国際協力事業団

タイ王国
首都圏配電公社

タイ王国

首都圏配電システム改善拡張計画調査

最終報告書

付　録

1995年11月

東 電 設 計 株 式 会 社
電 源 開 発 株 式 会 社

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LIST OF APPENDIX

APPENDIX

for

CHAPTER 3

107

183

183

377

255

695

615

555

200

DIMENSIONS ARE IN CENTIMETER

Appendix 3.3-1 69kV Double Circuit Tangent Structure

1
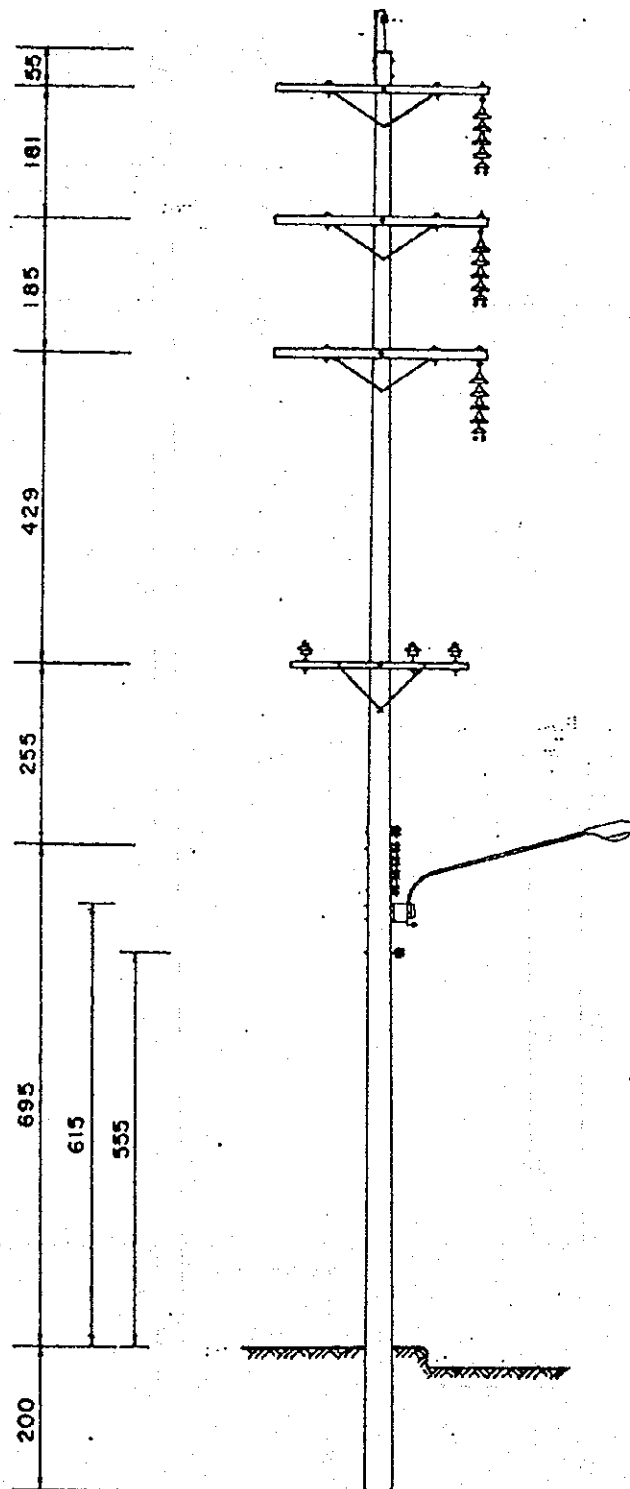
DIMENSIONS ARE IN CENTIMETER

Appendix 3.3-2 69kV Single Circuit 2-Bundled Conductor Tangent Structure

45

250

250

505

255

695

615

555

200

DIMENSIONS ARE IN CM.

Appendix 3.3-3 115kV Single Circuit Tangent Structure

DIMENSIONS ARE IN CM.

Appendix 3.3-4 115kV Single Circuit 2-Bundled Conductor Tangent Structure

50 | 250 | 70|70 | 250

380

305

305

1296

A   A

A   A

A   A

```
0-9B
```

50|70|70|50
50|70|70|50

```
0-5B
```

50 | 250 | 70 |70 | 250

SECTION "A-A"

SCALE 1:100

259 | 259

518
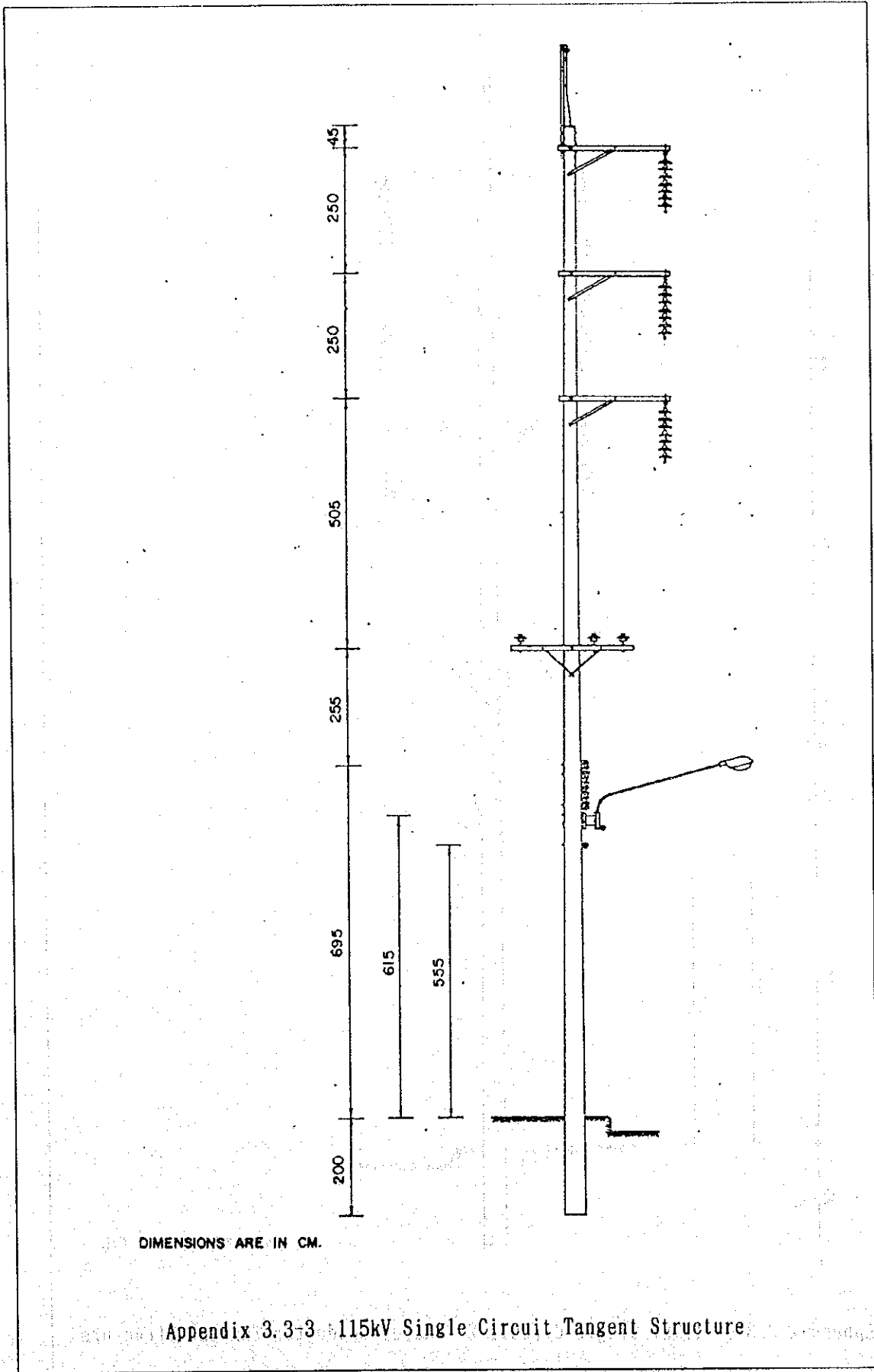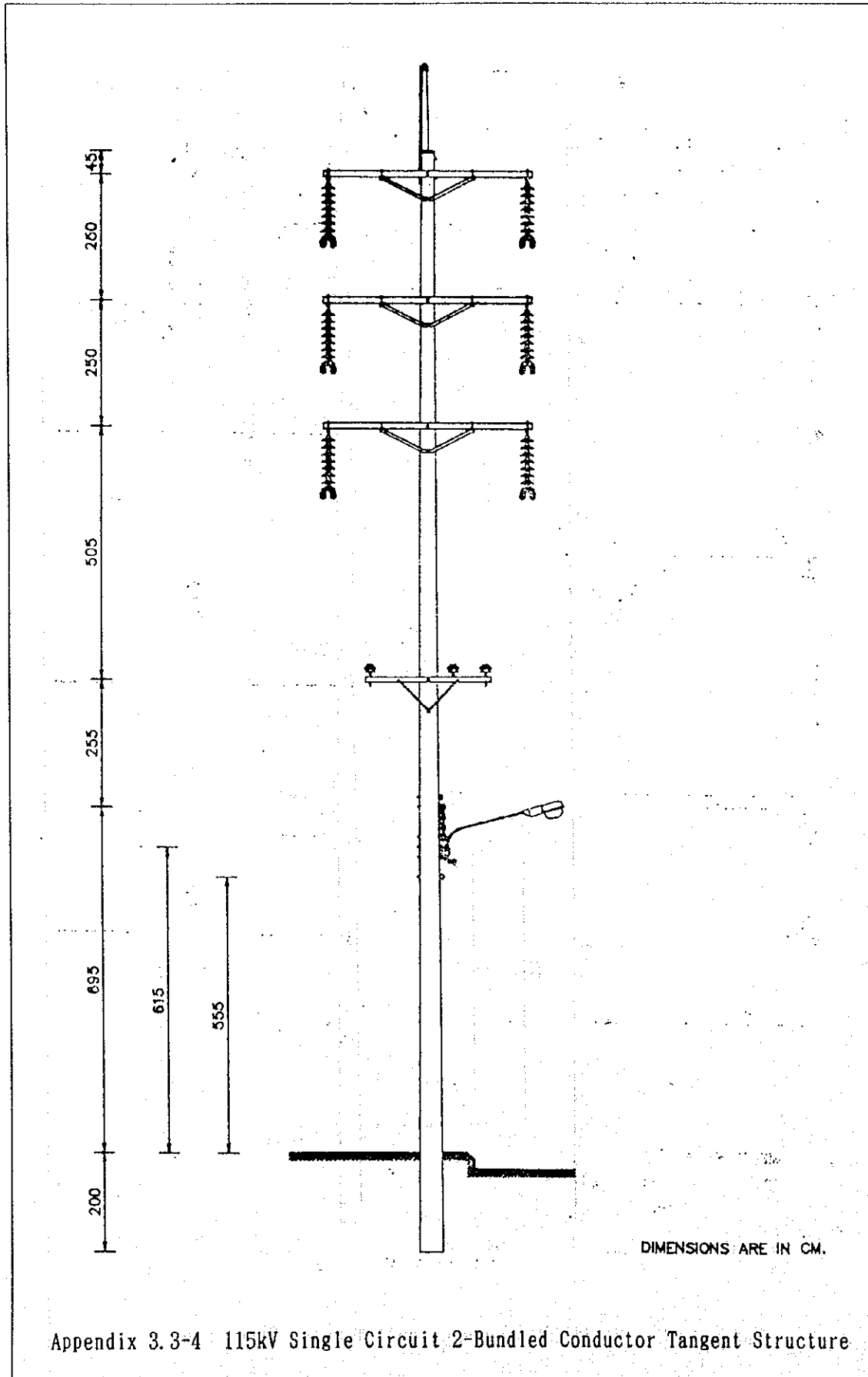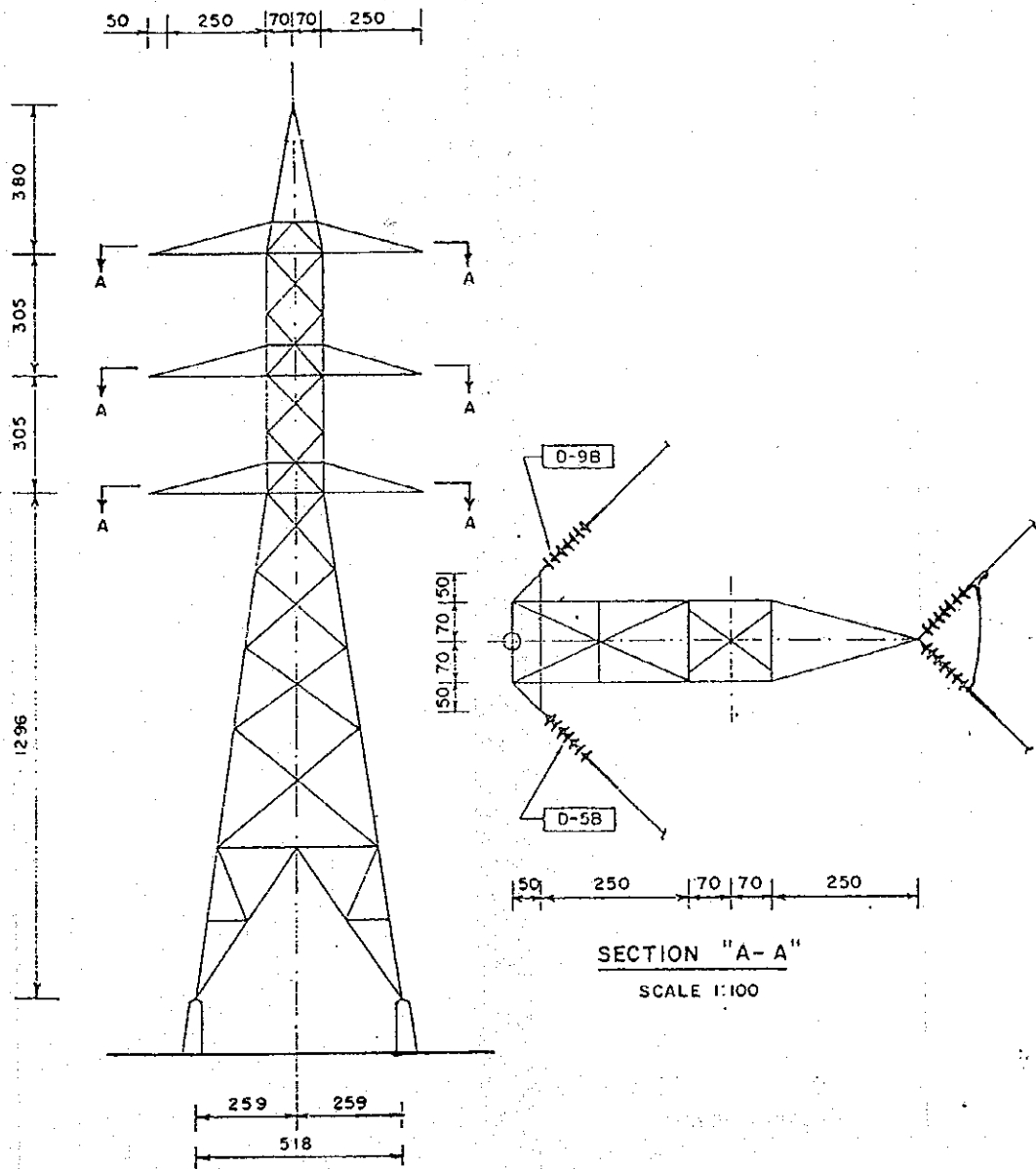
DIMENSIONS ARE IN CENTIMETER.

Appendix 3.3-5 69kV Construction Steel Tower Type C

247.5

190

190

2330

WORKING PLANE
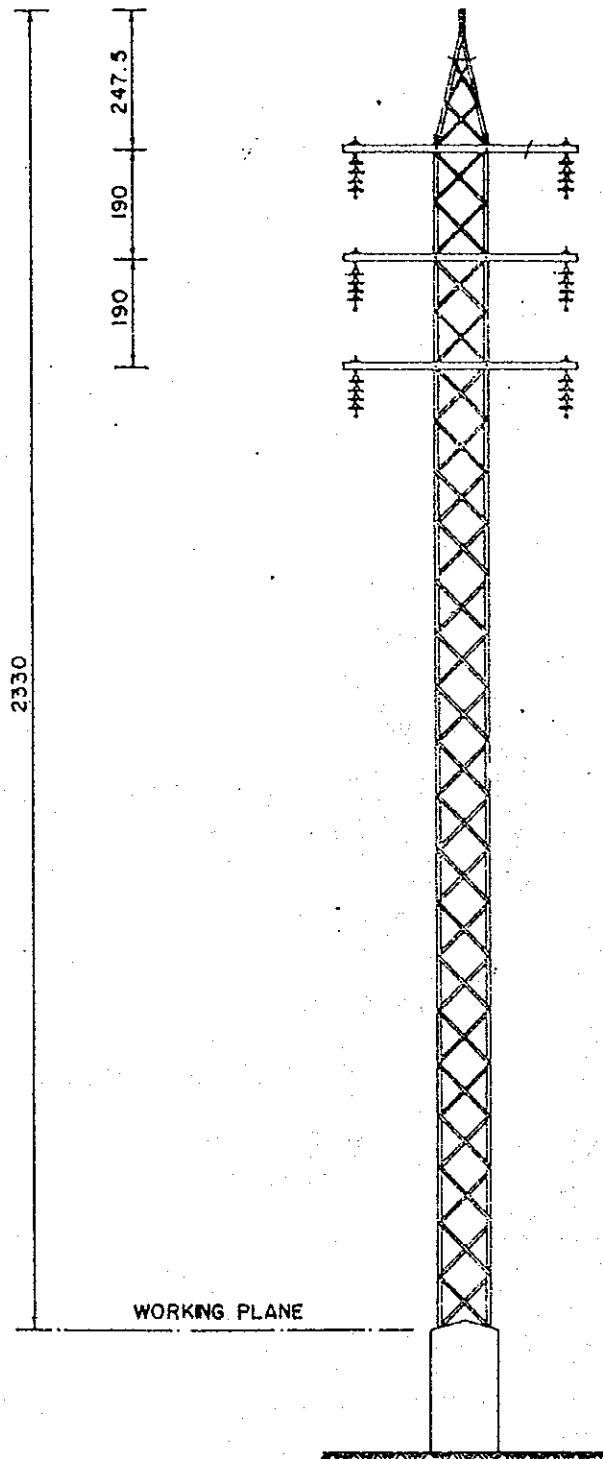
NOTE.

