APPENDIX

for

CHAPTER 6

(6.3-4)

Appendix 6.3-4 Load and Installed Capacity of Distribution Substations (JICA Study Team Plan, Planning Year = 1997 - 2001)

No	ABB	Substation	Voltage (KV)	1996 Bank configuration	Capacity (MVA)	coincident (MW)	non-coinci (MVA)	utilization factor (%)	1997 Bank configuration	Capacity (MVA)	coincident (MW)	non-coinci (MVA)	utilization factor (%)
1	BB	Bangbon	69-12	3 × 40 ×	120	59.67	77.66	64.7	3 × 40 ×	120	55.90	72.55	60.5
			69-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
2	BN	Bangchalong	115-24	1 × 60 ×	60	32.04	41.70	69.5	2 × 60 ×	120	61.63	83.87	69.9
3	BA	Bangkapi	69-12	2 × 40 ×	80	38.41	49.99	62.5	2 × 40 ×	80	28.47	36.95	46.2
			69-24	1 × 60 ×	60	21.93	28.54	47.6	1 × 60 ×	60	22.00	28.55	47.6
4	KA	Bangkhaen	115-24	1 × 60 ×	60	22.38	29.13	48.6	1 × 60 ×	60	27.15	35.23	58.7
5	BR	Bangkhunprom	69-12	3 × 40 ×	120	64.58	84.05	70.1	3 × 40 ×	120	61.47	79.77	66.5
6	BL	Bangklo	69-12	2 × 40 ×	80	38.55	50.18	62.7	1 × 40 ×	40	23.76	30.83	77.1
			69-24	× ×	0		0.00	0.0	1 × 40 ×	40	19.11	24.80	62.0
7	BO	Bangkok noi	69-12	1 × 40 ×	40	18.05	23.49	58.7	1 × 40 ×	40	13.52	21.03	60.1
			69-24	1 × 40 ×	40	19.08	24.83	62.1	1 × 60 ×	60	18.00	23.36	38.9
8	BC	Bangkrachao	69-12	2 × 10 ×	20	6.34	8.25	41.3	2 × 10 ×	20	6.88	8.93	44.6
			69-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
9	BM	Bangmod	69-12	2 × (40) ×	80	39.40	51.28	64.1	2 × (40) ×	80	40.05	51.97	65.0
			69-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
10	BG	Bangna	69-12	1 × 40 ×	40	14.02	18.25	45.6	× ×	0	0.00	0.00	0.0
			69-24	1 × 40 ×	40	21.04	27.38	68.5	2 × 40 ×	80	40.70	52.82	66.0
11	BJ	Bangnamjued	115-24	1 × 20 2 × 60	140	71.44	92.98	66.4	1 × 20 2 × 60	140	82.87	107.54	76.8
12	BI	Bangping	115-24	2 × 60 ×	120	69.22	90.09	75.1	2 × 60 ×	120	64.11	83.20	69.3
13	BK	Bangplakod	69-12	3 × (40) ×	120	57.74	75.15	62.6	3 × (40) ×	120	66.45	86.23	71.9
			69-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
14	BP	Bangplee	69-24	2 × 60 ×	120	59.54	77.49	64.6	2 × 60 ×	120	51.63	67.00	55.8
			115-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
15	PG	Bangpongpang	69-12	1 × 40 ×	40	22.00	28.63	71.6	1 × 40 ×	40	20.19	26.20	65.5
			69-24	1 × 60 ×	60	20.52	26.71	44.5	1 × 60 ×	60	28.00	36.34	60.6
			115-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
16	BD	Bangpood	69-24	2 × 60 ×	120	52.76	68.67	57.2	× ×	0	0.00	0.00	0.0
			115-24	× ×	0		0.00	0.0	2 × 60 ×	120	49.14	63.77	53.1
17	BU	Bangpu	115-24	2 × 40 ×	80	51.05	66.44	83.1	2 × 40 ×	80	43.27	56.16	70.2
18	RY	Bangrakyai	115-24	2 × 60 ×	120	39.35	51.22	42.7	2 × 60 ×	120	42.23	54.80	45.7
19	BS	Bangsaotong	115-24	1 × 60 ×	60	28.69	37.34	62.2	1 × 60 ×	60	32.30	41.92	69.9
20	BY	Bangyeekhan	69-12	2 × 40 ×	80	37.59	48.93	61.2	1 × 40 ×	40	22.13	28.72	71.8
			69-24	× ×	0		0.00	0.0	1 × 40 ×	40	22.00	28.55	71.4
21	CG	Chalongkrung	115-24	1 × 60 ×	60	29.30	38.14	63.6	1 × 60 ×	60	35.29	45.80	76.3
22	CK	Chankasem	69-12	2 × 40 ×	80	38.20	49.72	62.2	2 × 40 ×	80	29.81	38.68	48.4
			69-24	1 × 60 ×	60	15.99	20.81	34.7	1 × 60 ×	60	31.85	41.33	68.9
23	CL	Chidlom	230-12	2 × 50 ×	100	50.33	65.51	65.5	2 × 50 ×	100	47.54	61.69	61.7
			69-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
24	DM	Donmuang	69-12	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
			69-24	2 × 40 1 × 60	140	44.80	58.31	41.7	2 × 40 1 × 60	140	45.13	58.57	41.8
			115-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
25	HK	Huaykwang	69-24	2 × 60 ×	120	46.71	60.80	50.7	2 × 60 ×	120	48.73	63.24	52.7
26	KP	Kingpetch	69-12	3 × (40) ×	120	50.61	65.87	54.9	3 × (40) ×	120	63.53	82.44	68.7
			69-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
27	KJ	Klongjan	69-12	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
			69-24	1 × 40 2 × 60	160	69.29	90.18	56.4	1 × 40 2 × 60	160	63.82	82.82	51.8
28	KN	Klongnai	69-12	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
			69-24	1 × 40 ×	40	16.69	21.72	54.3	1 × 40 ×	40	18.93	24.57	61.4
29	SC	Klongsanamchai	69-12	1 × 40 ×	40	27.74	36.11	90.3	1 × 40 1 × (40)	80	43.28	56.16	70.2

