up Transformer (400kVA) 2)Zero phase (Vo) Transformer and others	Own work	From: 8/3 To: 8/3		Mr. Savuth Sothea	
3	Postponed to next inspection						
4				Frm: To:			

Head of wok	Work manager	Safety manager	Lock & Grounding	Leader	Worker	Confirmed

Meeting	Schedule	2010/6/2 at 8:00	Place	EUPM room	Atendant	1)K. Pisith 2)Se 3)Khin 4)Other staff
	Actual					

Remarks	Scope of work	Instruction
	1) Refer to Single diagram 2) Refer to Block diagram	1) 2) 3) 4) 5)

Confirmation Table of Locking and Grounding

Form-5

Work Name:	Periodic inspection for Diesel Power Station			Name of P.S: Diesel				
Work Period	2010/8/3 at 8:00 - 2010/8/9 by 17:00 (48 Hrs)			Date: 2010/8/2		Approved		
Shutdown Date:	2010/8/3 at 8:00 - 2010/8/9 by 17:00 (8 Hrs, every			Mr. Thai Khin				
No.	Lock operation for Parts	Status	Lock date	Unlock date	Lock lavel No. and Place				Status before lock
					Panel	Local	Common	Lavel No.	
1	Diesel Engine	Stop	8/4	8/4		O		1	Stop
2	Air tank valve "CLOSED	Closed	8/4	8/4		O		2	Open
3	Fuel oil valve "CLOSED"	Closed	8/4	8/4		O		3	Open
4	52G CB " OFF"	Off	8/4	8/4	O			4	Off
5	DC24V "OFF"	Off	8/4	8/4	O			5	On
6	43A "MANUAL"	Manual	8/4	8/4	O			6	AUTO
7	All NFB "OFF"	Off	8/4	8/4	O			7	On
	Relative Work								
8	Step up Transformer	No Charge	8/3	8/3		O		8	Charge
9	Vo Transformer	No Charge	8/3	8/3		O		8	Charge
10	Cut out power fuse	Off	8/3	8/3		O		8	On
11									
12									
13									
14									

Postponed to next inspection

Scope of Shutdown and Work ares

1) Refer to Single diagram
2) Refer to Block diagram
3)Lock lavel shall be provided at power ststion.

OUTAGE SCHEDULE

	WORK PERIOD		11/3/2010 to 11/9/2010	
	OUTAGE PERIOD:	Date	From: Nov/4 8:00	to: Nov/7 16:00
		Total hours	Continous : 88 hours	
	WORK Number	DG-002		
	Place		Diesel	
	Purpose		DG Overhaul Work after 8,000 hours	
	Responsible person at the site		Mr THENG SETHA	
	Deenergized MV Line		From	LBS 2
			To	PMT29, PMT30, PMT31,PMT33,PMT34,PMT35
	Outage PMT		PMT29, PMT30, PMT31,PMT33,PMT34,PMT35	

	PROCEDURE		Outage PMT	TIME	
				Scheduled	Result
1	O'Romis P/S MCB	Operation		7:30	
2	O'Moleng P/S MCB	Operation		7:30	
3	Diesel P/S MCB	Stop Operation		8:00	
4	LBS 2	Open for reducing load			
5	PMT-16	Off for reducing load			
	Note)				
	Result of outage period		Total:		
	Consumed total system load must be less 300kW supplied from O'Romis and O'Moleng hydropower stations.				

Summary Report for Periodic Inspection (3rd)

on

Project for Operation and Maintenance of the Rural Electrification on Micro-hydropower in Mondul Kiri

September, 2010

JICA Study Team

Electric Power Development Co., Ltd. (J-Power) and
Chugoku Electric Power Co., Inc.(Energia)

1. Introduction

We would like to report you that the Periodic Inspection (3rd) for Hydropower stations (O'Moleng and O'Romis) was carried out on June 2 to June 8, 2010 by the staff of EOM (Electricity of Mondul Kiri) under the supervising of Japanese engineer (Tanaka Suiryoku). And Diesel power station was also carried out on August 3 to 9, 2010 by the staff of EOM under the supervising of Japanese engineers from Daihatsu. The inspection of Diesel power station was postponed in August 2010 due to the drought in the river condition and the difficulty of DG stopping. The summary report of the inspection is described as follows.

2. Activities of the Schedule

2.1 Inspection of Hydropower station

1) Pre meeting for inspection: 2010/06/02
2) Periodic inspection for O'Moleng P.S : 2010/06/04 to 2010/06/05
3) Periodic inspection for O'Romis P.S : 2010/06/02 to 2010/06/03
4) Post meeting for inspection : 2010/06/07

2.2 Inspection of Diesel power station

1) Pre meeting for inspection: 2010/08/03
2) Periodic inspection for Diesel P.S : 2010/08/03 to 2010/08/09
3) Post meeting for inspection : 2010/08/09

2.3 On-the-job training for EOM staff

1) On-the-job training for Hydropower station : 2010/06/02 to 2010/06/05
2) On-the-job training for Manual in Hydropower: 2010/06/06 to 2010/06/07
3) On-the-job training for diesel power staff: 2010/08/07 to 2010/08/09
4) On-the-job training for Manual in Diesel engine: 2010/08/08 to 2010/08/09

3. The summary of the inspection results

3.1 Hydropower station for O'Moleng and O'Romis

Check results : Good

1) Turbine/Generator appearance inspection and cleaning
2) Inlet valve appearance inspection and cleaning
3) Speed changer appearance inspection and cleaning
4) G/V servomotor appearance inspection and stroke adjustment
5) Generator panel appearance inspection and cleaning
6) Bearing inspection and cleaning

The detailed inspection results should be referred "Inspection Report of Hydropower Station" as attached.

3.2 Results for Diesel power station

Check results : Good

1) Check and clean for Fuel oil filters and Lubricating oil filters
2) Check the Cam room and Crank room
3) Check and clean the Air compressor.
4) Check the Auxiliary equipment
5) Top haul maintenance for Cylinder head
6) Maintenance for Fuel oil nozzle tips
7) Check the Lubricating oil for Engine, Generator and Air compressor
8) Check and clean the A.C Generator inside

Replaced parts list over 4,000 hours running is attached in Table-1, and Table-2 is shown for Consumable parts & Tools for overhaul work, and Table-3 is shown the results of fuel nozzle test, respectively. The detailed "Inspection Report of Diesel Power Station" is attached.