DIMENSIONS ARE IN CENTIMETER

Appendix 3.3-6 69kV Construction Steel Tower Type D
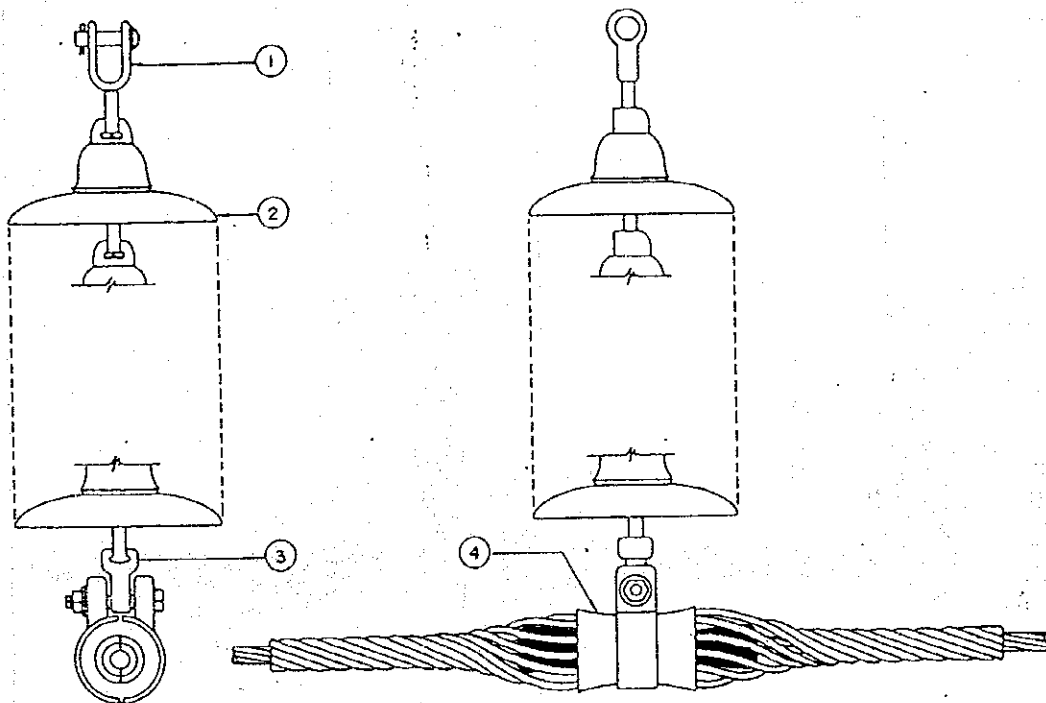
6

		BILL OF MATERIAL				
ITEM NO.	CODE NO.	REQUIREMENTS DETAIL NO.				DESCRIPTION
		1A	1B	1C	1D	1E
1	182 - 523	–	1	1	1	1	CLEVIS, BALL, TYPE B
2	161 - 523	2	4	6	7	8	INSULATOR, SUSPENSION TYPE NEMA CLASS 52-3
3	183 - 522	1	1	1	1	1	SOCKET, EYE
4	132 - 008	1	1	1	1	1	PREFORMED, ARMOR GRIP SUSPENSION, FOR 795 MCM. AA.

Appendix 3.3-7 Insulator Assemblies NO.1
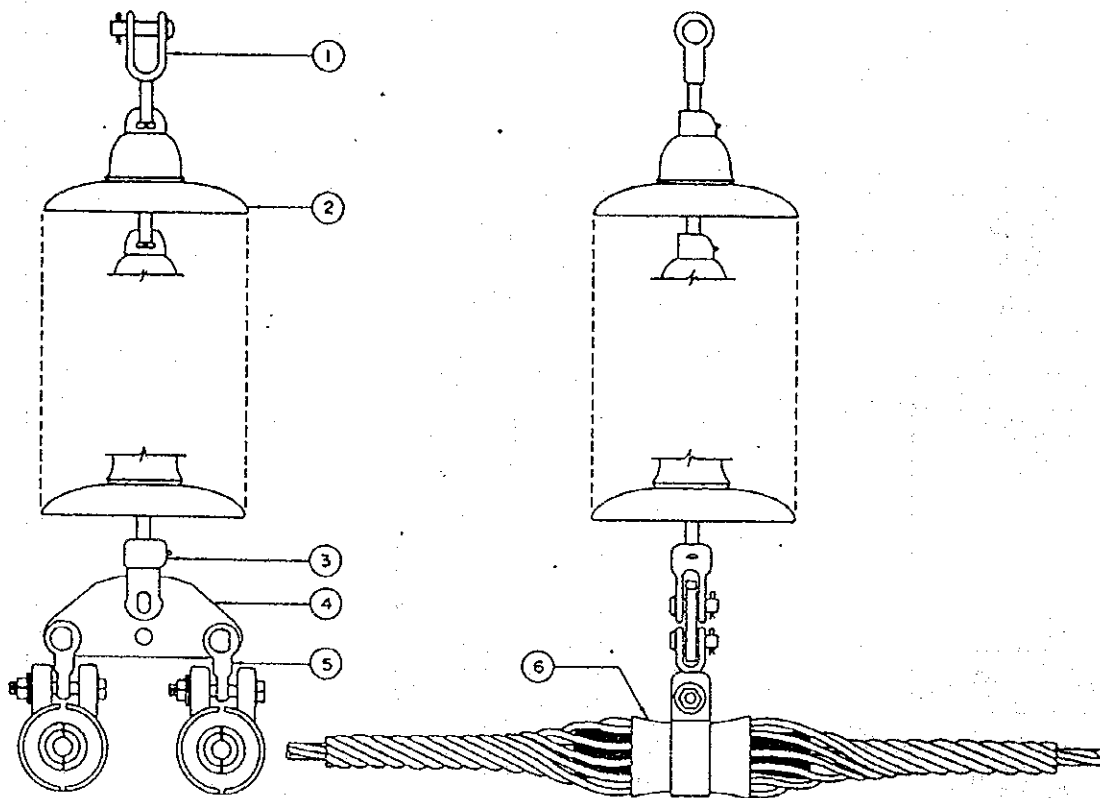
BILL OF MATERIAL					
ITEM NO.	CODE NO.	REQUIREMENTS DETAIL NO.			DESCRIPTION
		2A	2B	2C	
1	182 - 523	—	1	1	CLEVIS, BALL, TYPE B
2	161 - 523	2	4	6	INSULATOR, SUSPENSION TYPE NEMA CLASS 52-3
3	180 - 523	1	1	1	SOCKET, CLEVIS, TYPE B
4	188 - 800	1	1	1	PLATE, SPACER
5	181 - 001	2	2	2	CLEVIS, EYE
6	132 - 008	2	2	2	PREFORMED, ARMOR GRIP SUSPENSION, FOR 795 MCM. AA.

Appendix 3.3-8 Insulator Assemblies NO. 2
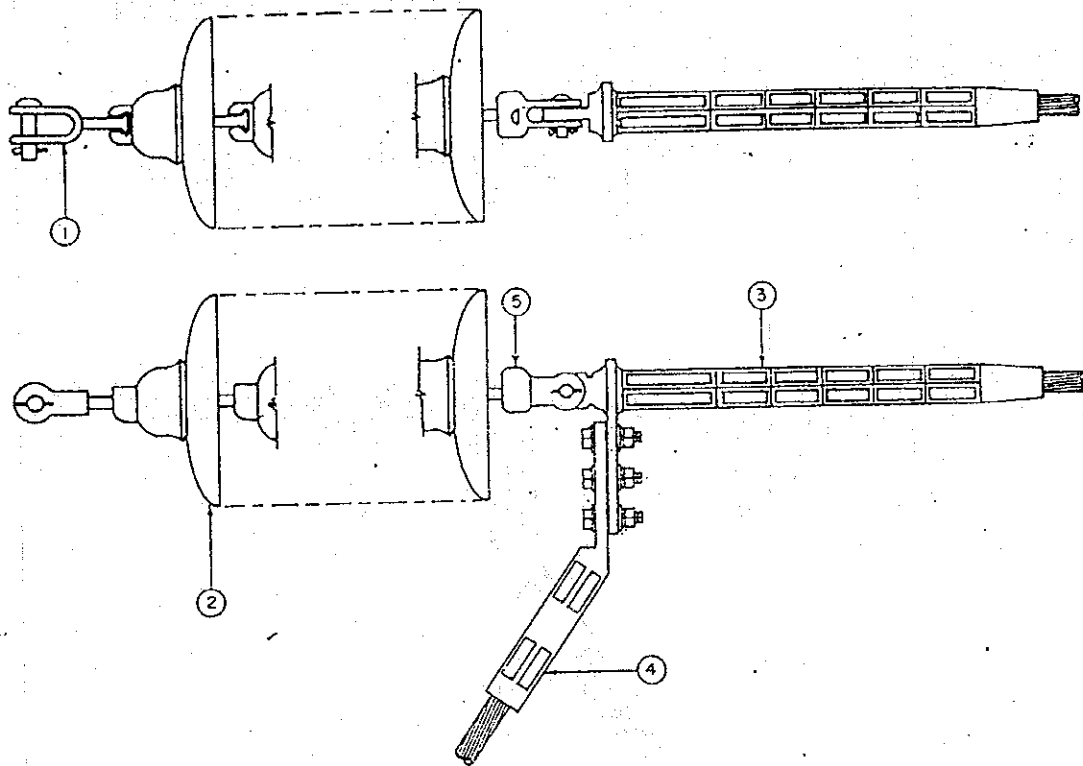
BILL OF MATERIAL					
ITEM NO	CODE NO	REQUIREMENTS DETAIL NO			DESCRIPTION
		5A	5B	5C	
1	182 - 523	1	1	1	CLEVIS, BALL TYPE B.
2	161 - 523	5	7	10	INSULATOR, SUSPENSION TYPE NEMA CLASS 52 -3
3	187 - 805	1	1	1	CONNECTOR, DEADEND, COMPRESSION TYPE, I-T FOR 795 MCM.AA.
4	187 - 809	1	1	1	CONNECTOR, JUMPER, COMPRESSION TYPE, ANGLE FOR 795 MCM.AA.
5	180 - 523	1	1	1	SOCKET, CLEVIS , TYPE B

Appendix 3.3-9 Insulator Assemblies NO. 5

9
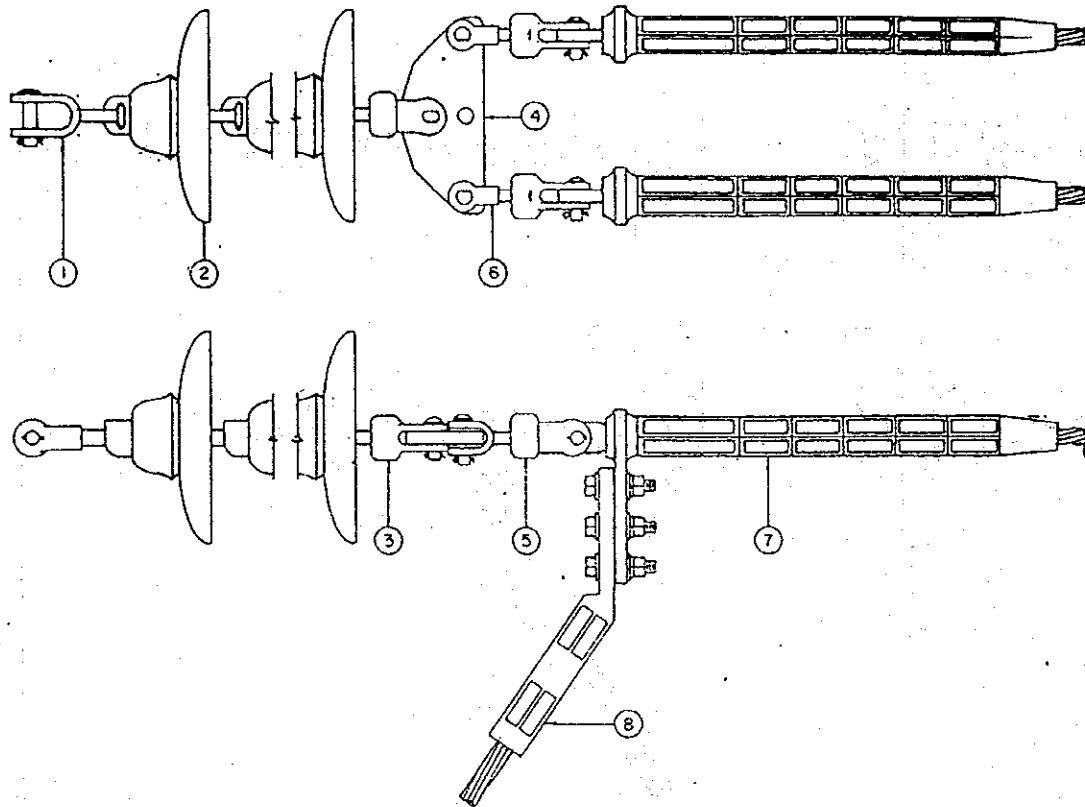
BILL OF MATERIAL					
ITEM NO.	CODE NO.	REQUIREMENTS DETAIL NO.			DESCRIPTION
		6A	6B	6C	
1	182 – 528	1	1	1	CLEVIS, BALL, TYPE K
2	161 – 528	5	7	10	INSULATOR, SUSPENSION TYPE NEMA CLASS 52-8
3	180 – 528	1	1	1	SOCKET, CLEVIS, TYPE K
4	188 – 800	1	1	1	PLATE, SPACER
5	180 – 523	2	2	2	SOCKET, CLEVIS, TYPE B
6	182 – 523	2	2	2	CLEVIS, BALL, TYPE B
7	187 – 805	2	2	2	CONNECTOR, DEADEND, COMPRESSION TYPE, I – T, FOR 795 MCM. AA.
8	187 – 809	2	2	2	CONNECTOR, JUMPER, COMPRESSION TYPE, ANGLE, FOR 795 MCM. AA.

Appendix 3.3-10 Insulator Assemblies NO.6

CONCRETE POLE

ROAD LEVEL

A ← → A

110

15 10 60 10 15

50

30

180 150

15

30 120 30

SECTION A-A

25 110 60 25

50 10 60 10 50

180

SIDE VIEW

CONCRETE BACKFILL

COMPACTED COARSE AGGREGATE

SEE NOTE 4

SEE NOTE 2

50

30

120 180

30

15

200 (UNLESS OTHERWISE NOTED)
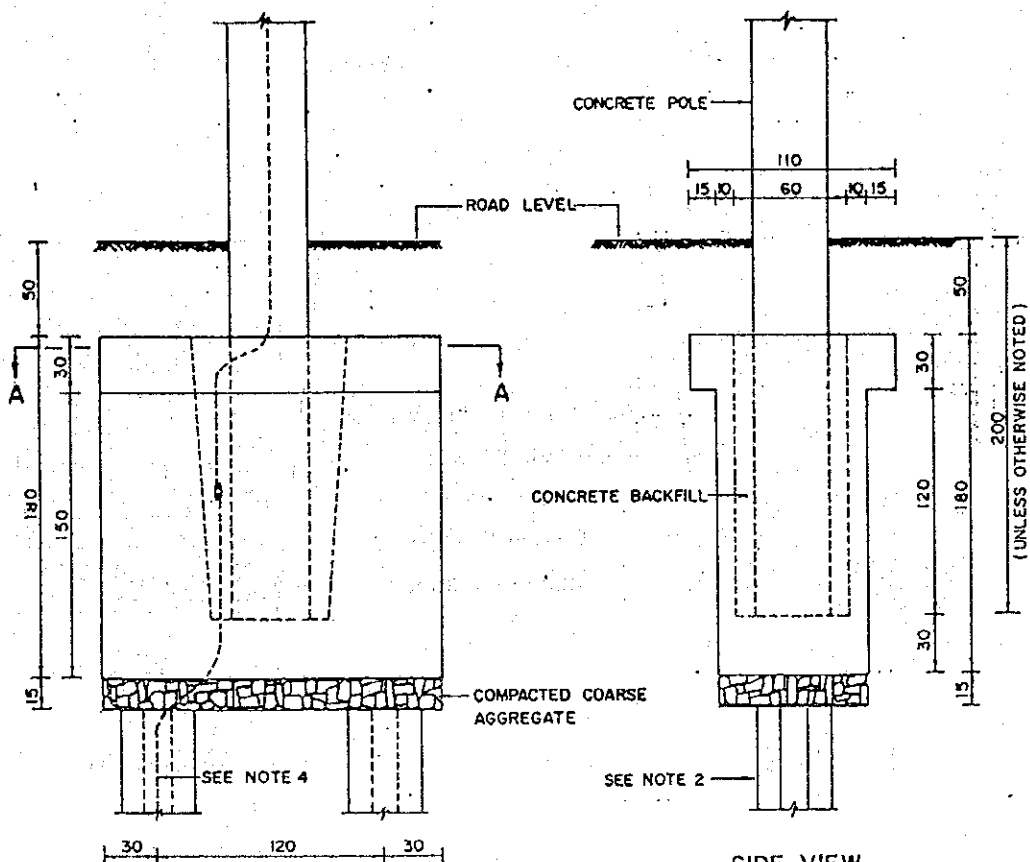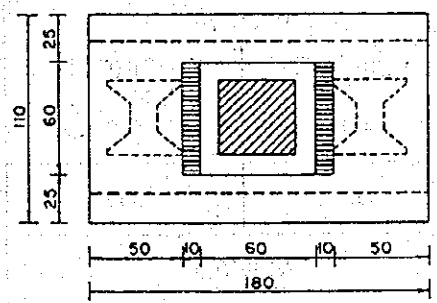
NOTES.

1. SEE DWG. NO. 120-068 SH. NO. 1 FOR MORE DETAIL OF CONSTRUCTION

2. APPLICATION SEE CHART IN SH. NO. 9 FOR BENDING MOMENT REQUIRED

3. DIMENSIONS ARE IN CM.

4. SEE DETAIL NO. 28 FOR GROUND ASSEMBLY

Appendix 3.3-11 Structure Foundation

STREET OR SIDEWALK OR GROUND SURFACE

SOIL OR BACKFILL

WARNING SIGN STRIP

CONCRETE SLAB

SLOPE
(AS SUITABLE IN PRACTICE)

SAND BACKFILL

UG. CABLE

COMPACTED SAND

CRUSHED ROCK

MIN. DEPTH*

160

100

260

100 100

W**

1—CIRCUIT

2D 2D

MIN. DEPTH*

160

100

260

100 100

W**

2—CIRCUIT

2D
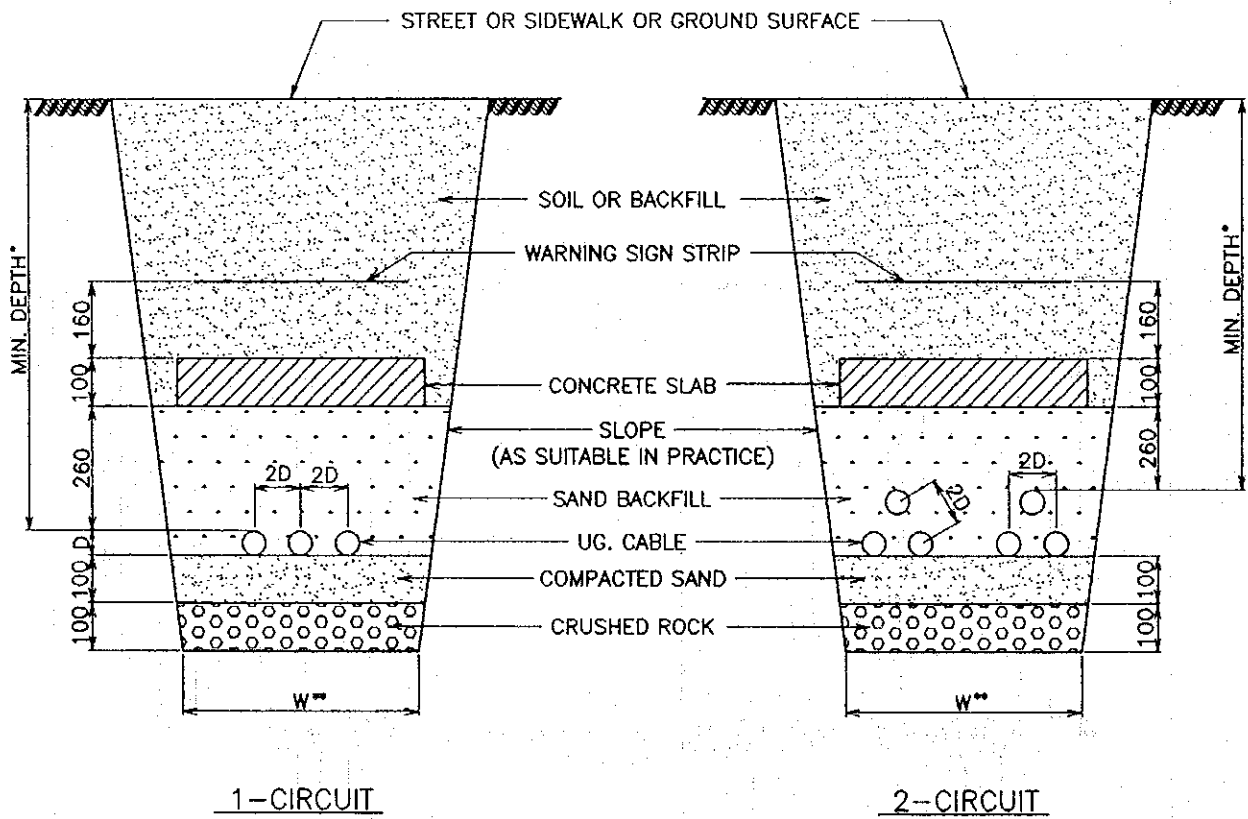
CABLE LAYING	MIN. DEPTH* (MM.)	W (MM.)**	
		1—CIRCUIT	2—CIRCUIT
UNDER ROAD OR STREET	1200	500	800
UNDER SIDEWALK	900	500	800
CUSTOMER AREA	900	AS REQ'D	

Appendix 3.3-12   Direct Buried Cable Laying (Primary & Subtransmission Construction)

SECTION A–A

- 3–ϕ 9 MM. STEEL ROUND BAR
- ϕ 6 MM. @ 30 STEEL ROUND BAR
- FINISHED SURFACE
- GROUND, SIDE WALK OR STREET SURFACE
- WARNING SIGN STRIP
- BACKFILLING OR SAND
- REINFORCED CONCRETE SLAB
- COMPACTED SAND (NO COMPACTED BY MACHINE)
- SPACER BLOCK
- HDPE CONDUIT (CLASS–I)
- REINFORCED CONCRETE
- COMPACTED SAND

900 MIN.
100 160
260
100 150 MIN.
200
25
100 MIN.
100 MIN.

SECTION B–B

- 3–ϕ 9 MM. STEEL ROUND BAR
- ϕ 6 MM. @ 30 STEEL ROUND BAR
- FINISHED SURFACE
- GROUND, SIDE WALK OR STREET SURFACE
- WARNING SIGN STRIP
- BACKFILLING OR SAND
- REINFORCED CONCRETE SLAB
- COMPACTED SAND (NO COMPACTED BY MACHINE)
- HDPE CONDUIT (CLASS–I)
- REINFORCED CONCRETE
- COMPACTED SAND

900 MIN.
100 160
260
100 150 MIN.
700 MIN.

Appendix 3.3-13 HDPE Duct Bank (Primary & Subtransmission Construction)

GROUND OR SIDE WALK
OR STREET SURFACE

SOIL BACKFILL

SLOPE (AS SUITABLE IN-
PRACTICE)

WARNING SIGN STRIP

SAND BACKFILL

RSC.

UG.CABLES

COMPACT SAND

MIN.DEPTH

10 MIN.

20

20

10 MIN.
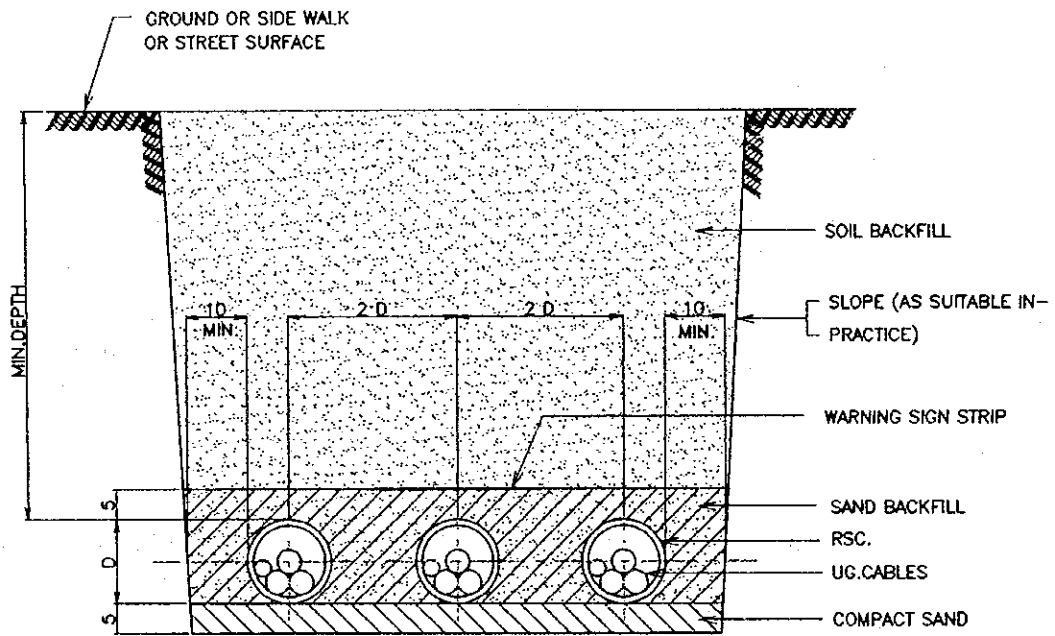
Appendix 3.3-14 Cable Laying in RSC (UG. Secondary Construction)

APPENDIX

for

CHAPTER 6

(6.3-1)

Appendix 6.3-1 Load and Installed Capacity of Distribution Substations (Planning Year = 2016)

No	ABB	Substation	Voltage (KV)	MEA Original Plan for FY 2011 Bank configuration		Capacity (MVA)	coincident (MV)	non-coinci (MVA)	utilization factor (%)	2016 before Expansion Capacity (MVA)	non-coinci (MVA)	increase (%)	utilization factor (%)	JICA Study Team Plan for FY 2016 Bank configuration		Capacity (MVA)	coincident (MV)	non-coinci (MVA)	utilization factor (%)	Space of Capacity (MVA)
45	KG	Huangsmit	69-24	2 x 40	1	140	73.06	93.95	87.1	(140)	102.53	1.73	73.2	2 x 40	1	110	80.11	102.53	73.2	10
45	KI	Huangthong 1	115-24	2 x 50	x	120	58.81		60.3	(120)	73.18	1.72	66.5	2 x 50		120	52.31	72.28	66.5	0
46	KN	Narva	115-24	2 x 50	x	120	73.01	93.89	78.2	(120)	104.85	2.23	87.4	2 x 50		120	65.07	83.25	69.4	0
			69-12		x	0		0.00	0.0	0	0.00	0.00	0.0		x	0	0.00	0.00	0.0	0
			69-24		x	0		0.00	0.0	0	0.00	0.00	0.0		x	0	0.00	0.00	0.0	0
			115-24	3 x 60		180	86.40	111.11	61.7	(180)	127.88	2.85	71.0	3 x 60		180	99.35	127.88	71.0	0
47	NH	Nongkhaw	69-12		x	0		0.00	0.0	0	0.00	0.00	0.0		x	0	0.00	0.00	0.0	0
			69-24	3 x 60		180	81.74	105.12	58.3	(180)	110.53	1.08	61.8	3 x 60		180	86.70	110.53	61.6	0
48	NR	Nonthaburi	69-12		x	0		0.00	0.0	0	0.00	0.00	0.0		x	0	0.00	0.00	0.0	0
			115-12		x	0		0.00	0.0	0	0.00	0.00	0.0		x	0	0.00	0.00	0.0	0
			115-24	3 x 60	x	180	78.55	101.81	58.1	(180)	135.00	5.97	75.0	3 x 60		180	105.52	135.00	75.0	0
49	NK	North Bangkok	69-12	3 x 40	x	0		0.00	0.0	0	0.00	0.00	0.0		x	0	0.00	0.00	0.0	0
			69-24			122	56.96	73.25	61.0	(120)	75.88	9.70	63.2	3 x 40	60	120	58.23	73.86	63.2	60
50	PE	Pakkred	69-12		x	0		0.00	0.0	0	0.00	0.00	0.0		x	0	0.00	0.00	0.0	0
			69-24		x	0		0.00	0.0	0	0.00	0.00	0.0		x	0	0.00	0.00	0.0	0
			115-12		x	0		0.00	0.0	0	0.00	0.00	0.0		x	0	0.00	0.00	0.0	0
			115-24	3 x 60		180	72.58	93.31	51.3	(180)	106.23	2.33	57.9	3 x 60	60	180	81.47	101.23	57.9	0
51	PA	Pakrwa	115-12	3 x 60	x	180	74.19	95.41	53.0	(180)	99.45	2.83	55.3	3 x 60	60	180	77.23	99.15	55.3	0
52	PS	Petchkasem	69-12	1 x 40	1	100	56.85	73.12	73.1	(100)	91.31	5.22	81.3	2 x 40	80	120	63.00	80.33	66.1	40
53	PI	Phaisingto	69-24	4 x 60	x	240	87.97	113.12	47.1	(240)	130.21	2.85	51.3	4 x 60	60	210	101.77	130.31	54.3	30
54	PJ	Poojao	69-12		x	0		0.00	0.0	0	0.00	0.00	0.0		x	0	0.00	0.00	0.0	0
			69-24	3 x 40		120	70.24	90.33	75.3	(120)	101.81	2.32	81.8	2 x 40	1	130	73.53	101.81	72.7	20
55	PC	Prachuchuen	69-12	1 x 40	2	160	71.71	92.22	57.6	(160)	123.63	5.97	77.0	3 x 60	2	160	95.33	123.23	77.0	0
56	PK	Prakanng	69-24	2 x 40	x	80	43.94	56.51	70.6	(80)	65.09	2.85	81.3	2 x 40	60	120	50.81	65.11	54.3	40
57	PR	Prakso	69-24	2 x 40		140	65.25	83.91	59.9	(140)	87.47	0.83	62.5	2 x 40	60	150	53.32	87.17	52.5	40
58	PD	Pramuek	69-24	2 x 40	x	80	38.17	48.09	61.4	(80)	58.58	3.95	73.3	2 x 40	40	80	45.37	58.58	74.5	40
59	PO	Praprakaeng	69-12	3 x 40	x	120	62.80	80.87	67.4	(120)	87.18	1.51	72.7	2 x 40	60	120	68.11	87.18	72.7	60
60	PA	Prasamut	69-12	3 x 40	x	120	58.53	75.27	62.7	(120)	86.64	2.85	72.2	3 x 40	40	120	67.72	86.64	72.2	60
61	PM	Prathuman	69-12	3 x 40	x	120	51.76	66.56	55.5	(120)	71.15	1.34	59.3	3 x 40	40	120	55.61	71.15	59.3	60
62	PT	Rajintra	115-24	3 x 60	x	180	73.52	94.51	52.5	(180)	129.12	8.63	77.3	3 x 60	60	180	104.71	129.12	77.3	0
63	RH	Rankhamhaeng	69-12	2 x 40	x	0		0.00	0.0	0	0.00	0.00	0.0		x	0	0.00	0.00	0.0	0
64	RH	Rasburana	69-12	2 x 40	1	140	51.21	65.85	47.0	(140)	75.84	2.86	51.2	2 x 40	60	140	58.23	73.81	51.2	20
65	RK	Roehino	115-24	3 x 60	x	120	59.32	76.28	63.6	(120)	91.82	3.73	75.0	3 x 60	40	120	71.51	91.62	76.1	60
66	RC	Rungpracha	69-24	3 x 60	x	180	75.07	96.51	53.5	(180)	128.36	5.96	71.6	3 x 60	60	180	100.80	128.55	71.6	0
67	SN	Salilom	69-12	3 x 40	2	180	71.30	91.56	50.9	(180)	111.15	3.95	61.8	3 x 60	60	180	86.88	111.15	61.8	0
68	SM	Samrong	69-12	2 x 40	x	80	41.28	53.09	66.4	(80)	64.34	4.11	81.2	2 x 40	40	100	50.75	64.71	64.9	20
69	SW	Saasen	69-12	3 x 60		180	70.99	91.29	50.7	(180)	102.90	2.42	57.2	2 x 40	60	180	80.43	102.90	57.2	0
70	SS	Sansab	69-24	3 x 40	x	120	58.45	88.02	73.1	(120)	107.68	4.11	82.7	2 x 40	40	110	81.16	107.53	76.9	20
71	SO	Sorodno	69-12	3 x 40	1	140	76.53	98.29	70.2	(140)	113.13	2.85	80.8	3 x 40	40	150	88.12	113.13	70.2	30
72	SP	Soomnoi	69-24	3 x 40		160	90.71	116.55	72.9	(160)	125.67	1.66	79.2	4 x 40	2	150	99.01	125.67	79.2	20
73	SI	South Bangkok	69-12		x	0		0.00	0.0	0	0.00	0.00	0.0		x	0	0.00	0.00	0.0	0
			69-24	2 x 40	x	80	17.73	22.80	70.3	(80)	25.70	8.03	70.3	2 x 40	60	60	20.03	25.32	64.9	50
74	SH	South Thonburi	69-12	3 x 60	x	180	89.97	115.70	61.3	(180)	122.10	1.08	67.8	3 x 60	60	180	95.13	122.10	67.8	0
75	SI	Srithanya	69-12		x	0		0.00	0.0	0	0.00	0.00	0.0		x	0	0.00	0.00	0.0	0
			69-24	2 x 40		60	44.46	57.17	71.5	(60)	61.12	1.34	76.4	1	100	17.77	61.12	61.1	20
76	SI	Silom	69-12	2 x 40	x	80	38.45	49.45	61.8	(80)	52.88	1.31	66.1	2 x 40	80	11.32	32.85	65.1	30
77	SI	Sippaya	69-12	3 x 40	x	0		0.00	0.0	0	0.00	2.85	0.0		x	0	0.00	0.00	0.0	0
78	SP	Soonvijai	69-12	3 x 40	1	160	82.88	106.58	66.6	(160)	122.68	2.85	76.7	4 x 40	60	160	95.82	122.55	75.7	20
			69-24	2 x 40	40	130	73.10	93.85	61.4											
79	YA	Tapern	69-12	3 x 40	x	0		0.00	0.0	0	0.00	2.42	0.0		x	0	0.00	23.32	12.3	0
			115-24			180		122.10	61.3					60		180	35.13	122.10	67.8	0
80	SO	Suannon	69-12	2 x 40		80	44.36	94.36	52.8	(180)	126.50	5.97	70.5	3 x 60	60	180	29.12	125.20	70.5	0
80	SU	Suranong	69-12			0		0.00	0.0	0	0.00	0.00	0.0		x	0	0.00	0.00	0.0	0
			69-24		80	180	90.41	112.05	55.2	(180)	112.05	2.42	62.3	60	180	87.53	112.05	62.3	10
81	TS	Taksin	69-12	2 x 40		80	71.64	92.13	51.2	(80)	98.38	1.34	54.7	2 x 40	80	75.97	93.18	51.7	0
82	TP	Teparok	69-24	2 x 40	1	140	42.58	54.75	68.5	(140)	55.65	0.63	59.9	2 x 40	40	80	13.73	55.95	69.2	30
							59.95	77.15	55.1	(140)	86.58	2.33	61.8		1	110	67.67	85.53	61.9	10

Appendix 6.3-1 Load and Installed Capacity of Distribution Substations (Planning Year = 2016)