4. Training for EOM Staff and Operators

4.1 Hydropower generating facilities

On the Job Training was carried out by the Japanese supervisor (Tanaka Suiryoku) and JICA Project team as follows.

1) Turbine/generator outside inspection and cleaning
2) Disassembly inspection of dummy load heater unit and cleaning
3) Inspection of inlet valve, servomotor and speed changer unit
4) Inspection of control panel and cleaning
5) Confirmation of operation method
6) Explanation of sequence control and diagram

4.2 O&M Manual in Hydropower

On the job Training for manual was also carried out by the Japanese supervisor (Tanaka Suiryoku/ Mr. Iwahana) and JICA study team on the desk and using power point as follows.

Lecture of Sequence numbers for block diagram and connection diagrams,

1) Lecture of symbols, parts name and function for block diagram and connection diagrams,

2) Lecture of connection diagram and protection relays and circuit

4.3 Diesel power generating facilities

On the Job Training was carried out by the Japanese supervisor (Daihatsu diesel/ Mr. Bono) and JICA study team as follows.

1) For assembly and disassembly in accordance with Instruction manual of Air compressor (Hasegawa Iron Works Co.)
2) Adjustment of Valve clearance
3) Fuel Nozzle Test

   Nozzle test using by special tools and pressure test pump were carried out.

   A way of judgment for testing nozzle was instructed to operators.
4) Daily operation and maintenance.

   In accordance with [O&M Manual for Diesel Engine] , following items were instructed to operators.
5) Assembly and disassembly method for turbine covers, inspection cover
   (1) Lecture of trouble shooting
   (2) Lecture of Sequence diagram and drawings
   (3) Lecture of cleaning for fuel and lub. oil filters

Observation: The result was good in order.

1) EOM staff carried out the OJT together with supervisor according to all training items.
2) Inspection method for electrical portion (other than mechanical portion) has been transferred and data collection by EOM staff during periodic inspection.
3) Lecture for electrical portion like soft ware engineering such as reading connection diagram and block diagram for sequence was carried out, the JICA study team expects to continue further study and understanding it.
4) EOM could not provide the budget and consumable goods for inspection, after transferring the EUMP to EDC, because it is so complicated the procedure and application of the budget after transferring EDC organization. JICA study team has led EOM staff to discuss with EDC head office, and provide the budget for next inspection.
5) Spare lubricating oil for replacement has been procured from EDC head office before inspection starting in accordance with the oil list.
6) EOM provided a scheduled stoppage plan of the power system for customers due to the shortage of supplied power from hydropower stations in dry season.

5. Comments on the O & M management

1) The 3 power stations, EOM have been contributed to supply the power continuously into Mondul Kiri power system in normal conditions since 2008.Otober 21.
2) Since the running hours were; O'Moleng 10,186 hours, O'Romis 11,631 hours in June 2nd , 2010, and Diesel 6,600 hours in 3rd August 2010, respectively from initial operation on October 21, 2008. It means that continuous operation of the power station would be stressed to the rotating machines and will be required timely inspection for maintenances.
3) As a result of inspection, there is no problem with any defect or malfunction such as machine trouble or electrical failure, so on.
4) It is good managed that the spare parts have been registered with Inventory book by the EOM staff, and they have trained to procure the spare parts from original manufacturer during 3rd Periodic inspection.
5) The plan of periodic inspection, EOM staff has made Work plan for periodic inspection in accordance with O&M manual as attached papers (Form-1, 3, 4, and 5).
   EOM staff has to make a plan of next periodic inspection and submit it to EDC head office to procure the spare parts and consumable parts as well as stoppage schedule for approval.
6) The next periodic inspection will be planned in December for O'Moleng, O'Romis Hydropower stations, and Diesel power stations will carry out in November 2010 after 8,000 running hours. That inspection will be a final inspection in consultation with JICA study team.

Attachment:

1) Photo of inspection and OJT
2) Inspection report for Hydropower & Diesel generating facility
3) Work Plan for periodic inspection
4) Reference data

-End-

Periodic Inspection (3rd) of O'Romis Hydropower Station, June 2 to 3, 2010

Drought condition at O'Romis Hydropower station (Head Tank)

Adjustment of Servo-motor stroke for Guide-vane

Inside inspection of Speed changer gear

Inspection and cleaning of Generator inside

Disassembly inspection of Dummy load

Cleaning of Dummy load

Inspection of Panel inside (Switches, meters and parts)

Trial operation after inspection of plant

Periodic Inspection (3rd) of O'Moleng Hydropower Station, June 4 to 5, 2010

Drought condition at O'Moleng Hydropower station

Adjustment of Servo-motor stroke for Guide-vane

Grease up for turbine bearings

Inside inspection and cleaning of generator

Disassembly inspection of Dummy load

Cleaning of Dummy load

Assembly of Dummy load after cleaning

Measuring Insulation resistance of Generator

Measuring Insulation resistance of dummy load

Inspection of cables connection and terminals at Control panels

Trial Operation after Inspection

OJT for protection relays and manual on the control panel at O'Moleng.

OJT for Electrical theory and manual inside control panel at O'Moleng.

Lecture of Electrical theory and manual for sequence diagrams (using project supplied material and tools)

Periodic Inspection (3rd) of Dieselpower Station, August 3 to 9, 2010

Administration and Diesel Generating Facility Buildings

Disassembly of Engine Head and cover

Inspection of inside Engine Room and Crank shaft

Disassembly of Engine head

Assembly of Engine head

Cleaning of Engine parts

Cleaning of Engine Lubricating oil filter

Inspection of inside Generator and cleaning

Trial Operation after Inspection

On-the-job Training for recording of Engine data

Meeting after DG Periodic Inspection

A-4-46

Summary Report for Periodic Inspection (4th)

on

Project for Operation and Maintenance

of the Rural Electrification on

Micro-hydropower in Mondul Kiri

November, 2010

JICA Study Team

Electric Power Development Co., Ltd. (J-Power) and
Chugoku Electric Power Co., Inc.(Energia)

1. Introduction

We would like to report you that the Periodic Inspection (4^{th}) for Hydropower stations (O'Moleng and O'Romis) was carried out on November 13 to 19, 2010 by the staff of EOM (Electricity of Mondul Kiri) under the supervising of Japanese engineer (Tanaka Suiryoku). And Diesel power station was also carried out on November 3 to 9, 2010 by the staff of EOM under the supervising of Japanese engineers from Daihatsu. The summary report of the inspection is described as follows.