No	ABB	Substation	Voltage (KV)	PEA Original Plan for FY 2011 Bank configuration								2016 before Expansion								JICA Study Team Plan for FY 2016 Bank configuration								
						Capacity (MVA)	coincident (MW)	non-coinci (MVA)	utilization factor (%)			Capacity (MVA)	coincident (MW)	non-coinci (MVA)	utilization factor (%)	Increase (%)	utilization factor (%)				Capacity (MVA)	coincident (MW)	non-coinci (MVA)	utilization factor (%)	Space of Capacity (MVA)	
83	TT	Thanomtok	69-12	3	×	180	76.20	0.00	51.1			(180)	0.00	115.55	0.0	0.00	0.0	1	×		0	0.00	0.00	0.0	0	
			19-24		×			97.99	51.3						51.2	3.15	51.2				180	20.31	115.55	51.2		0
84	TB	Thonburi	69-12	2	×	180	85.50	84.23	60.2			(180)	66.07	86.07	61.5	0.43	61.5	2	×	50	180	67.27	86.07	61.5		0
85	TK	Tongrueng	69-12	2	×	80	31.34	46.33	50.4			(80)	45.45	45.45	56.8	2.42	56.8	2	×	40	80	35.52	45.55	58.8		80
86	TB	Tangpetchaboon	69-12	3	×	180	85.84	110.41	61.3			(180)	118.03	118.03	85.8	1.34	85.8	3	×	60	180	92.25	118.03	0.0		0
87	TT	Tangthongliang	69-12	3	×	180	84.32	109.08	60.6			(180)	0.00	0.00	66.1	1.78	66.1	3	×	60	180	23.03	119.03	66.1		0
88	TL	Taliled	69-12	3	×	180	71.13	91.47	76.2			(180)	112.03	112.03	62.8	1.56	62.8	1	×	60	180	77.61	91.31	62.1		0
89	VT	Vothee	69-12	2	×	120	43.27	55.84	68.6			(120)	91.47	91.47	74.1	1.34	74.1	2	×	40	80	46.35	59.13	71.1		0
90	BE	Bangbua	69-12		×	0		0.00	0.0			0	59.48	59.48	0.0	0.00	0.0				0	0.00	0.00	0.0		0
			115-12		×			30.97	50.5			(180)	117.31	117.31	65.2	5.27	65.2	1	×	50	180	91.71	117.31	55.2		0
91	BZ	Bangson	69-12	3	×	180	70.74	81.78	45.4			(180)	100.02	100.02	55.6	1.11	55.6	3	×	60	180	73.13	100.02	55.6		0
92	BI	Boaring	69-24	3	×	180	63.58	121.65	67.6			(180)	138.32	138.32	75.3	2.33	75.3	3	×	60	180	106.50	138.32	73.3		0
93	EM	Ekmai	69-12	3	×	180	94.60	0.00	0.0			0	0.00	0.00	0.0	0.00	0.0				0	0.00	0.00	0.0		0
			115-24		×			89.19	49.9			(180)	103.31	103.31	57.4	2.85	57.4	3	×	60	180	80.77	103.31	57.1		0
94	EB	Ekburi	69-12	3	×	120	60.82	89.13	50.9			(120)	99.15	99.15	72.5	6.83	72.5				180	77.30	99.16	55.1		0
95	BA	Buanak	69-24	2	×	120	55.93	91.92				(120)														
96	JT	Jantura	69-24	3	×	180	67.55	86.87	48.3			(180)	93.99	93.99	55.6	2.85	55.6	3	×	60	180	73.15	93.99	55.6		60
			115-12		×		87.41	112.41	62.5			(180)	122.67	122.67	68.2	1.76	68.2	3	×	60	180	95.88	122.57	68.2		0
97	JR	Jangron	69-24	3	×	180	85.18	109.54	50.9			(180)	131.57	131.57	73.1	3.73	73.1	3	×	60	180	122.31	131.57	73.1		60
98	TO	Thaton	115-24	3	×	180	74.76	92.28	51.3			(180)	98.10	98.10	53.3	0.83	53.3	3	×	60	180	75.18	78.13	53.2		0
99	KO	Kingkaeo	115-24	2	×	120	53.37	58.63	57.2			(120)	61.68	61.68	76.4	5.96	76.4	3	×	60	120	61.06	78.13	63.2		50
100	LB	Klongmahanand	115-24	3	×	180	68.95	88.47	39.3			(180)	116.59	116.59	64.7	5.81	64.7	3	×	60	180	91.35	120.32	64.7		0
101	LB	Latchrabang 3	115-24	2	×	180	78.84	101.38	56.3			(180)	120.72	120.72	67.1	3.55	67.1	3	×	60	180	91.91	120.32	67.5		0
102	KS	Kwangthong 3	89-24	2	×	120	60.51	89.83	74.5			(120)	99.83	99.83	80.2	2.23	80.2	3	×	60	180	91.91	121.61	73.5		0
103	NS	Nonsee	115-24	3	×				62.4			0	0.00	0.00	73.5	3.35	73.5				180	102.31	132.17	73.6		0
104	PT	Pradinai	69-12	3	×	180	91.35	112.33	82.8			(180)	132.47	132.47	76.3	4.11	76.3	3	×	50	180	108.13	132.17	76.9		0
			69-24		×	180	81.95	113.10				(180)	138.35	138.35								103.13	138.33			0
105	SA	Seimontip	69-12		×	0		0.00	0.0			0	0.00	0.00	0.0	0.00	0.0				0	0.00	0.00	0.0		0
			69-24		×			0.00	0.0			0	0.00	0.00	0.0	0.00	0.0				0	0.00	0.00	0.0		0
			115-24		×	180	87.10	112.81	62.3			(180)	123.32	123.32	71.6	2.85	71.6	3	×	60	180	109.76	128.22	71.6		60
106	SB	Sumabinnam	69-12		×	0		0.00	0.0			0	0.00	0.00	0.0	0.00	0.0				0	0.00	0.00	0.0		0
			69-24		×			0.00	0.0			0	0.00	0.00	0.0	0.00	0.0				0	0.00	0.00	0.0		0
			115-24		×	180	81.92	105.35	58.5			(180)	140.32	140.32	78.2	5.07	78.2	3	×	60	180	110.01	110.22	14.2		0
107	RO	Soorabuay	115-24	2	×	120	51.43	66.20	55.3			(120)	78.18	78.18	55.7	3.51	55.7	2	×	50	120	61.57	78.73	55.7		50
108	SB	South Bangplee	115-24	3	×	120	47.61	51.33	51.0			(120)	66.84	66.84	53.1	1.77	53.1	3	×	50	120	52.21	66.81	55.7		50
109	SE	Seieion	89-24	3	×	180	99.19	122.56	70.9			(180)	143.11	143.11	73.3	2.33	73.3	3	×	60	180	111.83	113.11	70.3		50
110	SF	Suanluang	89-24	3	×	180	86.36	111.05	61.7			(180)	127.88	127.88	71.1	2.86	71.1	3	×	60	180	99.55	127.83	71.1		0
111	EK	Surasak	69-12	2	×	120	47.08	61.70	51.4			(120)	65.95	65.95	55.0	1.34	55.0	2	×	60	120	51.55	65.55	55.0		52
112	TN	Tuiban	69-24	2	×	120	58.68	74.60	62.2			(120)	77.85	77.85	61.2	0.33	61.2	2	×	60	120	59.85	77.85	51.9		60
113	TT	Taveesatiana	115-24	2	×	120	45.96	58.10	51.3			(120)	62.38	62.38	52.3	1.09	52.3	2	×	50	120	48.56	62.33	52.0		60
114	TM	Thonburiren	69-12	2	×	120	47.30	60.83	50.7			(120)	55.57	55.57	51.6	1.51	51.6	3	×	60	123	51.23	65.52	51.6		0
115	TB	Tungsungthong	69-12	3	×	180	83.62	102.53	58.7			(180)	143.71	143.71	79.8	5.97	79.8	3	×	60	180	112.32	143.71	78.8		0
			115-24		×							0	0.00	0.00	0.0	0.00	0.0				0	0.00	0.00	0.0		0
116	YK	Yeewhart	69-12	3	×	180	96.12	123.29	65.0			(180)	146.22	146.22	81.2	3.35	81.2	3	×	60	180	81.65	104.16	58.0		0
117	KB	Bangbor	69-21	3	×	120	46.26	59.49	42.6			(120)	70.89	70.89	50.9	3.51	50.9	3	×	60	120	55.31	70.80	52.0		0
118	JK	Bangjak	69-12		×	0		0.00	0.0			0	0.00	0.00	0.0	0.00	0.0				0	0.00	0.00	0.0		0
			115-24		×	180	32.75	119.27	66.3			(180)	133.85	133.85	71.3	2.33	71.3	3	×	50	180	101.82	133.85	71.1		0
119	KD	Bangkrodee	69-12	3	×	180	73.29	91.25	52.1			(180)	117.85	117.85	65.5	4.57	65.5	3	×	50	180	92.12	117.85	55.5		0
120	BH	Bangchan	115-24	3	×	180	85.81	110.35	61.3			(180)	117.33	117.33	81.0	5.06	81.0	3	×	50	180	98.30	125.11	70.3		0
121	NI	Bunmai	69-21	3	×	180	67.24	86.77	48.0			(180)	101.41	101.41	18.0	3.34	18.0				180	81.51	101.11	58.0		0
122	DO	Bincherng	69-12		×	180		0.00	0.0			(180)	0.00	0.00	0.0	0.00	0.0				0	0.00	0.00	0.0		0
			115-24		×		70.75	90.98	50.6			(180)	104.72	104.72	58.2	0.08	58.2	3	×	50	180	81.35	101.52	58.2		0
123	EC	Ekachai	69-12	3	×	180	84.45	108.60	50.3			(180)	135.81	135.81	75.5	4.57	75.5	3	×	50	180	105.15	135.81	75.5		0
124	CK	Kwaklang	69-21	3	×	180	94.56	121.73	67.6			(180)	140.11	140.11	77.8	2.85	77.8	3	×	60	180	102.31	140.11	77.8		0

Appendix 6.3-1 Load and Installed Capacity of Distribution Substations (Planning Year = 2016)

(4／5)

No	ABB	Substation	Voltage (kV)	MEA Original Plan for FY 2011 Bank configuration	Capacity (MVA)	coincident (MW)	non-coinci (MVA)	utilization factor (%)	2016 before Expansion Capacity (MVA)	non-coinci (MVA)	Increase (%)	utilization factor (%)	JICA Study Team Plan for FY 2016 Bank configuration	Capacity (MVA)	coincident (MW)	non-coinci (MVA)	utilization factor (%)	Space of Capacity (MVA)
125	JW	Jangwatana	115-24	3 × 60 ×	180	90.45	116.32	64.6	(180)	129.89	2.23	72.2	3 × 60 ✓	180	101.52	129.89	72.2	0
126	JJ	Jatujak	69-12	× ×	0		0.00	0.0	()	0.00	0.00	0.0	× ✓	0	0.00	0.00	0.0	0
			69-24	× ×	0		0.00	0.0	()	0.00	0.00	0.0	× ✓	0	0.00	0.00	0.0	0
			115-24	3 × 60 ×	180	76.58	98.48	54.7	(180)	107.47	1.76	59.7	3 × 60 ×	180	84.00	107.47	59.7	0
127	KE	Kaset	69-12	× ×	0		0.00	0.0	()	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0	0
			69-24	3 × 60 ×	180	77.69	99.91	55.5	(180)	133.52	5.97	74.2	3 × 60 ✓	180	104.36	133.52	74.2	0
128	KG	Klongkum	115-24	3 × 60 ×	180	75.09	96.56	53.7	(180)	142.09	8.03	78.9	3 × 60 ✓	180	111.06	142.09	78.9	0
129	KL	Klongprapa	115-24	3 × 60 ×	180	80.98	104.11	57.9	(180)	125.74	3.84	69.9	3 × 60 ✓	180	98.23	125.74	69.9	0
130	NU	Nitr-udom	69-12	× ×	0		0.00	0.0	()	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0	0
			69-24	3 × 60 ×	180	86.18	110.82	61.6	(180)	124.92	2.42	69.4	3 × 60 ✓	180	97.64	124.92	69.4	0
131	N4	Nuangthong 4	115-24	2 × 60 ×	120	67.35	86.61	72.2	(120)	96.72	2.23	80.6	3 × 60 ✓	180	92.48	116.32	64.6	0
132	N5	Nuangthong 5	115-24	2 × 60 ×	120	66.70	85.80	71.6	(120)	95.92	2.23	79.9	2 × 60 ✓	120	58.09	74.32	61.9	60
133	N6	Nuangthong 6	115-24	2 × 60 ×	120	66.45	85.45	71.2	(120)	95.43	2.23	79.5	2 × 60 ✓	120	57.71	73.83	61.5	60
134	N7	Nuangthong 7	115-24	2 × 60 ×	120	62.93	80.93	67.4	(120)	90.37	2.23	75.3	3 × 60 ✓	180	87.52	111.97	62.2	0
135	NL	Nanglerng	69-12	3 × 40 ✓	120	77.75	99.98	83.3	(120)	108.58	1.66	90.5	4 × 40 ✓	160	92.75	118.66	74.2	0
136	TA	Patanakarn	115-24	3 × 60 ×	180	80.89	104.02	57.8	(180)	119.79	2.86	66.6	3 × 60 ✓	180	93.63	119.79	66.6	0
137	PL	Plubola	115-24	2 × 60 ×	120	57.16	73.51	61.3	(120)	84.61	2.85	70.5	2 × 60 ✓	120	66.13	84.61	70.5	60
138	PW	Praves	115-24	2 × 60 ✓	120	62.49	80.36	67.0	(120)	107.35	5.06	89.5	3 × 60 ✓	180	99.49	127.29	70.7	0
139	RP	Prompong	115-24	3 × 60 ×	180	77.28	99.38	55.2	(180)	114.38	2.85	63.5	3 × 60 ✓	180	89.40	114.38	63.5	0
140	SI	Suinoi	115-24	2 × 60 ×	120	49.80	64.04	53.4	(120)	84.15	5.61	70.1	2 × 60 ✓	120	65.77	84.15	70.1	60
141	YN	Saayarn	115-12	× ×	0		0.00	0.0	()	0.00	0.00	0.0	× ✓	0	0.00	0.00	0.0	0
			115-24	3 × 60 ×	180	84.66	108.87	60.5	(180)	116.38	1.34	64.7	3 × 60 ✓	180	90.95	116.38	64.7	0
142	SN	Satorn	115-24	3 × 60 ×	180	95.22	122.45	68.0	(180)	130.90	1.34	72.7	3 × 60 ✓	180	102.31	130.90	72.7	0
143	HP	Shiaplee	115-24	3 × 60 ×	180	51.35	66.03	36.7	(180)	80.15	3.95	44.5	3 × 60 ✓	180	62.65	80.15	44.5	0
144	SW	Sriviang	69-24	× ×	0		0.00	0.0	()	0.00	0.00	0.0	× ✓	0	0.00	0.00	0.0	0
			69-24	2 × 60 ×	120	47.98	61.70	51.4	(120)	65.95	1.34	55.0	2 × 60 ✓	120	51.55	65.95	55.0	60
145	YT	Suanyai	115-24	2 × 60 ×	120	39.06	50.23	41.9	(120)	67.13	5.97	55.9	2 × 60 ✓	120	52.47	67.13	55.9	60
146	WT	Suwintawong	115-24	2 × 60 ×	120	45.36	58.33	48.6	(120)	80.41	6.63	67.0	2 × 60 ✓	120	62.85	80.41	67.0	60
147	TI	Tha-kwian	69-12	× ×	0		0.00	0.0	()	0.00	0.00	0.0	× ✓	0	0.00	0.00	0.0	0
			69-24	2 × 60 ×	120	48.23	62.02	51.7	(120)	66.85	1.51	55.7	2 × 60 ✓	120	52.25	66.85	55.7	60
148	TC	Trokchan	115-12	× ×	0		0.00	0.0	()	0.00	0.00	0.0	× ✓	0	0.00	0.00	0.0	0
			115-24	3 × 60 ×	180	91.72	117.95	65.5	(180)	139.09	3.35	77.3	3 × 60 ✓	180	108.71	139.09	77.3	0
149	TY	Tubyao	115-24	2 × 60 ×	120	61.46	79.04	65.9	(120)	94.06	3.54	78.4	3 × 60 ✓	180	98.78	126.38	70.2	0
150	TK	Tatkampaeng	69-12	× ×	0		0.00	0.0	()	0.00	0.00	0.0	× ✓	0	0.00	0.00	0.0	0
			69-24	3 × 60 ×	180	85.18	109.54	60.9	(180)	141.29	5.22	78.5	3 × 60 ✓	180	110.43	141.29	78.5	0
151	WR	Wuttakart	69-12	× ×	0		0.00	0.0	()	0.00	0.00	0.0	× ✓	0	0.00	0.00	0.0	0
			69-24	2 × 60 ×	120	50.74	65.25	54.4	(120)	66.67	0.43	55.6	2 × 60 ✓	120	53.78	68.81	57.3	60
152	AK	Asoke	115-24	3 × 60 ×	180	76.94	98.94	55.0	(180)	113.88	2.85	63.3	3 × 60 ✓	180	89.01	113.88	63.3	0
153	BT	Bangbuatong	115-24	3 × 60 ×	180	61.33	78.87	43.8	(180)	103.62	5.61	57.6	3 × 60 ✓	180	80.99	103.62	57.6	0
154	BS	Banghuasae	115-24	3 × 60 ×	180	72.05	92.65	51.5	(180)	104.43	2.42	58.0	3 × 60 ✓	180	81.62	104.43	58.0	0
155	BW	Bangkaew	115-24	2 × 60 ×	120	44.20	56.84	47.4	(120)	63.79	2.33	53.2	2 × 60 ✓	120	49.86	63.79	53.2	60
156	PY	Bangpleeyai	115-24	2 × 60 ×	120	49.63	63.82	53.2	(120)	69.68	1.77	58.1	2 × 60 ✓	120	54.46	69.68	58.1	60
157	TD	Bangtalard	115-24	2 × 60 ×	120	51.32	66.00	55.0	(120)	88.21	5.97	73.5	2 × 60 ✓	120	68.95	88.21	73.5	60
158	JB	Jomkahuo	115-24	3 × 60 ×	180	70.77	91.01	50.6	(180)	133.92	8.03	74.4	3 × 60 ✓	180	101.57	133.92	74.4	0
159	KB	Klongbangpi	115-24	3 × 60 ×	180	59.68	76.75	42.6	(180)	98.99	5.22	55.0	3 × 60 ✓	180	77.37	98.99	55.0	0
160	LW	Klongna	115-24	2 × 60 ×	120	47.80	61.47	51.2	(120)	66.26	1.51	55.2	2 × 60 ✓	120	51.79	66.26	55.2	60
161	GP	Klongpune	115-24	2 × 60 ×	120	48.87	62.85	52.4	(120)	74.11	3.35	61.8	3 × 60 ✓	180	90.56	115.87	64.4	0
162	KR	Krungtepkreeta	115-24	3 × 60 ×	180	89.16	114.66	63.7	(180)	153.16	5.96	85.1	3 × 60 ✓	180	95.80	122.57	68.1	0
163	LH	Land & House	115-24	3 × 60 ×	180	82.77	106.44	59.1	(180)	119.45	2.33	66.4	3 × 60 ✓	180	93.36	119.45	66.4	0
164	N8	Nuangthong 8	115-24	2 × 60 ×	120	61.32	78.86	65.7	(120)	88.06	2.23	73.4	2 × 60 ✓	120	68.83	88.06	73.4	60
165	N9	Nuangthong 9	115-24	2 × 60 ×	120	54.38	69.93	58.3	(120)	78.09	2.23	65.1	2 × 60 ✓	120	61.01	78.09	65.1	60
166	RL	Praramkao	115-24	2 × 60 ×	120	51.72	66.51	55.4	(120)	76.56	2.85	63.8	2 × 60 ✓	120	59.84	76.56	63.8	60
167	RJ	Rajchipraroop	115-24	3 × 60 ×	180	88.30	113.55	63.1	(180)	121.39	1.34	67.4	3 × 60 ✓	180	94.88	121.39	67.4	0
168	NP	Susampo	115-24	2 × 60 ×	120	54.13	69.61	58.0	(120)	85.15	4.11	71.0	2 × 60 ✓	120	66.55	85.15	71.0	60
169	ON	Sunanikom	115-24	3 × 60 ×	180	66.95	86.10	47.8	(180)	115.06	5.97	63.9	3 × 60 ✓	180	89.93	115.06	63.9	0
170	OS	Songsunikom	115-24	2 × 60 ×	120	46.91	60.33	50.3	(120)	83.16	5.63	69.3	2 × 60 ✓	120	65.00	83.16	69.3	60
171	SR	Srinakarin	115-24	2 × 60 ×	120	53.26	68.49	57.1	(120)	78.87	2.86	65.7	3 × 60 ✓	180	80.52	103.02	57.2	0
172	LO	Thonglor	115-24	2 × 60 ×	120	48.63	62.51	52.1	(120)	71.99	2.85	60.0	2 × 60 ✓	120	56.26	71.98	60.0	60
173	TU	Tungkru	115-24	2 × 60 ×	120	61.55	79.15	66.0	(120)	85.32	1.51	71.1	2 × 60 ✓	120	66.69	85.32	71.1	60
174	WD	Watdeedod	69-24	2 × 60 ×	120	47.82	61.50	51.3	(120)	74.65	3.95	62.2	3 × 60 ✓	180	68.38	87.19	48.5	0
175	GY	Bangkruay	115-24	2 × 60 ×	120	33.86	43.54	36.3	(120)	45.09	0.70	37.6	2 × 60 ✓	120	35.24	45.09	37.6	60
176	GG	Bangyung	115-24	2 × 60 ×	120	57.88	74.43	62.0	(120)	83.12	2.23	69.3	2 × 60 ✓	120	64.97	83.12	69.3	60
177	AA	Bangpla	115-24	2 × 60 ×	120	51.43	66.14	55.1	(120)	78.71	3.54	65.6	2 × 60 ✓	120	61.52	78.71	65.6	60
178	LD	Klongdan	115-24	2 × 60 ×	120	37.94	48.79	40.7	(120)	58.06	3.54	48.4	2 × 60 ✓	120	45.38	58.06	48.4	60
179	GT	Klonggratiam	115-24	2 × 60 ×	120	46.53	59.84	49.9	(120)	82.49	6.63	68.7	3 × 60 ✓	180	80.89	103.49	57.5	0
180	LG	Luangpang	115-24	2 × 60 ×	120	54.47	70.05	58.4	(120)	93.57	5.96	78.0	2 × 60 ✓	120	60.75	77.73	64.8	60
181	LS	Luangshe	115-24	2 × 60 ×	120	47.78	61.44	51.2	(120)	90.41	8.03	75.3	3 × 60 ✓	180	107.79	137.91	76.6	0
182	NI	Nimitmai	115-24	2 × 60 ×	120	46.92	60.34	50.3	(120)	83.18	6.63	69.3	2 × 60 ✓	120	65.01	83.18	69.3	60
183	NY	Nongyai	115-24	2 × 60 ×	120	48.94	62.94	52.5	(120)	66.41	1.08	55.3	2 × 60 ✓	120	51.91	66.41	55.3	60
184	IL	Pinklao	115-24	3 × 60 ×	180	89.60	115.22	64.0	(180)	139.86	3.95	77.7	3 × 60 ✓	180	109.32	139.86	77.7	0
185	PN	Pongpetch	115-24	2 × 60 ×	120	47.88	61.57	51.3	(120)	82.29	5.97	68.6	2 × 60 ✓	120	64.32	82.29	68.6	60
186	PT	Puttamonton	115-24	2 × 60 ×	120	43.23	55.59	46.3	(120)	73.05	5.61	60.9	2 × 60 ✓	120	57.10	73.05	60.9	60
187	RO	Rajchakru	115-24	2 × 60 ×	120	55.48	71.35	59.5	(120)	87.28	4.11	72.7	2 × 60 ✓	120	68.22	87.28	72.7	60
188	RR	Rajburi	115-24	2 × 60 ×	120	49.22	63.30	52.8	(120)	67.66	1.31	56.4	2 × 60 ✓	120	52.88	67.66	56.4	60
189	AT	Satorntai	115-24	3 × 60 ×	180	77.51	99.68	55.4	(180)	106.55	1.34	59.2	3 × 60 ✓	180	83.28	106.55	59.2	0
190	TL	Talingchan	115-24	2 × 60 ×	120	47.15	60.63	50.5	(120)	73.60	3.95	61.3	2 × 60 ✓	120	57.53	73.60	61.3	60

Appendix 6.3-1 Load and Installed Capacity of Distribution Substations (Planning Year = 2016)

No	ABB	Substation	Voltage (kV)	NEA Original Plan for FY 2011 Bank configuration		Capacity (MVA)	coincident (MV)	non-coinci (MVA)	utilization factor (%)	2016 before Expansion Capacity (MVA)	non-coinci (MVA)	Increase (%)	utilization factor (%)	JICA Study Team Plan for FY 2016 Bank configuration		Capacity (MVA)	coincident (MV)	non-coinci (MVA)	utilization factor (%)	Space of Capacity (MVA)
191	T1	Fluezenesit	115-24	2 ×	60	120	51.35	66.05	55.0	(120)	76.01	2.85	63.3	2 ×	60	120	59.41	76.01	63.3	60
192	R	Trisit	69-12	3 ×	40	120	55.42	77.27	59.4	(120)	77.40	1.66	64.5	3 ×	40	120	60.50	77.40	64.5	90
		Total				28,120	12,645.86	16,262.11	57.6	28,120	19,029.65	3.19	57.7			29,240	14,873.67	19,022.65	55.1	3,020

Diversity Factor
Power Factor

Number of Bank   a
Number of Substation b
Ratio   a/b

	2016 before Expansion	JICA Study Team Plan for FY 2016
Diversity Factor	1.1818	1.1818
Power Factor	0.9190	0.9237
Number of Bank a	501	515
Number of Substation b	192	192
Ratio a/b	2.6094	2.6823

APPENDIX

for

CHAPTER 6

(6.3-2)

Appendix 6.3-2 Load and Installed Capacity of Distribution Substations (JICA Study Team Plan, Planning Year = 2001 - 2016)

No	ABB	Substation	Voltage (KV)	2001 Bank config	2001 Capacity (MVA)	2001 coincident (MW)	2001 non-coinci (MVA)	2001 utilization factor (%)	2006 Bank config	2006 Capacity (MVA)	2006 coincident (MW)	2006 non-coinci (MVA)	2006 utilization factor (%)
1	BB	Bangbon	69-12 / 89-12	3 x 40	0 / 120	0.00 / 64.08	0.00 / 82.90	0.0 / 69.1	3 x 40	0 / 120	0.00 / 37.90	0.00 / 48.85	0.0 / 40.7
2	BN	Bangchalong	115-24	3 x 60	120	65.67	84.96	70.8	3 x 60	180	91.60	118.07	65.6
3	BA	Bangkapi	69-12 / 69-21	2 x 40 / 1 x 60	80 / 60	34.49 / 33.72	44.62 / 43.63	55.8 / 72.7	1 x 40 / 2 x 60	0 / 160	0.00 / 89.99	0.00 / 115.99	0.0 / 72.5
4	KA	Bangkhaen	115-24	2 x 60	120	36.94	47.79	39.8	3 x 60	180	73.30	91.18	52.5
5	BR	Bungkhunprom	69-12	3 x 40	120	56.50	73.10	60.9	3 x 40	120	71.18	95.62	79.7
6	BL	Bungklo	69-12 / 69-21		0	0.00	0.00	0.0		0	0.00	0.00	0.0
7	BO	Bangkok noi	69-12 / 69-21	2 x 40	80	41.15	53.21	66.6	2 x 40	80	31.32	41.50	55.6
			69-12	1 x 40	40	18.72	24.22	60.6		0	0.00	0.00	0.0
			69-21	1 x 60	60	27.60	35.71	59.5	1 x 40	160	63.22	81.49	50.9
8	BC	Bangkrachao	69-12	2 x 10	20	8.93	11.55	57.8	1 x 60	60	14.58	18.79	31.3
9	BN	Bangpod	69-12 / 69-21	2 x (40) / 1 x 60	80 / 60	39.53 / 31.77	51.14 / 41.10	63.9 / 68.5	3 x 60	0 / 180	0.00 / 76.79	0.00 / 98.98	0.0 / 55.0
10	BG	Bangna	69-12 / 69-24	2 x 40	0 / 80	0.00 / 41.27	0.00 / 53.39	0.0 / 66.7	2 x 40	0 / 80	0.00 / 40.20	0.00 / 51.82	0.0 / 61.8
11	BJ	Bangnamjued	115-24	1 x 20 / 2 x 60	140	70.52	91.24	65.2	1 x 20	110	43.67	56.29	10.2
12	BI	Bangping	115-24	2 x 60	120	66.57	86.13	71.8	2 x 60	120	63.88	82.34	68.6
13	AK	Bangplakod	69-12 / 69-24	3 x (40)	120 / 0	68.51 / 0.00	88.64 / 0.00	73.9 / 0.0	3 x 60	180	38.50	73.11	41.9
14	BP	Bangplee	69-24 / 115-24	2 x 60	120 / 0	59.25 / 0.00	76.66 / 0.00	63.9 / 0.0	2 x 60	120	53.59	69.08	57.6
15	PC	Bangpongpang	69-12 / 69-24 / 115-24	2 x 60	0 / 0 / 120	0.00 / 0.00 / 62.18	0.00 / 0.00 / 80.45	0.0 / 0.0 / 67.0	3 x 60	0 / 0 / 180	0.00 / 0.00 / 86.57	0.00 / 0.00 / 111.59	0.0 / 0.0 / 62.0
16	BD	Bangpood	69-24 / 115-24	2 x 60	0 / 120	0.00 / 48.00	0.00 / 62.10	0.0 / 51.8	3 x 60	0 / 180	0.00 / 74.65	0.00 / 96.22	0.0 / 53.5
17	BU	Bangpu	115-24	2 x 40	80	45.82	59.28	74.1	3 x 60	180	71.36	91.98	51.1
18	RY	Bangrakyai	115-24	2 x 60	120	42.27	54.69	45.6	2 x 60	120	59.22	76.31	63.6
19	BS	Bangsaotong	115-24	1 x 60	60	32.89	42.55	70.9	2 x 60	120	63.99	82.18	68.7
20	BY	Bangyeekhan	69-12 / 69-24	2 x 40	0 / 80	0.00 / 40.78	0.00 / 52.76	0.0 / 56.0	2 x 40	0 / 80	0.00 / 26.22	0.00 / 33.80	0.0 / 12.3
21	CC	Chalongkrung	115-24	1 x 60	60	33.87	43.82	73.0	2 x 60	120	57.74	74.13	62.0
22	CK	Chankasem	69-12 / 69-24	1 x 40	40	17.60	22.77	56.9		0	0.00	0.00	0.0
			69-24	1 x 40	40	48.68	62.98	63.0	2 x 60	140	62.70	80.82	57.7
23	CL	Chidlom	230-12 / 69-24	2 x 50	100 / 0	54.06 / 0.00	69.94 / 0.00	69.9 / 0.0	3 x 60	0 / 120	0.00 / 53.86	0.00 / 69.13	0.0 / 37.9
24	DM	Donmuang	69-12 / 69-24		0 / 0	0.00 / 0.00	0.00 / 0.00	0.0 / 0.0		0 / 0	0.00 / 0.00	0.00 / 0.00	0.0 / 0.0
			115-24	2 x 60	120	51.79	67.00	53.8	3 x 60	180	70.51	90.93	50.5
25	HK	Huaykwang	69-24	3 x 60	180	74.53	96.42	53.6	3 x 60	180	78.71	101.16	56.1
26	KP	Kingpetch	69-12 / 69-24	2 x (40) / 1 x 60	80 / 60	41.94 / 27.19	54.26 / 35.18	67.8 / 58.6	3 x 60	180	89.56	115.14	61.1
27	KJ	Klongjun	69-12 / 69-24	2 x 60	0 / 160	0.00 / 56.22	0.00 / 72.74	0.0 / 45.5	2 x 60	0 / 160	0.00 / 63.29	0.00 / 81.16	0.0 / 50.9
28	KN	Klongtwi	69-12 / 69-24	2 x 60	0 / 120	0.00 / 43.33	0.00 / 56.06	0.0 / 46.7	2 x 60	0 / 120	0.00 / 63.95	0.00 / 88.89	0.0 / 71.1
29	SC	Klongsunmachai	69-12	1 x 40	40	16.49	21.33	53.3		0	0.00	0.00	0.0

No	ABB	Substation	Voltage (KV)	2011 Bank config.	2011 Capacity (MVA)	2011 coincident (MW)	2011 non-coinci (MVA)	2011 util. factor (%)	2016 Bank config.	2016 Capacity (MVA)	2016 coincident (MW)	2016 non coinci (MVA)	2016 util. factor (%)
1	BB	Bangbon	69-12	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			69-24	3 x 40 x	120	49.20	63.27	52.7	3 x 40 x	120	52.19	66.77	55.6
2	BN	Bangchalong	115-24	3 x 60 x	180	95.25	122.49	68.1	3 x 60 x	180	100.09	123.06	71.1
3	BA	Bangkapi	69-12	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			69-24	1 x 40 2 x 60	160	78.93	101.50	63.4	1 x 40 2 x 60	160	91.31	116.83	73.0
4	KA	Bangthaen	115-24	3 x 60 x	180	78.17	100.91	58.1	3 x 60 x	180	89.01	113.88	63.3
5	BK	Bangkhunprom	69-12	3 x 40 x	120	72.14	92.77	77.3	3 x 40 x	120	70.87	90.57	75.6
6	BL	Bangklo	69-12	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			69-24	1 x 40 1 x 60	80	40.56	52.16	65.2	1 x 40	100	48.08	61.51	61.5
7	BO	Bangkok noi	69-12	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			69-24	1 x 40 2 x 60	160	62.98	80.99	50.6	1 x 40 2 x 60	160	66.80	85.47	53.1
8	BC	Bangkrachao	69-12	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			69-24	2 x 60 x	120	22.00	28.29	23.6	2 x 60 x	120	31.24	39.97	33.3
9	BN	Bangmod	69-12	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			69-24	3 x 60 x	180	84.49	108.65	60.4	3 x 60 x	180	86.78	111.03	61.7
10	BG	Bangpa	69-12	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			69-24	2 x 40 1 x 60	80	44.86	57.69	72.1	1 x 40 1 x 60	100	50.60	61.71	61.7
11	BJ	Bangpasued	115-24	1 x 20 2 x 60	140	76.16	97.94	70.0	1 x 20 2 x 60	140	79.01	101.09	72.2
12	BI	Bangping	115-24	3 x 60 x	180	77.33	99.44	55.3	3 x 60 x	180	81.01	103.65	57.6
13	BK	Bangplakod	69-12	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			69-24	3 x 60 x	180	69.42	89.27	49.6	3 x 60 x	180	73.67	94.25	52.4
14	BP	Bangplee	69-24	2 x 60 x	120	61.43	79.00	65.8	2 x 60 x	120	66.31	81.84	70.7
			115-24	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
15	PC	Bangpongpang	69-12	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			69-24	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			115-24	3 x 60 x	180	71.16	91.51	50.8	3 x 60 x	180	81.31	107.91	60.0
16	BD	Bangpood	69-24	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			115-24	3 x 60 x	180	99.95	128.53	71.4	3 x 60 x	180	61.54	82.57	45.9
17	BU	Bangpu	115-24	3 x 60 x	180	72.13	92.76	51.5	3 x 60 x	180	73.57	96.69	53.7
18	RV	Bungrakvai	115-24	2 x 60 x	120	49.69	63.90	53.3	2 x 60 x	120	65.62	83.96	70.0
19	BS	Bangsuntong	115-24	3 x 60 x	180	99.72	128.24	71.2	3 x 60 x	180	81.32	101.04	57.8
20	BY	Bangyeekhan	69-12	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			69-24	2 x 40 x	80	33.39	42.91	53.7	2 x 40 x	80	40.75	52.13	65.2
21	CC	Chulomkrung	115-24	2 x 60 x	120	62.16	79.94	66.6	2 x 60 x	120	61.51	78.70	65.6
22	CK	Chunkasem	69-12	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			69-24	2 x 40 1 x 60	140	88.32	87.86	62.8	2 x 40 1 x 60	140	74.94	95.88	68.5
23	CL	Chidlom	230-12	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			69-24	2 x 60 x	120	59.31	76.27	63.6	2 x 60 x	120	63.72	81.53	67.9
24	DM	Donmuang	69-12	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			69-24	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			115-24	3 x 60 x	180	61.87	83.42	46.3	3 x 60 x	180	78.73	100.73	56.0
25	MK	Muerkrung	69-24	3 x 60 x	180	91.67	117.88	65.5	3 x 60 x	180	106.06	135.69	75.4
26	KP	Kingpetch	69-12	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			69-24	3 x 60 x	180	92.09	118.42	65.8	3 x 60 x	180	98.94	126.59	70.3
27	KJ	Klongjan	69-12	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			69-24	1 x 40 2 x 60	160	67.67	87.02	54.4	1 x 40 2 x 60	160	78.32	100.21	62.6
28	KN	Klongmai	69-12	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			69-24	3 x 60 x	180	74.31	95.56	53.1	3 x 60 x	180	90.18	115.38	61.1
29	SC	Klongsamwachai	69-12	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0

Appendix 6.3-2 Load and Installed Capacity of Distribution Substations (JICA Study Team Plan, Planning Year = 2001 - 2016).