2. Activities of the Schedule

2.1 Inspection of Hydropower station

1) Pre meeting for inspection: 2010/11/13
2) Periodic inspection for O'Moleng P.S : 2010/11/15 to 2010/11/16
3) Periodic inspection for O'Romis P.S : 2010/11/13 to 2010/11/14
4) Post meeting for inspection : 2010/11/19

2.2 Inspection of Diesel power station

1) Pre meeting for inspection: 2010/11/03
2) Periodic inspection for Diesel P.S : 2010/11/03 to 2010/11/08
3) Post meeting for inspection : 2010/11/09

2.3 On-the-job training for EOM staff

1) On-the-job training for Hydropower station: 2010/11/13 to 2010/11/16
2) On-the-job training for Manual in Hydropower: 2010/11/18
3) On-the-job training for diesel power staff: 2010/11/03 to 2010/11/08
4) On-the-job training for Manual in Diesel engine: 2010/11/08 to 2010/11/09

3. The summary of the inspection results

3.1 Hydropower station for O'Moleng and O'Romis

Check results: Good in operation

1) Turbine/Generator appearance inspection and cleaning
2) Disassembly and inside inspection of turbine runner
3) Turbine ground packing change (2 pieces)
4) Bearing grease change and cleaning (both side of turbine)
5) Inlet valve appearance inspection and cleaning
6) Speed changer appearance inspection and cleaning
7) G/V servomotor and stroke appearance inspection
8) Generator panel appearance inspection and cleaning

9) Bearing grease up with 100 times for generator (both side of generator)

The detailed inspection results should be referred "Inspection Report of Hydropower Station by Tanaka Hydro" as attached.

(1) Photo of hydropower station

(2) Inspection records at O'Romis and O'Moleng

(3) Measurement of gaps on turbine shaft at O'Romis and O'Moleng

(4) Meter check records at O'Romis and O'Moleng

3.2 Results for Diesel power station

Check results: Good in operation

(1) Check and clean for all (four (4) kinds) of fuel oil filters

(2) Check and clean for all (four (4) kinds) of lubrication oil filters

Replaced one casing packing (Teflon) due to leakage

(3) Check and cleaning of Air starting valve due to rust of inside

(4) Check the Cam room and Crank room

(5) Fuel nozzle injection testing, and also cleaning of pressure tester due to rust

(6) Change of lubricating oil for engine and rocker arm (280 litters)

(7) Check of crank-shaft deflection

(8) Inspection and cleaning of generator

(9) Inspection of auxiliary equipment

Cleaning and test run for radiator, C.W pump, F.O transfer pump, F.O unloading pump, F.O drain pump, but pit drain pump was disassembled due to malfunction with wasted materials and many rubbish.

(10) Disassembly inspection of turbo-charger

Replaced three (3) kind of seal rings

(11) Overhaul work for diesel engine

Replaced all of valve stem seals, also replaced all of piston rings and oil rings due to reach to life span.

(12) Replaced cooling water (J.W line 100 litters and Cooler water line 400 litters)

The detailed inspection results should be referred "Inspection Report of Diesel Power Station by Daihatsu Mfg." as attached. Refer to tables as follows.

Photos for overhaul work

Table-1: Work schedule

Table-2: Test results for fuel nozzle tip

Table-3: Measurement record of piston rings and cylinder liners

Table-4: Measurement record of crank-shaft deflection

Table-5: Record of test running

Table-6: Requirement of Supervisor engineer and parts procurement procedure

Table-7: Replaced parts and consumable parts for overhaul work

Maintenance schedule for diesel engine

4. Training for EOM Staff and Operators

4.1 Hydropower generating facilities

On the Job Training was carried out by the Japanese supervisor (Tanaka Suiryoku) and JICA Project team as follows.

Disassembly of turbine outside/inside inspection and cleaning

1) Disassembly inspection of dummy load heater unit
2) Inspection of inlet valve, servomotor and speed changer unit
3) Inspection of generator & control panel and cleaning
4) Confirmation of operation method
6) Explanation of sequence control and diagram

4.2 O&M Manual in Hydropower

On the job Training for manual was also carried out by the JICA study team on the desk and using power point as follows.

Lecture of Sequence numbers for block diagram and connection diagrams,

1) Lecture of symbols, parts name and function for block diagram and connection diagrams,
2) Lecture of connection diagram and protection relays and circuit

4.3 Diesel power generating facilities

On the Job Training was carried out by the Japanese supervisor (Daihatsu diesel/ Mr. Bono) and JICA study team as follows.

1) For assembly and disassembly of overhaul work in accordance with Instruction manual and actual overhaul works
2) Adjustment of Valve clearance
3) Fuel nozzle test

Nozzle test using by special tools and pressure test pump were carried out.

A way of judgment for testing nozzle was instructed to operators.

4) Cooling water control and rust inhibitor

5) Measurement of maximum pressure for engine

6) Daily operation and maintenance.

In accordance with [O&M Manual for Diesel Engine] , following items were instructed to operators.

(1) Lecture of trouble shooting

(2) Lecture of Sequence diagram and drawings

(3) Lecture of cleaning for fuel and lub. oil filters

(4) Lecture of procurement of spare parts

The commercial staff of spare parts agent (from Singapore was dispatched to the site and explained how to proceeding the parts procurement and supervisor for overhaul work.