No	ABB	Substation	Voltage (KV)	2001 Bank configuration	2001 Capacity (MVA)	2001 coincident (MW)	2001 non-coinci (MVA)	2001 utilization factor (%)	2006 Bank configuration	2006 Capacity (MVA)	2006 coincident (MW)	2006 non-coinci (MVA)	2006 utilization factor (%)
			69-24	1 × 60	60	27.82	35.99	60.0	×	0	0.00	0.00	0.0
			115-24	×	0	0.00	0.00	0.0	2 × 60	120	51.13	65.91	51.9
30	KS	Klongsanpasumii	69-12	2 × 20 40	80	47.65	61.65	77.1	1 × 40	100	39.61	51.06	51.1
			69-24	×	0	0.00	0.00	0.0	×	60			
31	KN	Klongsarn	69-12	×	0	0.00	0.00	0.0	2 × 40	80	45.82	59.06	73.8
			69-24	2 × 40	80	43.86	56.71	70.9	×	0	0.00	0.00	0.0
32	KT	Klongtoey	69-12	×	0	0.00	0.00	0.0	2 × 40	80	39.96	51.51	61.1
			69-24	2 × 40	80	38.00	49.16	61.5	×	0	0.00	0.00	0.0
33	KG	Klongwatsing	69-12	×	0	0.00	0.00	0.0	2 × 60	120	56.11	72.71	60.6
			69-24	2 × 60	120	43.20	55.89	46.6	×	0	0.00	0.00	0.0
34	KU	Krunai	69-12	1 × 40 (40)	80	36.63	47.39	59.2	2 × 60	120	57.19	73.72	61.1
			69-24	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
35	LK	Lardplakan	115-24	1 × 60	60	21.69	31.91	53.2	1 × 60	60	23.66	30.50	50.8
36	LP	Lardprao	69-12	2 × (40)	80	30.67	39.68	49.6	×	0	0.00	0.00	0.0
			69-24	1 × 60	60	18.36	23.75	39.6	3 × 60	180	63.11	81.39	45.2
37	LM	Lumpini	69-12	1 × 40	40	22.38	28.95	72.4	×	0	0.00	0.00	0.0
			69-24	2 × 40 60	140	71.70	92.76	66.3	3 × 40	180	97.01	125.05	69.5
38	MN	Mahaisawan	69-12	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
			69-24	2 × 40 60	140	62.04	80.27	57.3	2 × 40 60	140	59.00	76.05	51.3
39	MM	Mahuek	69-12	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
			69-24	3 × 60	180	73.85	95.54	53.1	3 × 60	180	72.35	93.26	51.8
40	MA	Mai-ad	69-12	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
			69-24	2 × 40	80	42.71	55.26	69.1	2 × 40	80	42.52	51.81	68.5
41	MS	Makasan	69-12	2 × 40	80	41.99	54.33	67.9	×	0	0.00	0.00	0.0
			69-24	1 × 60	60	28.85	37.33	62.2	2 × 40 60	140	71.90	92.68	66.2
42	MB	Minburi	115-24	2 × 60	120	52.13	67.44	56.2	3 × 60	180	76.21	98.23	51.6
43	MC	Mochit	69-12	2 × 40 (40)	120	65.63	84.91	70.8	2 × 40	140	58.64	75.59	51.0
			69-24	×	0	0.00	0.00	0.0	2 × 60	120	49.71	64.08	53.4
44	MG	Muangmain	115-24	2 × 60	120	57.04	73.80	61.5	2 × 60	120	61.18	83.12	69.3
45	MI	Muangthong	115-24	2 × 60	120	67.66	87.53	72.9	×	0	0.00	0.00	0.0
46	NN	Na-na	69-12	1 × 40	40	16.99	21.98	55.0	×	0	0.00	0.00	0.0
			69-24	2 × 60	120	28.16	36.43	30.4	3 × 60	180	75.85	97.77	51.3
47	NH	Mongkhua	69-12	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
			69-24	2 × 60	120	59.55	77.04	64.2	3 × 60	180	77.53	99.91	55.5
48	NK	Monthaburi	69-12	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
			115-12	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
			115-24	2 × 60	120	65.05	84.16	70.1	3 × 60	180	73.93	95.30	52.9
49	NK	North Bangkok	69-12	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
			69-24	3 × 40	120	41.92	54.24	45.2	3 × 40	120	41.96	51.09	45.1
50	PE	Pakkred	69-12	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
			69-24	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
			115-12	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
			115-24	3 × 60	180	72.45	93.73	52.1	3 × 60	180	61.97	83.75	16.5
51	PN	Paknum	115-24	2 × 60	120	50.89	65.84	54.9	3 × 60	180	61.13	83.05	16.1
52	PS	Petchkasem	69-12	2 × 22.1	41.8	25.74	33.30	74.3	×	0	0.00	0.00	0.0
			69-24	1 × 40	40	16.84	21.79	51.5	1 × 40	100	11.25	57.01	57.0
53	PI	Phaisingto	69-12	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
			69-24	3 × 60	180	89.76	116.13	64.5	1 × 60	210	80.21	103.13	13.1

Appendix 6.3-2 Load and Installed Capacity of Distribution Substations (JICA Study Team Plan, Planning Year = 2001 – 2016)

(4/14)

No	ABB	Substation	Voltage (KV)	2011 Bank configuration	2011 Capacity (MVA)	2011 coincident (MW)	2011 non-coinci (MVA)	2011 utilization factor (%)	2016 Bank configuration	2016 Capacity (MVA)	2016 coincident (MW)	2016 non-coinci (MVA)	2016 utilization factor (%)
30	KS	Klongsanpasuit	69-24		0	0.00	0.00	0.0		0	0.00	0.00	0.0
			115-24	2 × 60	120	67.42	86.70	72.3	3 × 60	180	81.71	108.12	60.2
31	KN	Klongsarn	69-12		0	0.00	0.00	0.0		0	0.00	0.00	0.0
			69-24	1 × 40	100	49.17	63.23	63.2	2 × 60	120	55.21	70.61	58.9
32	KT	Klongtoey	69-12		0	0.00	0.00	0.0		0	0.00	0.00	0.0
			69-24	2 × 60	120	54.21	69.71	58.1	2 × 60	120	55.67	71.23	59.1
33	KG	Klongratsing	69-12		0	0.00	0.00	0.0		0	0.00	0.00	0.0
			69-24	3 × 60	180	92.15	118.50	65.8	3 × 60	180	85.69	109.63	60.9
34	KU	Krunai	69-12		0	0.00	0.00	0.0		0	0.00	0.00	0.0
			69-24	3 × 60	180	76.38	98.22	54.6	3 × 60	180	97.36	121.56	69.2
35	LK	lardplakan	69-12		0	0.00	0.00	0.0		0	0.00	0.00	0.0
			69-24	3 × 60	180	87.47	112.48	62.5	3 × 60	180	105.60	135.11	75.1
36	LP	lardprao	115-24	1 × 60	60	25.17	32.37	51.0	2 × 60	120	35.31	15.21	37.7
37	LN	Lumpini	69-12		0	0.00	0.00	0.0		0	0.00	0.00	0.0
			69-24	3 × 60	180	68.69	88.33	49.1	3 × 60	180	73.35	96.10	53.6
38	MN	Mahaisavan	69-12		0	0.00	0.00	0.0		0	0.00	0.00	0.0
			69-24	3 × 40	180	103.19	132.70	73.7	3 × 40 1 × 60	180	106.56	136.31	75.7
39	MM	Mahamek	69-12		0	0.00	0.00	0.0		0	0.00	0.00	0.0
			69-24	2 × 40	140	73.36	94.34	67.4	2 × 40 1 × 60	110	73.35	96.10	68.9
40	MA	Mai-ad	69-12		0	0.00	0.00	0.0		0	0.00	0.00	0.0
			115-24	3 × 60	180	84.46	108.61	60.3	3 × 60	180	100.11	128.08	71.2
41	MS	Makasan	69-12		0	0.00	0.00	0.0		0	0.00	0.00	0.0
			69-24	1 × 40	100	50.14	64.48	64.5	2 × 60	120	56.81	72.68	60.6
42	MB	Minburi	69-12		0	0.00	0.00	0.0		0	0.00	0.00	0.0
			69-24	2 × 40	140	75.73	97.39	69.6	2 × 40 1 × 60	140	81.37	104.10	74.4
43	MC	Mochit	115-24	3 × 60	180	95.51	122.82	68.2	3 × 60	180	112.14	143.48	79.7
44	MG	Muangmuin	69-12		0	0.00	0.00	0.0		0	0.00	0.00	0.0
			115-24	2 × 40	140	73.06	93.95	67.1	2 × 40 1 × 60	140	80.14	102.53	73.2
45	M1	Muangthong 1	115-24	2 × 60	120	56.81	73.06	60.9	2 × 60	120	62.31	79.76	66.5
46	MN	Na-na	69-12		0	0.00	0.00	0.0		0	0.00	0.00	0.0
			69-24	3 × 60	120	64.61	83.99	69.2		120	65.07	83.25	69.1
47	MH	Mongkhua	69-12		0	0.00	0.00	0.0		0	0.00	0.00	0.0
			115-24	3 × 60	180	86.40	111.11	61.7	3 × 60	180	99.95	127.88	71.0
48	MK	Nonthaburi	69-12		0	0.00	0.00	0.0		0	0.00	0.00	0.0
			69-24	3 × 60	180	81.74	105.12	58.1	3 × 60	180	86.70	110.93	61.6
			115-12		0	0.00	0.00	0.0		0	0.00	0.00	0.0
			115-24		0	0.00	0.00	0.0		0	0.00	0.00	0.0
49	NK	North Bangkok	69-12		0	0.00	0.00	0.0		0	0.00	0.00	0.0
			69-24	3 × 60	180	92.21	118.61	65.9	3 × 60	180	105.32	135.00	75.0
50	PE	Pakkred	69-12		0	0.00	0.00	0.0		0	0.00	0.00	0.0
			69-24	3 × 40	120	62.67	80.59	67.2	3 × 40	120	59.29	75.36	63.2
51	PN	Paknum	115-24	3 × 60	180	71.19	95.41	53.0	3 × 60	180	77.73	99.15	55.3
52	PS	Petchkasem	69-12		0	0.00	0.00	0.0		0	0.00	0.00	0.0
			69-24	1 × 40	100	50.41	61.82	61.8	2 × 60	120	62.00	79.33	66.1
53	PI	Phuisingto	69-12		0	0.00	0.00	0.0		0	0.00	0.00	0.0
			69-24	4 × 60	240	87.97	113.13	47.1	1 × 60	210	101.77	130.21	51.3

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Appendix 6.3-2 Load and Installed Capacity of Distribution Substations (JICA Study Team Plan, Planning Year = 2001 - 2016)

No	ABB	Substation	Voltage (KV)	2001 Capacity (MVA)	coincident (MW)	non-coinci (MVA)	utilization factor (%)	2006 Capacity (MVA)	coincident (MW)	non-coinci (MVA)	utilization factor (%)
54	PJ	Poojao	69-12	0	0.00	0.00	0.0	0	0.00	0.00	0.0
			69-24	120	69.15	89.47	74.6	120	58.16	74.97	62.5
55	PC	Prachuchuen	69-12	0	0.00	0.00	0.0	0	0.00	0.00	0.0
			69-24	100	37.63	48.68	48.7	100	39.36	50.73	50.7
56	PK	Prakanong	69-12	0	0.00	0.00	0.0	0	0.00	0.00	0.0
			69-24	80	40.19	52.00	65.0	80	35.91	46.29	57.9
57	PR	Praksa	115-24	140	68.44	88.35	63.3	110	61.71	83.11	59.6
58	PO	Prannuk	69-12	0	0.00	0.00	0.0	0	0.00	0.00	0.0
			69-24	80	35.64	46.11	57.6	80	35.13	46.08	57.6
59	PD	Prapradaeng	69-12	120	58.09	75.16	62.6	120	61.83	83.57	69.6
			69-24	0	0.00	0.00	0.0	0	0.00	0.00	0.0
60	PA	Prasanmit	69-12	0	0.00	0.00	0.0	0	0.00	0.00	0.0
			69-24	120	62.83	81.29	67.7	120	51.19	65.98	55.0
61	PM	Prathuman	69-12	40	23.81	30.81	77.0	0	0.00	0.00	0.0
			69-24	80	45.32	58.63	73.3	120	52.21	67.30	56.1
62	RT	Ramintra	115-24	120	44.02	56.95	47.5	180	73.91	95.27	52.9
63	RH	Rankhamhaeng	69-12	0	0.00	0.00	0.0	0	0.00	0.00	0.0
			69-24	140	55.49	71.79	51.3	140	50.80	65.48	16.8
64	RN	Rasburana	69-12	120	66.41	85.92	71.6	120	49.02	63.19	52.7
			69-24	0	0.00	0.00	0.0	0	0.00	0.00	0.0
65	RK	Ronklao	115-24	120	56.05	72.52	60.1	120	62.35	80.37	67.0
66	RC	Rungpracha	69-12	0	0.00	0.00	0.0	0	0.00	0.00	0.0
			69-24	180	75.50	97.68	54.3	180	56.10	72.70	40.4
67	SA	Sailom	69-12	80	45.86	59.34	74.2	80	40.51	52.26	65.3
			69-24	0	0.00	0.00	0.0	0	0.00	0.00	0.0
68	SR	Saorong	69-12	0	0.00	0.00	0.0	0	0.00	0.00	0.0
			69-24	180	61.91	80.10	44.5	180	78.39	101.01	56.1
69	SN	Samsen	69-12	80	41.21	53.32	66.7	120	63.79	82.22	68.5
			69-24	40	23.34	30.20	75.5	0	0.00	0.00	0.0
70	SS	Sansab	69-12	40	18.86	24.40	61.0	110	67.90	87.52	62.5
			69-24	80	41.81	54.09	67.6	0	0.00	0.00	0.0
71	SD	Sapandum	69-12	160	84.58	109.43	68.4	160	93.55	120.58	73.1
72	SP	Sapanmai	69-12	0	0.00	0.00	0.0	0	0.00	0.00	0.0
			69-24	120	53.14	68.75	57.3	180	89.92	115.91	61.1
73	SL	Silom	69-12	80	37.10	48.00	60.0	80	43.26	55.76	69.7
			69-24	0	0.00	0.00	0.0	0	0.00	0.00	0.0
74	SY	Sipraya	69-12	40	21.02	27.20	68.0	0	0.00	0.00	0.0
			69-24	40	21.19	27.42	68.5	80	35.31	45.51	56.9
75	SV	Saxnvijai	69-12	40	22.95	29.69	74.2	0	0.00	0.00	0.0
			69-24	120	46.57	60.25	50.2	160	78.29	100.92	63.1
76	SK	South Bangkok	69-12	0	0.00	0.00	0.0	60	11.18	18.56	30.9
			69-24	60	15.02	19.43	32.4				
77	ST	South Thonburi	69-12	0	0.00	0.00	0.0	0	0.00	0.00	0.0
			69-24	120	53.48	69.19	57.7	180	79.82	102.89	57.2
78	YA	Srithunya	69-12	0	0.00	0.00	0.0	0	0.00	0.00	0.0
			115-12	40	19.12	24.74	61.8	0	0.00	0.00	0.0
			115-24	0	0.00	0.00	0.0	120	60.91	78.51	65.1
79	SO	Suansom	69-12	0	0.00	0.00	0.0	0	0.00	0.00	0.0
			69-24	120	55.11	71.30	59.1	120	60.97	78.59	65.3

Appendix 6.3-2 Load and Installed Capacity of Distribution Substations (JICA Study Team Plan, Planning Year = 2001 – 2016)

No	ABB	Substation	Voltage (KV)	2011 Bank configuration	2011 Capacity (MVA)	2011 coincident (MW)	2011 non-coinci (MVA)	2011 utilization factor (%)	2016 Bank configuration	2016 Capacity (MVA)	2016 coincident (MW)	2016 non-coinci (MVA)	2016 utilization factor (%)
54	PJ	Poojao	69-12	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
			69-24	3 × 40	120	70.24	90.33	75.3	2 × 40 1 × 60	110	79.58	101.81	72.7
55	PC	Prachachuen	69-12	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
			69-24	1 × 40 2 × 60	160	78.55	101.02	63.1	2 × 40 2 × 60	160	96.33	123.25	77.0
56	PK	Prakanong	69-12	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
			69-24	2 × 40	80	43.94	56.51	70.6	2 × 40	120	50.81	65.01	51.2
57	PR	Prakasa	115-24	2 × 40 1 × 60	140	65.25	83.91	59.9	1 × 40 1 × 60	140	68.37	87.17	62.5
58	PO	Pranruk	69-12	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
			69-24	2 × 40	80	38.17	49.09	61.1	2 × 40	80	46.57	59.38	71.3
59	PD	Prapradaeng	69-12	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
			69-24	3 × 40	120	62.89	80.87	67.1	3 × 40	120	68.11	87.18	72.7
60	PA	Prasanmit	69-12	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
			69-24	3 × 40	120	58.53	75.27	62.7	3 × 40	120	67.72	86.64	72.2
61	PU	Prathuwan	69-12	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
			69-24	3 × 40	120	51.76	66.56	55.5	3 × 40	120	55.61	71.15	59.3
62	RT	Ramintra	115-24	3 × 60	180	87.13	112.04	62.3	3 × 60	180	108.71	139.12	77.3
63	RH	Ramkhamhaeng	69-12	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
			69-24	2 × 40 1 × 60	140	51.21	65.85	47.0	2 × 40 1 × 60	140	59.28	75.81	51.2
64	RN	Rasburana	69-12	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
			69-24	3 × 40	120	59.32	76.28	63.6	3 × 40	120	71.61	91.62	76.1
65	RK	Roeklao	115-24	3 × 60	180	75.07	96.51	53.6	3 × 60	180	100.80	128.96	71.6
66	RC	Rungpracha	69-12	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
			69-24	3 × 60	180	71.29	91.56	50.9	3 × 60	180	86.88	111.15	61.8
67	SM	Sailom	69-12	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
			69-24	2 × 40	80	41.28	53.09	66.4	1 × 40 1 × 60	100	50.76	64.91	64.9
68	SR	Saoroong	69-12	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
			69-24	3 × 60	180	70.99	91.29	50.7	3 × 60	180	80.43	102.90	57.2
69	SN	Sansen	69-12	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
			69-24	3 × 40	120	68.45	88.02	73.4	2 × 40 1 × 60	140	81.16	107.68	76.9
70	SS	Sansab	69-12	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
			69-24	2 × 40 1 × 60	140	76.43	98.29	70.2	2 × 40 2 × 60	160	88.42	113.13	70.7
71	SD	Sapandam	69-12	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
			69-24	4 × 40	160	90.71	116.65	72.9	1 × 40 1 × 60	160	99.01	126.67	79.2
72	SP	Sapanmai	69-12	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
			69-24	3 × 60	180	99.26	127.65	70.9	3 × 60	180	109.68	140.33	78.0
73	SL	Silom	69-12	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
			69-24	2 × 40	80	44.46	57.17	71.5	1 × 40 1 × 60	100	47.77	61.12	61.1
74	SY	Sipraya	69-12	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
			69-24	2 × 40	80	38.45	49.45	61.8	2 × 40	80	41.32	52.86	66.1
75	SV	Soonvijai	69-12	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
			69-24	1 × 40 2 × 60	160	82.88	106.58	66.6	1 × 40 2 × 60	160	95.99	122.68	76.7
76	SK	South Bangkok	69-12	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
			69-24	1 × 60	60	17.73	22.80	38.0	1 × 60	60	20.09	25.70	42.8
77	ST	South Thonburi	69-12	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
			69-24	3 × 60	180	89.97	115.70	64.3	3 × 60	180	95.13	122.10	67.8
78	YA	Srithanya	69-12	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
			115-12	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
			115-24	3 × 60	180	80.68	103.76	57.6	3 × 60	180	99.19	126.94	70.5
79	SU	Soonsom	69-12	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
			69-24	3 × 60	180	77.30	99.41	55.2	3 × 60	180	87.58	112.05	62.3