Agent name: DAIKAI Engineering Pte Ltd. Mr. Rodny Tan

NO. 128 Pioneer Road Singapore 639586

E-mail: rodtan@daikai.com

Tel. +65 6863 2856 Fax. +65 6863 2876

5. Observation

As a result of inspection, there is no problem both hydro and diesel power stations with any defect or malfunction such as machine trouble or electrical failure, so on.

1) The 3 power stations, EOM have been contributed to supply the power continuously into Mondul Kiri power system in normal conditions since 2008.Otober 21 up to now.
2) Since the running hours were; O'Moleng 12,914 hours, O'Romis 14,439 hours and Diesel 7,156 hours in November 15th , 2010, respectively from initial operation.
3) EOM staff carried out the OJT together with supervisor according to all training items.
4) Inspection method for mechanical & electrical equipment has been transferred and data collection by EOM staff during periodic inspection. However, the staff of EOM shall study the O&M manual and final drawings/document for the future.
5) Lecture for electrical portion like soft ware engineering such as reading connection diagram and block diagram for sequence was carried out, the JICA study team expects to continue further study and understanding it.
6) EOM provided the budget and consumable goods for inspection work in accordance with the list of last periodic inspection. However, EOM/EDC shall quickly progress the procurement of overhaul parts for diesel engine, because it will take a month at least from new order.
7) Spare lubricating oil for replacement has been procured from EDC head office before

inspection starting in accordance with the oil list.

8) EOM provided a scheduled stoppage plan of the power system for customers due to the shortage of supplied power from hydropower stations in dry season.

Also, EOM staff has announced the outage plan to the all customers in Senmonorom city.

6. Comments on the O & M management

1) EOM staff has a good management for the spare parts registered with Inventory book, but using spare parts such as periodic inspection with overhaul work, shall procure and record into the inventory book for next inspection.

So, EOM staff has to make a plan of next periodic inspection and submit it to EDC head office to procure the spare parts and consumable parts as well as stoppage schedule for approval.

2) The plan of periodic inspection, EOM staff has made Work plan and outage plan for periodic inspection in accordance with O&M manual (Form-1, 3, 4, and 5).

3) The next periodic inspection shall be carried out

(1) As for hydropower station, the periodic inspection shall be planned once a year, however small inspection has to check a weekly and monthly in accordance with O&M Manual.

Inspection Item	Interval	Kind of Inspection
Weekly inspection	Every 2 weeks	Patrol and cleaning, etc.
Monthly inspection	Every 3 months	Visual inspection and grease up for generator bearing every 6 month, etc.
Periodic inspection	Once a year	1) Turbine disassembly and inside inspection 2) Change of turbine bearing grease every year. 3) Check lub. oil for speed changer every year, but if oil dirty, to change lub. oil. Normally, lub. oil shall be changed every 2 years. 4) Cleaning dummy load 5) Check of control panels

(2) As for Diesel power stations, the periodic inspection shall be carried out in accordance with running hours in the following table, and interval of filters cleaning/change shall be every 2,000 hours running of diesel engine.

Interval	Running Hours (h)	Kind of Inspection	Kind of Inspection
1st Inspection	4,000-5,000	Top haul work	Check F.O nozzles and cleaning, etc. Change of water J.W line: 100l And to fill rust inhibitor: 4ml/litter = 400ml
2nd Inspection	8,000-10,000	Overhaul work	Check piston/cylinder and cleaning, change lub. Oil and cooling water, etc. Change of water J.W line: 100l And to fill rust inhibitor: 4ml/litter = 400ml Change of Cooler water line: 400l and to fill rust inhibitor: 2ml/litter = 800ml
3rd Inspection	12,000-14,000	Top haul work	Same as 1st Inspection
4th Inspection	16,000-18,000	Overhaul work	Same as 2nd Inspection

4) This is a point and normal way for the periodic inspection in Japan that EOM/EDC shall arrange the supervisor from agent or original manufacture in order to overhaul work both hydro and diesel power stations, respectively. EOM/EDC must provide the budget for the supervisor fee in the yearly financial plan, 2011 in accordance with Chapter 3 Long & Medium Term Plan, Volume I in the O&M Manual.

Even if, EOM/EDC staff is able to carry out for small inspection such as weekly, monthly check without supervisor, but when overhaul work it is necessary to arrange the supervisor to prevent the trouble or damage of equipment during the work and in the future.

Attachment:

1) Photo of inspection and OJT

2) 4th Inspection report for Hydropower & Diesel generating facility

3) Work Plan for periodic inspection

-End-

Photo of 4th Periodic Inspection (November 3 to 19, 2010, at EOM/EDC)
O'Romis Hydropower Station (Date: 13/11/2010)

1.Disassembly work of turbine cover and

2. Cleaning of turbine bearings

3. Speed changer gear

4. Used ground packing

5. Cleaning of generator inside

6. Cleaning of flywheel cover

O'Moleng Hydropower Station (Date: 15 - 16/11/2010)

1. Disassembly work of turbine cover

2. Bending portions on runner vanes

3. Grease change for turbine bearings

4. Used turbine ground packing

5. Cleaning of speed changer

6. Inspection inside of speed gear

7. Change lub. oil for speed gear

8.Inside of generator (dirty condition)

7. Dummy load unit

8. Trial operation after inspection

Diesel Power Station (Date: 3 - 9/11/2010)

1. Preparation of spare parts

2. Disassembly of engine head cover

3. Disassembled engine parts

4. Disassembly of piston

5. Disassembled pistons

6. Disassembled connecting rods

7. Insertion of pistons

8. Assembled diesel engine

9. Inspection of cooler unit

10. Cleaning of oil filters

11. Trial operation after overhaul work

12. Post meeting of overhaul work

13. Training for inspection procedure/manual

14. On-the-job training

Third (3rd) Evaluation **Summary of Self-Evaluation for Hydro & Diesel Power Station, Mondul Kiri Electricity, EDC**

Date: 2011/2/17	Name	Y. Soyen		Eng Rithy		Um Monichetra		C. Kosal				Average		Corresp. A to E	Evaluated by JICA
Tasks (O'Moleng)	Position in charge	Section chief, O'R		Group Leader		Operator		Operator							
Check 1 : Plan		1st	3rd	1st	3rd	1st	3rd	1st	3rd			1st	3rd	3rd	3rd
Planning avility for Hydro/DG P.S	①M & L term plan	60	100	60	100	60	100	60	100			60	100	A	A
(Task Code : TM2, TR2 & TD2)	②Periodic inspection plan	60	100	80	100	80	100	80	100			75	100	A	A
	③Peplacement & repire plan	60	100	60	100	60	100	60	100			60	100	A	A
Check 2: Operation															
Operation avility for Hydro/DG P.S	①Start/paralle-in/load/stop	100	100	80	100	100	100	100	100			95	100	A	A
(Code TM3, Tr3 & TD3)	②Emergence or quick stop	100	100	60	100	100	100	100	100			90	100	A	A
	③Balance operation of water level	100	100	40	100	100	100	100	100			85	100	A	A
Check 3 : Maintenance															
Maintenance avility for Hydro P.S	①Daily, weekly, monthly inspections	100	100	100	100	100	100	100	100			100	100	A	A
(Task Code : TM3, TR3 & TD4)	②Periodic detailed inspection	100	100	100	100	100	100	100	100			100	100	A	A
	③Management of tools & equipment	100	100	100	100	100	100	100	100			100	100	A	A
	④Management of spare parts	100	100	100	100	100	100	100	100			100	100	A	A
Check 4 : Trouble Shooting															
Counter measuring availability for Hydro/DG P.S	①Recovery of light faults	100	100	100	100	100	100	100	100			100	100	A	A
(Task Code : TM3, TR3 & TD4)	②Recovery of heavy faults	40	100	60	100	60	100	60	100			55	100	A	A
	③Recovery of power system turbulence	40	100	60	100	100	100	100	100			75	100	A	A
Check 5 : Data Management														A	A
Availability of Data recording and analysis for Hydro/DG P.S	① Daily, monthly and yearly operation records inspection records	100	100	80	100	100	100	100	100			95	100	A	A
(Task Code : TM2, TR2 & TD2)	②Daily, monthly and yearly inspection records	100	100	60	100	100	100	100	100			90	100	A	A
	③Event and faults records	100	100	60	100	100	100	100	100			90	100	A	A
Check 6 : Understanding of Drawings, sequence and															
Availability of understanding for Hydro/DG P.S	①Drawings of equipment and station	20	100	20	100	40	100	60	100			35	100	A	A
(Task Code : TM3, TR3 & TD4)	②Sequence diagram	20	40	20	40	40	60	60	40			35	45	C-D	C
	③O & M manual	20	100	20	100	40	100	60	100			35	100	A	A
	Average	75	97	66	97	83	98	86	97			78	97	A-C	A-B

Legend: A 100%, B 80%, C 60%, D 40%, E 20%

Third (3rd) Evaluation **Summary of Self-Evaluation for Hydro & Diesel Power Station, Mondul Kiri Electricity, EDC**

Date: 2011/2/17	Name			H. Sokhorn		Sin Simeng		S. Soranda		T. Phally		Average		Corresp. A to E	Evaluated by JICA
Tasks (O'Romis)	Position in charge			Section chief, O'R		Group Leader		Operator		Operator					
Check 1 : Plan		1st	3rd	1st	3rd	1st	3rd	1st	3rd	1st	3rd	1st	3rd	3rd	3rd
Planning avility for Hydro/DG P.S	①M & L term plan			60	100	60	100	60	60	60	100	60	90	A	A
(Task Code : TM2, TR2 & TD2)	②Periodic inspection plan			60	100	80	100	80	100	80	100	70	100	A	A
	③Peplacement & repire plan			60	80	60	100	80	100	40	100	65	90	A	A
Check 2: Operation															
Operation avility for Hydro/DG P.S	①Start/paralle-in/load/stop			100	100	100	100	100	100	40	100	100	100	A	A
(Code TM3, Tr3 & TD3)	②Emergence or quick stop			100	100	100	100	100	100	60	100	100	100	A	A
	③Balance operation of water level			100	100	100	100	100	100	100	100	100	100	A	A
Check 3 : Maintenance															
Maintenance avility for Hydro P.S	①Daily, weekly, monthly inspections			100	100	100	100	100	100	100	100	100	100	A	A
(Task Code : TM3, TR3 & TD4)	②Periodic detailed inspection			100	100	80	100	100	100	60	100	95	100	A	A
	③Management of tools & equipment			80	100	80	100	80	100	60	100	80	100	A	A
	④Management of spare parts			80	100	80	100	100	100	40	100	85	100	A	A
Check 4 : Trouble Shooting															
Counter measuring availability for Hydro/DG P.S	①Recovery of light faults			80	100	80	100	80	100	100	100	80	100	A	A
(Task Code : TM3, TR3 & TD4)	②Recovery of heavy faults			60	100	60	100	60	100	40	100	60	100	A	A
	③Recovery of power system turbulence			60	100	60	100	80	100	20	100	65	100	A	A
Check 5 : Data Management															
Availability of Data recording and analysis for Hydro/DG P.S	① Daily, monthly and yearly operation records inspection records			100	100	100	100	100	100	100	100	100	100	A	A
(Task Code : TM2, TR2 & TD2)	②Daily, monthly and yearly inspection records			100	100	100	100	100	100	60	100	100	100	A	A
	③Event and faults records			100	100	100	100	100	100	20	100	100	100	A	A
Check 6 : Understanding of Drawings, sequence and															
Availability of understanding for Hydro/DG P.S	①Drawings of equipment and station			60	80	40	80	20	100	40	60	45	85	A	A
(Task Code : TM3, TR3 & TD4)	②Sequence diagram			40	80	40	80	40	40	20	60	40	70	B	B
	③O & M manual			40	80	20	80	40	100	100	60	35	85	A	A
	Average			78	96	76	97	80	95	60	94	78	96	A-B	A-B

Legend: A 100%, B 80%, C 60%, D 40%, E 20%

Third (3rd) Evaluation **Summary of Self-Evaluation for Hydro & Diesel Power Station, Mondul Kiri Electricity, EDC**