No	ABB	ABB	Substation	Voltage (KV)	2001 Bank config	Capacity (MVA)	coincident (MW)	non-coinci (MVA)	utilization factor (%)	2006 Bank config	Capacity (MVA)	coincident (MW)	non-coinci (MVA)	utilization factor (%)
80	SU		Surawong	69-12	1 × 40	40	23.51	30.42	76.0	×	0	0.00	0.00	0.0
				69-24	2 × 60	120	46.20	59.77	49.8	3 × 60	180	61.58	79.38	44.1
81	TS		Taksin	69-12	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
				69-24	2 × 40	80	37.47	48.48	60.6	2 × 40	80	42.08	51.21	67.8
82	TP		Teparak	69-24	2 × 40 / 1 × 60	140	70.60	91.34	65.2	2 × 40 / 1 × 60	140	62.18	80.53	57.5
83	TT		Thanontok	69-12	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
				69-24	2 × 60	120	47.79	61.83	51.5	2 × 60	120	67.83	87.13	72.9
84	TB		Thonburi	69-12	2 × 40	80	42.45	54.92	68.7	×	0	0.00	0.00	0.0
				69-24	1 × 60	60	29.45	38.10	63.5	2 × 40 / 1 × 60	140	38.61	49.77	35.6
85	TK		Tongkung	69-12	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
				69-24	2 × 40	80	41.40	53.56	67.0	2 × 40	80	22.50	29.00	36.3
86	NB		Tangpetchabxsn	69-12	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
				69-24	3 × 60	180	83.28	107.75	59.9	3 × 60	180	83.31	107.39	39.7
87	FT		Tangthonglang	69-12	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
				69-24	3 × 60	180	77.22	99.90	55.5	3 × 60	180	76.38	98.15	51.7
88	WL		Watliob	69-12	3 × 40	120	66.82	86.45	72.0	3 × 40	120	71.97	92.77	77.3
89	YT		Yothee	69-12	2 × 40	80	44.10	57.05	71.3	2 × 40	80	42.15	54.31	67.9
				69-24	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
90	BE		Bangkac	69-12	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
				115-12	1 × (40)	40	22.52	29.14	72.8	×	0	0.00	0.00	0.0
				115-24	1 × 60	60	30.21	39.12	65.2	3 × 60	180	81.01	104.16	58.0
91	BZ		Bangson	69-12	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
				69-24	2 × 60	120	42.80	55.37	46.1	2 × 60	120	47.51	61.23	51.0
92	RI		Bearing	69-24	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
				115-24	2 × 60	120	63.69	82.40	68.7	2 × 60	120	50.52	65.12	54.3
93	EN		Ekamai	69-12	1 × (40)	40	19.94	25.80	64.5	×	0	0.00	0.00	0.0
				69-24	2 × 60	120	62.12	80.37	67.0	×	0	0.00	0.00	0.0
				115-24	×	0	0.00	0.00	0.0	3 × 60	180	83.23	107.29	59.6
94	EB		Ekburi	115-24	2 × 60	120	41.20	53.30	44.4	2 × 60	120	44.97	57.97	48.3
95	HA		Huamak	69-12	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
				69-24	1 × 60	60	21.32	27.58	46.0	×	0	0.00	0.00	0.0
				115-24	×	0	0.00	0.00	0.0	2 × 60	120	63.30	81.85	68.2
96	IN		Intamura	69-24	2 × 60	120	46.02	59.54	49.6	3 × 60	180	79.20	102.09	56.7
97	JR		Jangron	69-12	1 × (40)	40	24.41	31.58	79.0	2 × 60	120	55.41	71.12	59.5
				69-24	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
98	KO		Khator	115-24	3 × 60	180	74.51	96.40	53.6	3 × 60	180	58.70	75.66	42.0
99	KI		Kingkaev	115-24	2 × 60	120	56.79	73.47	61.2	2 × 60	120	50.15	61.61	53.0
100	KH		Klongmahasawad	115-24	2 × 60	120	51.92	67.17	56.0	2 × 60	120	44.20	56.97	37.5
101	LB		Lardkrabung	115-24	2 × 60	120	49.27	63.74	53.1	2 × 60	120	41.63	53.66	11.7
102	M3		Muang thong 3	115-24	2 × 60	120	60.74	78.58	65.5	2 × 60	120	69.36	89.10	71.5
103	KS		Kunsee	69-12	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
				69-24	2 × 60	120	43.04	55.68	46.4	2 × 60	120	65.61	81.57	70.5
104	PP		Pradipat	69-12	1 × (40)	40	22.25	28.79	72.0	×	0	0.00	0.00	0.0
				69-24	1 × 60	60	31.07	40.20	67.0	2 × 60	120	61.05	82.57	68.8
105	SI		Sainuatip	69-12	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
				69-24	3 × 60	180	62.29	80.59	44.8	3 × 60	180	73.79	95.11	52.8
				115-24	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
106	SB		Sanambinnum	69-12	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
				69-24	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0

Appendix 6.3-2 Load and Installed Capacity of Distribution Substations (JICA Study Team Plan, Planning Year = 2001 - 2016)

No	ABB	Substation	Voltage (kV)	2011 Bank configuration	2011 Capacity (MVA)	2011 coincident (MW)	2011 non-coinci (MVA)	2011 utilization factor (%)	2016 Bank configuration	2016 Capacity (MVA)	2016 coincident (MW)	2016 non-coinci (MVA)	2016 utilization factor (%)
80	SU	Suravong	69-12	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			69-24	3 x x 60	180	71.61	92.13	51.2	3 x x 60	180	76.97	98.18	51.7
81	TS	Taksin	69-12	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			69-24	2 x x 40	80	42.58	54.76	68.5	2 x x 40	80	43.73	55.95	69.9
82	TP	Teparuk	69-12	1 x	140	59.99	77.15	55.1	1 x	140	67.67	86.58	61.8
			69-21	2 x x 40	60				2 x x 40	60			
83	TT	Thannntok	69-12	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			69-21	3 x x 60	180	76.20	97.99	54.1	3 x x 60	180	90.31	115.35	61.2
84	TB	Thonburi	69-12	1 x	0	0.00	0.00	0.0	1 x	0	0.00	0.00	0.0
			69-21	2 x x 40	140	65.50	84.23	60.2	2 x x 40	140	67.27	86.07	61.5
85	TK	Tongkung	69-12		0	0.00	0.00	0.0		0	0.00	0.00	0.0
			69-21	2 x x 40	80	31.36	40.33	50.4	2 x x 40	80	35.32	45.45	56.8
86	YB	Yangpotchaboon	69-12	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			69-24	3 x x 60	180	102.27	131.51	73.1	3 x x 60	180	92.25	118.03	65.6
87	YT	Yangthonglang	69-12	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			69-24	3 x x 60	180	84.82	109.08	60.6	3 x x 60	180	93.03	119.03	66.1
88	YL	Yatlicb	69-12	x	120	71.13	91.47	76.2	x	160	77.64	99.31	62.1
			69-24	4 x x 40	0	0.00	0.00	0.0	4 x x 40	0	0.00	0.00	0.0
89	YT	Yolhee	69-12	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			69-24	2 x x 40	80	43.27	55.64	69.6	2 x x 40	80	46.19	59.18	71.1
90	BE	Bangkae	69-12	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			115-12	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			115-24	3 x x 60	180	74.61	95.95	53.3	3 x x 60	180	91.71	117.31	65.2
91	BZ	Bungson	69-12	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			69-24	2 x x 60	120	63.58	81.76	68.1	3 x x 60	180	78.18	100.02	55.6
92	RI	Bearing	69-24	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			115-24	3 x x 60	180	94.60	121.65	67.6	3 x x 60	180	106.70	136.52	75.8
93	EM	Ekamai	69-12	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			69-24	x	0	0.00	0.00	0.0	x x	0	0.00	0.00	0.0
			115-24	3 x x 60	180	69.82	89.79	49.9	3 x x 60	180	80.77	103.31	57.1
94	EB	Ekburi	115-24	2 x x 60	120	64.32	82.71	68.9	3 x x 60	180	77.50	99.16	55.1
95	HA	Huamak	69-12	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			69-24	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			115-24	2 x x 60	120	67.55	86.87	72.4	3 x x 60	180	78.15	99.99	55.6
96	IN	Intamara	69-24	3 x x 60	180	87.41	112.41	62.5	3 x x 60	180	95.88	122.67	68.2
97	JR	Jangron	69-12	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			69-24	3 x x 60	180	85.18	109.54	60.9	3 x x 60	180	102.81	131.57	73.1
98	KO	Khntor	115-24	3 x x 60	180	71.76	92.28	51.3	3 x x 60	180	75.18	96.19	53.1
99	KI	Kingluee	115-24	2 x x 60	120	53.37	68.63	57.2	2 x x 60	120	61.11	78.18	65.2
100	KH	Klongnahasaud	115-24	3 x x 60	180	98.97	127.28	70.7	3 x x 60	180	91.06	116.50	64.7
101	LB	Lardkrabang	115-24	3 x x 60	180	78.84	101.39	56.3	3 x x 60	180	91.36	120.72	67.1
102	N3	Muangtheng 3	115-24	2 x x 60	120	69.51	89.39	74.5	3 x x 60	180	91.91	121.13	67.5
103	NS	Nonsee	69-12	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			69-24	3 x x 60	180	87.35	112.33	62.1	3 x x 60	180	103.51	132.17	73.6
104	PP	Pradipat	69-12	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			69-24	3 x x 60	180	87.95	113.10	62.8	3 x x 60	180	108.13	138.35	76.9
105	SA	Sairuntip	69-12	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			69-21	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			115-24	3 x x 60	180	87.19	112.01	62.2	3 x x 60	180	100.76	128.92	71.6
106	SB	Sumnabinnan	69-12	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			69-21	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0

Appendix 6.3-2 Load and Installed Capacity of Distribution Substations (JICA Study Team Plan, Planning Year = 2001 - 2016)

No.	ABB	Substation	Voltage (kV)	2001 Bank configuration	Capacity (MVA)	coincident (MW)	non-coinci (MVA)	utilization factor (%)	2006 Bank configuration	Capacity (MVA)	coincident (MW)	non-coinci (MVA)	utilization factor (%)
			115-12	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
107	RG	Saorahong	115-21	2 x 60	120	55.89	72.31	60.3	3 x 60	180	77.91	100.43	55.8
108	OB	South Bangplee	115-21	1 x 60	60	25.02	32.37	51.0	2 x 60	120	48.61	62.66	52.2
109	SE	Srisian	115-21	2 x 60	120	59.34	76.77	61.0	2 x 60	120	65.67	81.65	70.5
110	SS	Saanluang	115-21	3 x 60	180	85.68	110.85	61.6	3 x 60	180	88.12	113.59	63.1
111	UK	Surasak	69-21	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			115-21	3 x 60	180	56.47	73.06	40.6	3 x 60	180	81.61	105.19	58.4
			69-12	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
112	TN	Taiban	69-21	2 x 60	120	31.90	45.15	37.6	2 x 60	120	45.91	59.22	49.1
113	TW	Taweewattana	115-21	2 x 60	120	62.39	80.72	67.3	2 x 60	120	52.67	67.89	56.6
114	TR	Thonburiroa	69-12	2 x (40)	80	61.26	79.26	66.1	2 x 60	120	45.88	59.11	49.3
			115-21	x	0	43.08	55.74	69.7	x	0	0.00	0.00	0.0
115	TH	Tungsonghong	69-21	2 x 60	120	0.00	0.00	0.0	2 x 60	120	51.70	70.51	58.8
			115-21			41.26	53.38	41.5			63.70	81.68	70.6
116	YK	Yenarkart	69-12	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			69-21	2 x 60	120	44.81	57.98	48.3	2 x 60	180	86.17	111.45	61.9
117	AB	Bangbor	115-21	2 x 60	120	43.07	55.72	46.4	2 x 60	120	35.54	45.83	38.2
118	JK	Bangjak	69-12	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			115-12	1 x (40)	40	13.02	16.85	42.1	x	0	0.00	0.00	0.0
			115-21	1 x 60	60	19.16	24.79	41.3	3 x 60	180	81.59	109.01	60.6
119	KD	Bangkradee	69-12	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			115-21	2 x 60	120	35.28	45.64	38.0	2 x 60	120	43.33	56.11	46.8
120	BH	Bangshan	115-21	2 x 60	120	37.78	48.88	40.7	2 x 60	120	52.02	67.06	55.9
121	BM	Bunmai	69-24	2 x 60	120	28.39	36.73	30.6	2 x 60	120	44.92	57.90	48.3
122	DD	Dindaeng	69-12	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			115-12	2 x (40)	80	45.40	58.74	73.4	x	0	0.00	0.00	0.0
			115-24	x	0	0.00	0.00	0.0	2 x 60	120	62.14	80.18	67.1
123	EC	Ekachai	69-12	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			115-21	2 x 60	120	24.35	31.50	26.3	2 x 60	120	45.30	58.39	48.7
124	GK	Gheaklang	69-24	2 x 60	120	48.45	62.68	52.2	x	0	0.00	0.00	0.0
			115-21	2 x 60	120	0.00	0.00	0.0	2 x 60	180	86.50	111.50	61.9
125	JW	Jangwatana	115-21	2 x 60	120	59.52	77.01	64.2	3 x 60	180	98.63	127.13	70.6
126	JJ	Jatujak	69-12	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			69-24	2 x 60	120	23.16	29.98	25.0	2 x 60	120	67.19	86.99	72.5
			115-24	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
127	KE	Kaset	69-12	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			69-21	2 x 60	120	51.65	66.82	55.7	2 x 60	120	66.53	85.82	71.5
128	KG	Klongkum	115-21	2 x 60	120	47.15	61.00	50.8	2 x 60	120	52.31	67.13	56.2
129	KL	Klongprapa	115-21	2 x 60	120	32.30	41.79	34.8	2 x 60	120	63.08	81.30	67.8
130	NU	Nitr udom	69-12	1 x 40	40	21.53	27.85	69.6	x	0	0.00	0.00	0.0
			69-24	x	0	0.00	0.00	0.0	2 x 60	120	67.90	87.53	72.9
131	NJ	Muangthong 4	115-21	2 x 60	120	59.50	76.98	61.2	2 x 60	120	67.21	86.63	72.2
132	N5	Muangthong 5	115-21	2 x 60	120	59.19	76.58	63.8	2 x 60	120	66.65	85.91	71.6
133	N6	Muangthong 6	115-21	2 x 60	120	59.54	77.03	61.2	2 x 60	120	66.31	85.17	71.2
134	N7	Muangthong 7	115-21	2 x 60	120	63.01	81.52	67.9	2 x 60	120	62.80	80.95	67.5
135	NL	Nangloeng	69-12	2 x 40	80	44.19	57.17	71.5	2 x 40	120	62.60	80.60	67.3
136	TA	Patanakarn	115-21	3 x 60	120	34.80	45.02	37.5	3 x 60	180	103.33	133.19	71.0
137	PL	Pluhpla	115-21	2 x 60	120	42.70	55.25	46.0	2 x 60	120	47.67	61.15	51.2

Appendix 6.3-2 Load and Installed Capacity of Distribution Substations (JICA Study Team Plan, Planning Year = 2001 - 2016)

No	ABB	Substation	Voltage (kV)	2011					2016				
				Bank configuration	Capacity (MVA)	coincident (MW)	non-coinci (MVA)	utilization factor (%)	Bank configuration	Capacity (MVA)	coincident (MW)	non coinci (MVA)	utilization factor (%)
107	RC	Saorahong	115-12	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			115-24	3 x 60 x	180	81.92	105.35	58.5	3 x 60 x	180	110.01	110.79	73.2
108	OR	South Bangpiec	115-24	2 x 60 x	120	66.52	85.54	71.3	2 x 60 x	120	61.57	78.78	65.7
109	SE	Sriciam	115-24	2 x 60 x	120	47.61	61.23	51.0	2 x 60 x	120	52.24	66.81	55.7
110	SG	Suanluang	69-24	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			115-24	3 x 60 x	180	99.19	127.56	70.9	3 x 60 x	180	111.88	113.11	79.5
111	UK	Surasak	69-12	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			69-24	3 x 60 x	180	86.36	111.06	61.7	3 x 60 x	180	99.96	127.89	71.1
112	TN	Taitan	69-24	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			115-24	2 x 60 x	120	47.98	61.70	51.3	2 x 60 x	120	51.35	65.95	55.0
113	TF	Taweevattana	115-24	2 x 60 x	120	58.08	74.69	62.2	2 x 60 x	120	60.85	77.85	61.9
114	TR	Thunburirom	69-12	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			115-24	2 x 60 x	120	48.01	61.74	51.5	2 x 60 x	120	48.76	62.33	52.0
115	TH	Tungsongbung	69-24	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			115-24	2 x 60 x	120	47.30	60.83	50.7	2 x 60 x	120	51.25	65.57	51.6
116	YK	Venarkart	69-12	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			69-24	3 x 60 x	180	83.62	107.53	59.7	3 x 60 x	180	112.32	143.71	79.8
117	AB	Bangtor	69-12	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			69-24	3 x 60 x	180	96.42	123.99	68.9	3 x 60 x	180	81.65	101.16	58.0
118	JK	Bangjak	69-12	x					x				
			115-12	x					x				
			115-24	2 x 60 x	120	67.68	87.03	72.5	2 x 60 x	120	55.31	70.80	59.0
119	KD	Bangkradee	69-12	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			115-24	3 x 60 x	180	92.75	119.27	66.3	3 x 60 x	180	101.62	133.85	71.4
120	BH	Bangshan	115-24	3 x 60 x	180	73.29	94.25	52.4	3 x 60 x	180	92.12	117.86	65.5
121	NI	Banmai	69-24	2 x 60 x	120	97.47	125.35	69.6	2 x 60 x	180	98.90	126.11	70.2
122	DD	Bindaeng	69-12	x					x				
			69-24	x					x				
			115-24	3 x 60 x	120	67.24	86.47	72.1	3 x 60 x	180	81.61	101.41	58.0
123	EC	Ekachai	69-12	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			115-24	3 x 60 x	180	76.58	98.48	50.6	3 x 60 x	180	81.09	101.72	58.2
124	GK	Choeklang	69-24	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			115-24	3 x 60 x	180	84.45	108.60	60.3	3 x 60 x	180	106.15	135.81	73.5
125	JW	Jangwatana	115-24	3 x 60 x	180	94.66	121.73	67.6	3 x 60 x	180	109.31	110.11	77.8
126	JJ	Jatujag	69-12	x					x				
			69-24	x					x				
			115-24	2 x 60 x	180	98.85	127.12	70.6	2 x 60 x	180	101.32	129.89	72.2
127	KE	Kaset	69-12	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			69-24	3 x 60 x	180	76.58	98.48	51.7	3 x 60 x	180	81.09	107.17	59.7
128	KG	Klongkum	115-24	3 x 60 x	180	91.38	117.51	65.3	3 x 60 x	180	101.36	133.52	71.2
129	KL	Klongprapa	115-24	3 x 60 x	180	75.09	96.56	53.7	3 x 60 x	180	111.06	112.09	78.9
130	NU	Nitruden	69-12	x	0	0.00	0.00	0.0	x	0	0.00	0.00	0.0
			69-24	3 x 60 x	180	80.98	104.14	57.9	3 x 60 x	180	98.28	123.71	69.9
131	M4	Muangthong 4	115-24	3 x 60 x	180	86.18	110.82	61.6	3 x 60 x	180	97.61	121.92	69.1
132	M5	Muangthong 5	115-24	2 x 60 x	120	67.35	86.61	72.2	2 x 60 x	180	92.18	118.32	65.7
133	M6	Muangthong 6	115-24	2 x 60 x	120	66.79	85.89	71.6	2 x 60 x	120	58.09	71.32	61.9
134	M7	Muangthong 7	115-24	2 x 60 x	120	66.45	85.45	71.2	2 x 60 x	120	57.71	73.83	61.5
135	NL	Nunglerng	69-12	3 x 60 x	120	62.93	80.93	67.4	1 x 40 x	160	92.75	111.97	62.2
136	TA	Patarukarn	115-24	3 x 60 x	180	62.20	79.98	66.7	3 x 60 x	180	93.63	118.66	74.2
137	PL	Plubpla	115-24	2 x 60 x	120	80.89	104.02	57.8	2 x 60 x	120	66.13	119.79	66.6
						57.16	73.51	61.3				81.61	70.5