Date: 2011/2/17	Name	T. Setha		Yeb Thav		Nol Nin		Eng Tola		Hang Vuthy		Average		Corresp. A to E	Evaluated by JICA
Tasks (Diesel)	Position in charge	Section Manager		Section Chief, DG		Group Leader		Operator		Operator					
Check 1 : Plan		1st	3rd	1st	3rd	1st	3rd	1st	3rd	1st	3rd	1st	3rd	3rd	3rd
Planning avility for Hydro/DG P.S	①M & L term plan	60	80	60	100	20	80	20	80	20	100	36	88	A	A
(Task Code : TM2, TR2 & TD2)	②Periodic inspection plan	60	80	60	100	20	80	20	100	20	80	36	88	A	A
	③Peplacement & repire plan	100	80	100	100	20	100	20	100	20	80	52	92	A	A
Check 2: Operation															
Operation avility for Hydro/DG P.S	①Start/paralle-in/load/stop	100	100	100	100	80	100	80	100	80	100	88	100	A	A
(Code TM3, Tr3 & TD3)	②Emergence or quick stop	100	100	100	100	60	100	20	100	60	100	68	100	A	A
	③Balance operation of water level	Not Required													
Check 3 : Maintenance															
Maintenance avility for Hydro P.S	①Daily, weekly, monthly inspections	100	100	100	100	100	100	80	100	80	100	92	100	A	A
(Task Code : TM3, TR3 & TD4)	②Periodic detailed inspection	100	100	100	100	60	100	60	100	60	100	76	100	A	A
	③Management of tools & equipment	100	100	100	100	80	100	40	100	80	100	80	100	A	A
	④Management of spare parts	100	100	40	100	40	100	20	100	20	100	44	100	A	A
Check 4 : Trouble Shooting															
Counter measuring availability for Hydro/DG P.S	①Recovery of light faults	100	100	100	100	80	100	60	100	60	100	80	100	A	A
(Task Code : TM3, TR3 & TD4)	②Recovery of heavy faults	60	100	60	100	20	80	20	100	20	100	36	96	A	A
	③Recovery of power system turbulence	100	100	100	100	60	40	20	100	20	100	60	88	A	A
Check 5 : Data Management															
Availability of Data recording and analysis for Hydro/DG P.S	① Daily, monthly and yearly operation records inspection records	100	100	100	100	100	100	80	100	80	100	92	100	A	A
(Task Code : TM2, TR2 & TD2)	②Daily, monthly and yearly inspection records	100	100	100	100	80	100	80	100	20	100	76	100	A	A
	③Event and faults records	100	100	100	100	60	100	60	100	60	100	76	100	A	A
Check 6 : Understanding of Drawings, sequence and															
Availability of understanding for Hydro/DG P.S	①Drawings of equipment and station	60	100	20	100	20	100	20	100	20	100	28	100	A	A
(Task Code : TM3, TR3 & TD4)	②Sequence diagram	60	100	20	60	20	40	20	40	20	40	28	56	C-D	C
	③O & M manual	60	100	20	100	20	100	20	100	20	100	28	100	A	A
	Average	82	92	73	93	49	85	39	91	40	89	57	90	A-C	A-B

Legend: A 100%, B 80%, C 60%, D 40%, E 20%

Annex -3 Format of Action Plan

Project Name	Division Name
Project for Operation and Maintenance of the Rural Electrification on Micro-hydropower in Mondul Kiri	i Technical Division

1st Interview for setting Action Plan	2nd Interview for Interim	3rd Interview for Final
Date: 14/16-06-2010	Date: 6-10-2010	Date: 17-1-2011
Sign:	Sign:	Sign:

○ **Summary of Action Plan and Improvement**

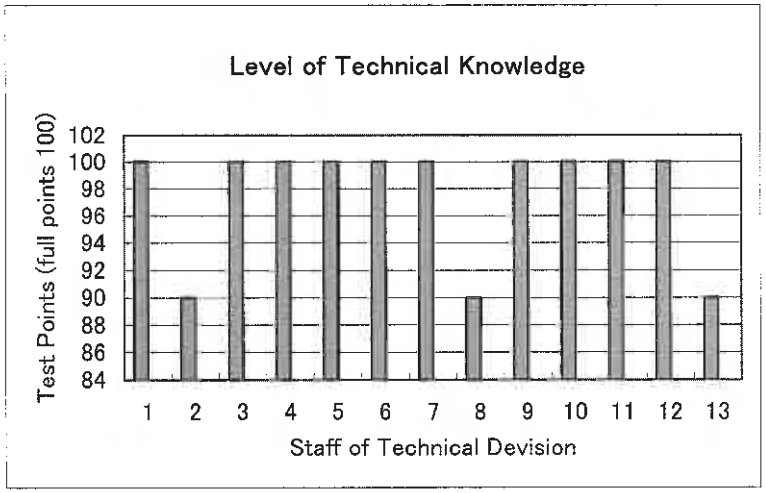
C/P						JICA Advisor Team	
Name of Power Station	Achievement Level: Current Level	Achievement Level: Target Level	Measures	Interim Result	Final Result	Rating	Evaluation
1. O'Moleng Hydropower	Level: B-C (average 78%)	**Tasks What?** Understanding of electrical theory and sequence diagram **By When?** 31-1-2011	**How to do?** - To study the symbols and numbers of sequence - To study of wiring diagram - To study of sequence diagram	**How's progressing?** - To have an examination for level check for all staff - The results was Improved. The test point was 98 in average.	**Resulted?** - Reaching the action plan to be satisfactory: - To understand the sequence diagram, symbols, numbers and wiring diagram	A B C D E	➢ After their efforts, they can read a sequence and wiring diagram ➢ They understood how to apply its now-how and knowledge in the electrical theory and fault analysis.
2. O'Romis Hydropower	Level: B-C (average 76%)	**Tasks What?** Understanding of electrical theory and sequence diagram **By When?** 31-1-2011	**How to do?** - To study the symbols and numbers of sequence - To study of wiring diagram - To study of sequence diagram	**How's progressing?** - To have an examination for level check for all staff - The results was Improved. The test point was 98 in average.	**Resulted?** - Reaching the action plan to be satisfactory: - To understand the sequence diagram, symbols, numbers and wiring diagram	A B C D E	➢ After their efforts, they can read a sequence and wiring diagram ➢ They understood how to apply its now-how and knowledge in the electrical theory and fault analysis.
3. Diesel Power	Level: C-D (average 52%)	**Tasks What?** Understanding of electrical theory and sequence diagram **By When?** 31-1-2011	**How to do?** - To study the symbols and numbers of sequence - To study of wiring diagram - To study of sequence diagram	**How's progressing?** - To have an examination for level check for all staff - The results was Improved. The test point was 98 in average.	**Resulted?** - Reaching the action plan to be satisfactory: - To understand the sequence diagram, symbols, numbers and wiring diagram	A B C D E	➢ After their efforts, they can read a sequence and wiring diagram ➢ They understood how to apply its now-how and knowledge in the electrical theory and fault analysis.

Action Plan for Mondul Kiri O&M Technical Support

Results of Examination for EOM Staff (Diesel, Hydropower Stations)

2010.10.06

			Points		
	Staff	Total Points	Q1	Q2	Q3
O'M Hydro	1	100	25	50	25
	2	90	25	50	15
	3	100	25	50	25
	4	100	25	50	25
O'R Hydro	5	100	25	50	25
	6	100	25	50	25
	7	100	25	50	25
	8	90	25	40	25
D.G	9	100	25	50	25
	10	100	25	50	25
	11	100	25	50	25
	12	100	25	50	25
T.D	13	90	25	50	15
	Total	1270	325	640	305
	Average	98	25	49	23



Action Plan for Mondul Kiri Electrification Project, EOM/EDC

(Examination for Electrical Section) Date: 2010.10.06

You may answer appropriated thought in the following questions.
Please fill in or select your answers into the items

Total points [ ]

Name ( )

Division ( )

The following is "Technical Term for electrical engineering practice", please answer it.

1) Please select in "SI units" for electrical terms as follows; SI units: International System of units

Points: 25

1	Power (P)	2
2	Current (I)	5
3	Voltage (V)	1
4	Resistance (R)	3
5	Frequency (F)	6

(1) Volt (V) (2) Watt (W) (3) Ohm (Ω)
(4) $\sqrt{3}$ (5) Ampere (A) (6) Hertz (Hz)

2) How many do you know the "Sequence Numbers" as follows;

Points: 50

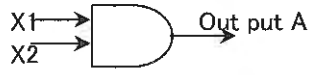
1	Pressure switch or relay	10
2	Field circuit breaker switch or relay	3
3	Incomplete sequence relay	4
4	Voltage relay	8
5	Lock out relay	9
6	Device or relay for master control	1
7	Over speed switch or relay	2
8	A.C Under voltage relay	5
9	A.C Over current relay	6
10	A.C Over voltage relay	7

(1) 4 (2) 12 (3) 41 (4) 48 (5) 27
(6) 51 (7) 59 (8) 84 (9) 86 (10) 63

3) Please identify and fill in "Electrical Circuit Symbol"

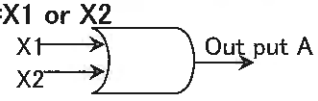
Points: 25

1 A=X1 + X2



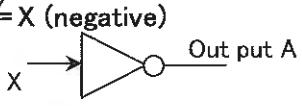
[4]

2 A=X1 or X2



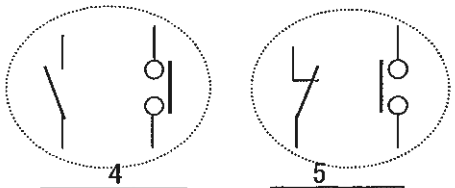
[5]

3 A ≠ X (negative)



[3]

a or b-contact ?



4 [1] 5 [2]

(1) a-contact (2) b-contact (3) NOT (4) AND (5) OR

ផែនការសកម្មភាពសំរាប់តំរោងអគ្គិសនីភាវូបនីយកម្ម ខេត្តមណ្ឌលគីរី. EOM/EDC

(វិញ្ញាសារប្រលងសំរាប់ផ្នែក គ្រឿងម៉ាស៊ីនអគ្គិសនី) កាលបរិច្ឆេទ 2010. 10. 6

អ្នកអាចឆ្លើយនូវគំនិតសមស្រប នៅក្នុងសំនួរជាលំដាប់លំដោយខាងក្រោម:

សូមធ្វើការបំពេញ ឬ ជ្រើសរើសយកចំលើយរបស់អ្នកដាក់ចូលក្នុងប្រអប់នៃចំនុចនិមួយៗ

ពិន្ទុសរុប:	

ឈ្មោះ: ( )

ផ្នែក: ( )

តើអ្នកដឹងទេថា ល័ក្ខខ័ណ្ឌវិស្វកម្មបច្ចេកទេសរបស់ផ្នែកគ្រឿងម៉ាស៊ីនអគ្គិសនី មានប្រភេទអ្វីខ្លះ?

1) សូមធ្វើការជ្រើសរើសក្នុងក្រុមនៃ mks របស់ល័ក្ខខ័ណ្ឌគ្រឿងអគ្គិសនីដូចខាងក្រោម: (mks: នាឡិការវាស់-គីឡូក្រាម-វិនាទី)

1	ថាមពល (P)		ពិន្ទុ:
2	ចរន្ត (I)		
3	តង់ស្យុង (V)		
4	រេស៊ីស្តង់ (R)		
5	ប្រេកង់ (F)		

(1) វ៉ុល (V) (2) វ៉ាត់ (W) (3) អូម(Ω)

(4) √3 (5) អំពែរ (A) (6) Hertz (Hz)

2) តើអ្នកស្គាល់ចំនួនលេខនៃនិមិត្តសញ្ញាតាមលំដាប់ដែលមានដូចខាងក្រោមបានប៉ុន្មានដែរ?