Appendix 6.3-2 Load and Installed Capacity of Distribution Substations (JICA Study Team Plan, Planning Year = 2001 - 2016)

No	ABB	Substation	Voltage (KV)	2001 Bank configuration	2001 Capacity (MVA)	2001 coincident (MW)	2001 non-coinci (MVA)	2001 utilization factor (%)	2006 Bank configuration	2006 Capacity (MVA)	2006 coincident (MW)	2006 non-coinci (MVA)	2006 utilization factor (%)
138	PT	Praves	115-24	2 × 60	120	43.61	56.12	47.0	2 × 60	120	62.51	80.62	67.2
139	KP	Prompong	115-24	2 × 60	120	35.75	46.25	38.5	2 × 60	120	70.31	90.67	75.6
140	SI	Sainoi	115-24	2 × 60	120	22.36	28.93	24.1	2 × 60	120	42.71	55.05	45.9
141	YN	Saeyarn	115-12	2 × (40)	80	42.50	54.99	68.7		0	0.00	0.00	0.0
			115-24	×		0.00	0.00	0.0	2 × 60	120	61.17	79.23	66.0
142	SH	Salorn	115-24	2 × 60	120	53.35	69.02	57.5	2 × 60	120	61.32	79.01	65.9
143	HP	Shinplee	115-24	2 × 60	120	55.54	71.86	59.9	2 × 60	120	44.01	56.77	47.3
144	SR	Sriwiang	69-12	2 × (40)	80	34.88	45.13	56.4		0	0.00	0.00	0.0
			69-24	×		0.00	0.00	0.0	2 × 60	120	45.91	59.22	49.1
145	YI	Saanui	115-24	2 × 60	120	21.36	27.64	23.0	2 × 60	120	30.58	39.12	32.9
146	YW	Suvintavong	69-12	2 × 60	120	16.36	21.17	17.6	2 × 60	120	40.98	52.82	11.0
147	TI	Tha-kwian	69-12	2 × (40)	80	38.95	50.39	63.0		0	0.00	0.00	0.0
			69-24	×		0.00	0.00	0.0	2 × 60	120	54.08	69.71	58.1
148	TC	Trokchan	115-12	2 × (40)	80	34.72	44.92	56.2		0	0.00	0.00	0.0
			115-24	×		0.00	0.00	0.0	3 × 60	180	79.11	102.40	56.9
149	TY	Tubyao	115-24	2 × 60	120	30.36	39.28	32.7	2 × 60	120	51.02	65.76	51.8
150	WK	Wattanapueng	69-12	×	0	0.00	0.00	0.0		0	0.00	0.00	0.0
			69-24	2 × 60	120	34.25	44.31	36.9	2 × 60	120	52.45	67.61	56.3
151	FR	Tuttakart	69-12	×	0	0.00	0.00	0.0		0	0.00	0.00	0.0
			69-24	2 × 60	120	33.32	43.11	35.9	2 × 60	120	44.09	56.83	47.1
152	AK	Asoke	115-24	×	0	0.00	0.00	0.0	2 × 60	120	64.20	82.75	69.0
153	BT	Bangbuatong	115-24	×	0	0.00	0.00	0.0		0	0.00	0.00	0.0
154	HS	Banghuasue	115-24	×	0	0.00	0.00	0.0	2 × 60	120	63.33	81.63	68.0
155	BW	Bongkaer	115-24	×	0	0.00	0.00	0.0	2 × 60	120	37.02	47.72	39.8
156	PY	Bangpleevai	115-24	×	0	0.00	0.00	0.0		0	0.00	0.00	0.0
157	TD	Bangtalard	115-24	×	0	0.00	0.00	0.0	2 × 60	120	45.32	58.12	48.7
158	JB	Jorakabue	115-24	×	0	0.00	0.00	0.0	3 × 60	180	78.22	100.82	56.0
159	KD	Klongbangpi	115-24	×	0	0.00	0.00	0.0		0	0.00	0.00	0.0
160	LA	Klongna	115-24	×	0	0.00	0.00	0.0	2 × 60	120	38.15	49.18	41.0
161	CP	Klongpuae	115-24	×	0	0.00	0.00	0.0		0	0.00	0.00	0.0
162	KR	Krungtephreela	115-24	×	0	0.00	0.00	0.0		0	0.00	0.00	0.0
163	LH	Lad & House	115-24	×	0	0.00	0.00	0.0	2 × 60	120	69.25	89.26	74.1
164	M8	Muangthong 8	115-24	×	0	0.00	0.00	0.0	2 × 60	120	61.18	78.86	65.7
165	M9	Muangthong 9	115-24	×	0	0.00	0.00	0.0	2 × 60	120	54.26	69.91	58.3
166	RL	Prarunkao	115-24	×	0	0.00	0.00	0.0	2 × 60	120	48.99	63.15	32.6
167	RJ	Rajchuprarop	115-24	×	0	0.00	0.00	0.0	3 × 60	180	69.78	89.95	50.0
168	NP	Sananpao	115-24	×	0	0.00	0.00	0.0	2 × 60	120	63.80	82.21	68.5
169	OM	Sananikom	115-24	×	0	0.00	0.00	0.0	2 × 60	120	57.75	71.11	62.0
170	XS	Songsunikom	115-24	×	0	0.00	0.00	0.0	2 × 60	120	37.63	48.51	40.1
171	IR	Srimakarin	115-24	×	0	0.00	0.00	0.0	2 × 60	120	51.13	65.91	51.9
172	LO	Thonglor	115-24	×	0	0.00	0.00	0.0		0	0.00	0.00	0.0
173	TU	Tungkru	115-24	×	0	0.00	0.00	0.0		0	0.00	0.00	0.0
174	WD	Watdeddd	69-24	×	0	0.00	0.00	0.0	2 × 60	120	49.07	63.25	52.7
175	GY	Bangkruay	115-24	×	0	0.00	0.00	0.0		0	0.00	0.00	0.0
176	GG	Bangpany	115-24	×	0	0.00	0.00	0.0		0	0.00	0.00	0.0
177	AA	Bangpla	115-24	×	0	0.00	0.00	0.0		0	0.00	0.00	0.0
178	LD	Klongdan	115-24	×	0	0.00	0.00	0.0		0	0.00	0.00	0.0
179	GT	Klonggratiam	115-24	×	0	0.00	0.00	0.0		0	0.00	0.00	0.0
180	LG	Luangpang	115-24	×	0	0.00	0.00	0.0		0	0.00	0.00	0.0

No	ABB	Substation	Voltage (kV)	2011 Bank config.	2011 Capacity (MVA)	2011 coincident (MW)	2011 non-coinci (MVA)	2011 util. factor (%)	2016 Bank config.	2016 Capacity (MVA)	2016 coincident (MW)	2016 non-coinci (MVA)	2016 util. factor (%)
138	PV	Praves	115-24	2x60	120	62.49	80.36	67.0	3x60	180	99.49	127.29	70.7
139	KP	Prompong	115-24	3x60	180	77.28	99.38	55.2	3x60	180	89.10	111.38	63.5
140	SI	Sainoi	115-24	2x60	120	49.80	64.04	53.4	2x60	120	65.77	81.15	70.1
141	YN	Sawyarn	115-12	x60	0	0.00	0.00	0.0	x60	0	0.00	0.00	0.0
142	SH	Satorn	115-24	3x60	180	101.07	129.97	72.2	3x60	180	90.96	116.38	64.7
143	HP	Shaplee	115-24	3x60	180	95.22	122.45	68.0	3x60	180	102.31	130.90	72.7
144	SN	Sririang	69-12	3x60	180	81.36	108.48	60.3	3x60	180	62.65	89.15	44.5
145	YI	Suanvai	69-24	2x60	0	0.00	0.00	0.0	x60	0	0.00	0.00	0.0
146	IV	Surintawong	115-24	2x60	120	47.98	61.70	51.4	2x60	120	51.55	65.95	55.0
147	TI	Tha-kvian	69-12	2x60	120	39.06	50.23	41.9	2x60	120	52.17	67.13	55.9
148	TC	Troikchan	115-12	2x60	120	45.36	58.33	48.6	2x60	120	62.85	80.11	67.0
149	TV	Tubvao	115-24	x60	0	0.00	0.00	0.0	x60	0	0.00	0.00	0.0
150	WK	Watkampaeng	69-12	3x60	180	91.72	117.95	65.5	3x60	180	108.71	139.09	77.3
151	WR	Wuttakart	69-24	2x60	120	61.46	79.04	65.9	2x60	120	98.78	126.38	70.2
152	AK	Asoke	69-12	x60	0	0.00	0.00	0.0	x60	0	0.00	0.00	0.0
153	BT	Bangboxtong	115-24	3x60	180	85.18	109.54	60.9	3x60	180	110.13	141.29	78.5
154	RS	Banghuansae	115-24	x60	0	0.00	0.00	0.0	x60	0	0.00	0.00	0.0
155	BW	Bangkaev	115-24	2x60	120	50.74	65.25	54.4	2x60	120	53.78	68.81	57.3
156	PV	Bangpleevai	115-24	3x60	180	76.94	98.94	55.0	3x60	180	89.01	113.88	63.3
157	TD	Bangtalard	115-24	3x60	180	89.48	115.07	63.9	3x60	180	80.99	103.62	57.6
158	JB	Jorrakabuo	115-24	3x60	180	72.05	92.65	51.5	3x60	180	81.62	101.13	58.0
159	KB	Klongbangpi	115-24	2x60	120	44.20	56.84	47.4	2x60	120	49.86	63.79	53.2
160	LA	Klongna	115-24	2x60	120	61.76	79.42	66.2	2x60	120	54.46	69.68	58.1
161	GP	Klongpune	115-24	2x60	120	58.14	74.77	62.3	2x60	120	68.95	88.21	73.5
162	KR	Krunptopkrouta	115-24	3x60	180	110.42	142.00	78.9	3x60	180	104.61	133.92	74.4
163	LH	Land & House	115-24	3x60	180	70.83	91.09	50.6	3x60	180	77.37	99.99	55.0
164	M8	Muangthong 8	115-24	2x60	120	47.80	61.47	51.2	2x60	120	51.79	66.26	55.2
165	M9	Muangthong 9	115-24	2x60	120	48.87	62.85	52.4	2x60	180	90.56	115.87	64.1
166	RL	Prarankaw	115-24	3x60	180	89.16	111.66	63.7	3x60	180	95.80	122.57	68.1
167	RJ	Rajchaprarop	115-24	3x60	180	82.77	106.41	59.1	3x60	180	93.36	119.15	66.1
168	NP	Sanampao	115-24	2x60	120	61.32	78.86	65.7	2x60	120	68.83	88.06	73.1
169	OM	Saranikom	115-24	2x60	120	54.38	69.93	58.3	2x60	120	61.01	78.09	65.1
170	OS	Songsumikom	115-24	2x60	120	51.72	66.51	55.4	2x60	120	59.81	76.56	63.8
171	IR	Srinakarin	115-24	3x60	180	88.30	113.55	63.1	3x60	180	91.88	121.39	67.1
172	LD	Thongtor	115-24	2x60	120	54.13	69.61	58.0	2x60	120	66.55	85.15	71.0
173	TU	Tungkru	115-24	2x60	120	66.95	86.10	71.8	3x60	180	89.93	115.06	63.9
174	ID	Watdeebod	69-24	2x60	120	45.91	60.33	50.3	2x60	120	65.00	83.16	69.3
175	CY	Bangkruay	115-24	2x60	120	53.26	68.49	57.1	3x60	180	80.32	103.02	57.2
176	GG	Bangpang	115-24	2x60	120	48.63	62.54	52.1	2x60	120	56.26	71.98	60.0
177	AA	Bangpla	115-24	2x60	120	61.55	79.15	66.0	2x60	120	66.69	85.32	71.1
178	LD	Klongdan	115-24	2x60	120	61.96	79.68	66.1	2x60	120	68.38	87.49	48.6
179	GT	Klongkratua	115-24	x60	0	0.00	0.00	0.0	3x60	180	80.89	103.19	37.6
180	LG	Luangpang	115-24	2x60	120	54.47	70.05	58.1	2x60	120	60.75	77.73	69.3

No	ABB	Substation	Voltage (KV)	2001 Bank configuration	2001 Capacity (MVA)	2001 coincident (MW)	2001 non-coinci (MVA)	2001 utilization factor (%)	2006 Bank configuration	2006 Capacity (MVA)	2006 coincident (MW)	2006 non-coinci (MVA)	2006 utilization factor (%)
181	LS	Lumpayshe	115-24	x x	0	0.00	0.00	0.0	x x	0	0.00	0.00	0.0
182	NI	Nimitmai	115-24	x x	0	0.00	0.00	0.0	x x	0	0.00	0.00	0.0
183	RY	Nongrai	115-24	x x	0	0.00	0.00	0.0	x x	0	0.00	0.00	0.0
184	IL	Pinklao	115-24	x x	0	0.00	0.00	0.0	x x	0	0.00	0.00	0.0
185	PH	Pongpetch	115-24	x x	0	0.00	0.00	0.0	x x	0	0.00	0.00	0.0
186	PT	Puttamonton	115-24	x x	0	0.00	0.00	0.0	x x	0	0.00	0.00	0.0
187	RO	Rajchakru	115-24	x x	0	0.00	0.00	0.0	x x	0	0.00	0.00	0.0
188	RR	Rajdamri	115-24	x x	0	0.00	0.00	0.0	x x	0	0.00	0.00	0.0
189	AT	Satorntai	115-24	x x	0	0.00	0.00	0.0	x x	0	0.00	0.00	0.0
190	TL	Tulingchan	115-24	x x	0	0.00	0.00	0.0	x x	0	0.00	0.00	0.0
191	TN	Tiunruanmit	115-24	x x	0	0.00	0.00	0.0	x x	0	0.00	0.00	0.0
192	RM	Trimit	69-12	x x	0	0.00	0.00	0.0	x x	0	0.00	0.00	0.0
		Total			17,545	7,664.89	9,916.55	56.5		22,310	9,969.28	12,850.26	57.5

Diversity Factor   1.1825   1.1820
Power Factor   0.9140   0.9170

Number of Bank a   341   404
Number of Substation b   151   167
Ratio : a/b   2.2583   2.4192

Appendix 6.3-2　Load and Installed Capacity of Distribution Substations (JICA Study Team Plan, Planning Year = 2001 - 2016)

No	ABB	Substation	Voltage (kV)	2011 Bank configuration	2011 Capacity (MVA)	2011 coincident (MW)	2011 non-coinci (MVA)	2011 utilization factor (%)	2016 Bank configuration	2016 Capacity (MVA)	2016 coincident (MW)	2016 non-coinci (MVA)	2016 utilization factor (%)
181	LS	Lumpaychc	115-24	x	0	0.00	0.00	0.0	3 x 60	180	107.79	137.91	76.6
182	NI	Nimilmai	115-24	2 x 60	120	46.92	60.34	50.3	2 x 60	120	65.01	83.18	69.3
183	NY	Nongyai	115-24	2 x 60	120	50.23	61.60	53.8	2 x 60	120	51.91	66.41	55.3
184	IL	Pinklao	115-24	3 x 60	180	89.60	115.22	61.0	3 x 60	180	109.32	139.86	77.7
185	PH	Pongpetch	115-24		0	0.00	0.00	0.0	2 x 60	120	61.32	82.29	68.6
186	PT	Puttamonton	115-24		0	0.00	0.00	0.0	2 x 60	120	57.10	73.05	60.9
187	RO	Rajchakru	115-24	2 x 60	120	55.48	71.35	59.5	2 x 60	120	68.22	87.28	72.7
188	RR	Rajdamri	115-24		0	0.00	0.00	0.0	2 x 60	120	52.88	67.66	56.4
189	AT	Satorntai	115-24	3 x 60	180	77.51	99.68	55.4	3 x 60	180	83.28	106.55	59.2
190	TL	Talingchan	115-24		0	0.00	0.00	0.0	2 x 60	120	57.53	73.60	61.3
191	TN	Tiaruesmit	115-24	2 x 60	120	51.35	66.03	55.0	2 x 60	120	39.41	76.01	63.3
192	KN	Trinit	69-12	3 x 40	120	70.97	91.27	76.1	3 x 40	120	60.50	77.10	61.5
		Total			26,700	12,645.85	16,262.11	60.9		29,210	11,873.67	19,029.65	63.1

	2011	2016
Diversity Factor	1.1818	1.1818
Power Factor	0.9190	0.9237
Number of Bank　a	476	515
Number of Substation　b	182	192
Ratio　a/b	2.6154	2.6823