ពិន្ទុ:

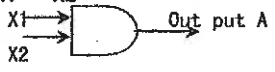
1	Pressure switch or relay ( )	
2	Field circuit breaker switch or relay ( )	
3	Incomplete sequence relay ( )	
4	Voltage relay ( )	
5	Lock out relay ( )	
6	Device or relay for master control ( )	
7	Over speed switch or relay ( )	
8	A.C Under voltage relay ( )	
9	A.C Over current relay ( )	
10	A.C Over voltage relay ( )	

(1) 4 (2) 12 (3) 41 (4) 48 (5) 27

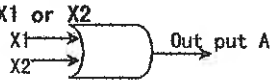
(6) 51 (7) 59 (8) 84 (9) 86 (10) 63

4) សូមបំពេញនិមិត្តសញ្ញាស្បៀគ្វីរបស់គ្រឿងម៉ាស៊ីនអគ្គិសនី ពិន្ទុ:

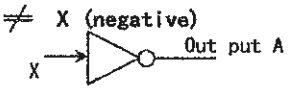
1 A=X1 + X2



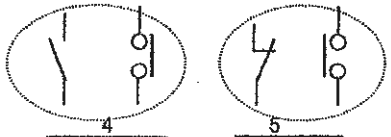
2 A=X1 or X2



3 A ≠ X (negative)



តើមួយណាជាកុងតាក់ a និង មួយណាជាកុងតាក់ b?



(1) a-កុងតាក់ (2) b-កុងតាក់ (3) NOT (4) AND (5) OR

Evaluation Plan for Abilities of EUMP

Power Generation

May 2010

JICA Advisor Team
Project for Operation and Maintenance
of the Rural Electrification on Micro-hydropower
in Mondul Kiri

1. Summary of Evaluation Plan for Power Generation Ability

(1) Term of Evaluation : From May 2010 until March 2011

(2) Evaluation Point of Time: 1st time May ～ June 2010
2nd time September ～ October 2010
3rd time February 2010(Final)

(3) Target Technical Personnel of EUMP

1) Manager class of technical section	2 persons
2) Staff of O' Romis hydropower station	5 persons
3) Staff of O' Moleng hydropower station	5 persons
4) Staff of Diesel power station	5persons

2. Evaluation Methodology

First Evaluation: June 2010

1) First Self-Evaluation by using Evaluation Sheet
Target person in charge conduct the first self-evaluation of items in Task Code by using "Evaluation Sheet". JICA advisor will give some suggestions.

2) Making out Action Plan
Based on the result of the first self-evaluation, target person in charge make out each action plan to improve the ability of O&M and submit it to JICA Advisory team.
JICA advisor will give some suggestions.

⇩

Second Evaluation: September 2010

3) Interim Self-Evaluation
Target person in charge conduct the second self-evaluation by using "Evaluation Sheet" and modify the action plan if needed.

⇩

Third Evaluation and: December 2010

4) Comprehensive Evaluation
Target person in charge conduct the third self-evaluation by using "Evaluation Sheet". And they submit it and the result of action plan to JICA advisory team.

5) Advise by JICA team
JICA advisor will give some suggestions to improve their ability though interview.

⇩

Comprehensive Evaluation: February 2011

6) Comprehensive Evaluation
JICA advisor conducts comprehensive evaluation by using the report and attitude during OJT.

How to Check the Ability

To check the ability is the five level rating system.

Rating:: (High) A—B—C—D—E (Low)

Each of them is

A: 100～80% ⇒ Completed the tasks of his work

B: 79～60% ⇒ Almost achieved his tasks required improvement of 1 or 2 items

C: 59～40% ⇒ Possible his tasks under the consultation with station leader

D: 39～20% ⇒ Possible his tasks under the consultation with technical section

E: 19%以下 ⇒ Required further OJT at present and future

The overall points of the above in average will be calculated, and the level of A and B will be achieved.

Result of Achievement Evaluation

Task Item and Cade	Detailed Task	1st Evaluation	2nd Evaluation	3rd Evaluation	Comprehensive Evaluation
1) Plan	① ② ③				
2) Operation	① ② ③				
3) Maintenance	① ② ③ ④				
4) Trouble Shooting	① ② ③				
5) Data Management	① ② ③				
6) Understanding of Drawings, Sequence and Documents	① ② ③				

Rating: : (High)　A－B－C－D－E　(Low)

Check 1 : Plan (Task Code : TM2, TR2 & TD2)

Planning availability for Hydro or DG power stations?

①Medium & Long term plan　②Periodic inspection plan　③Replacement & repair Plan

Check 2 : Operation (Task Code : TM3, TR3 & TD4)

Operating availability for Hydro or DG power stations?

①Start/parallel-in/load/stop　②Emergence or quick stop　③Balance operation of water level

Check 3 : Maintenance (Task Code : TM3, TR3 & TD4)

Maintaining availability for Hydro or DG power stations?

①Daily, weekly, monthly inspections　②Periodic detailed inspection　③Management of tools & equipment　④Management of spare parts

Check 4 : Trouble Shooting (Task Code : TM3, TR3 & TD4)

Counter measuring availability for Hydro or DG power stations?

①Recovery of light faults　②Recovery of heavy faults　③Recovery of power system turbulence

Check 5 : Data Management (Task Code : TM2, TR2 & TD2)

Availability of Data recording and analysis for Hydro or DG power stations?

①Daily, monthly and yearly operation records　②Daily, monthly and yearly inspection records

③Event and faults records

Check 6 : Understanding of Drawings, sequence and documents (Task Code : TM3, TR3 & TD4)

Availability of understanding for Hydro or DG power stations?

①Drawings of equipment and station　②Sequence diagram　③O & M manual

Annex -2 Format of Self-evaluation sheet

Division, Position _____

Name _____

Date, Place _____

Name of JICA Advisor _____

Task Item and Code Number	Number of Detailed Task	Grade of Evaluation	Reason or Comment	Check by JICA
1)	①	A B C D E		
	②	A B C D E		
2)	①	A B C D E		
	②	A B C D E		
3)	①	A B C D E		
	②	A B C D E		
	③	A B C D E		
	④	A B C D E		
	⑤	A B C D E		
4)	①	A B C D E		
	②	A B C D E		
	③	A B C D E		
	④	A B C D E		
5)	①	A B C D E		
	②	A B C D E		
	③	A B C D E		
	④	A B C D E		
	⑤	A B C D E		

Note: Number of detailed task shall be referred to with Evaluation sheet