Appendix 6.3-4 Load and Installed Capacity of Distribution Substations (JICA Study Team Plan, Planning Year = 1997 - 2001)

No	ABB	Substation	Voltage (KV)	1998 Bank configuration	Capacity (MVA)	coincident (MW)	non-coinci (MVA)	utilization factor (%)	1999 Bank configuration	Capacity (MVA)	coincident (MW)	non-coinci (MVA)	utilization factor (%)
1	BB	Bangbon	69-12	3 × 40 ×	120	51.54	66.83	55.7	2 × 40 ×	80	31.15	40.36	50.5
			69-24	× ×	0	0.00	0.00	0.0	1 × 40 ×	40	23.96	31.04	77.6
2	BN	Bangchalong	115-24	2 × 60 ×	120	67.21	87.15	72.6	2 × 60 ×	120	61.90	80.21	66.8
3	BA	Bangkapi	69-12	2 × 40 ×	80	29.00	37.61	47.0	2 × 40 ×	80	31.66	41.92	56.2
			69-24	1 × 60 ×	60	23.49	30.46	50.8	1 × 60 ×	60	21.00	31.10	51.8
4	KA	Bangkhaen	115-24	1 × 60 ×	60	28.24	36.62	61.0	2 × 60 ×	120	33.05	42.82	35.7
5	BR	Bangkhunprom	69-12	3 × 40 ×	120	62.70	81.30	67.8	3 × 40 ×	120	71.23	92.29	76.9
6	BL	Bangklo	69-12	1 × 40 ×	40	17.00	22.04	55.1	1 × 40 ×	40	17.00	22.03	55.1
			69-24	1 × 40 ×	40	20.29	26.31	65.8	1 × 40 ×	40	21.78	28.22	70.6
7	BO	Bangkok noi	69-12	1 × 40 ×	40	19.94	25.86	64.6	1 × 40 ×	40	20.17	26.14	65.3
			69-24	1 × 60 ×	60	22.00	28.53	47.6	1 × 60 ×	60	23.66	30.66	51.1
8	BC	Bangkrachao	69-12	2 × 10 ×	20	7.16	9.28	46.4	2 × 10 ×	20	7.15	9.65	48.3
			69-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
9	BM	Bangmod	69-12	2 × (40) ×	80	38.31	49.68	62.1	2 × (40) ×	80	25.85	33.49	41.9
			69-24	× ×	0	0.00	0.00	0.0	1 × 60 ×	60	20.00	25.91	13.2
10	BG	Bangna	69-12	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
			69-24	2 × 40 ×	80	43.65	56.60	70.8	2 × 40 ×	80	45.16	58.52	73.2
11	BJ	Bangnamjued	115-24	1 × 20 2 × 60	140	83.34	108.07	77.2	1 × 20 2 × 60	140	85.16	110.34	78.8
12	BI	Bangping	115-24	2 × 60 ×	120	68.26	88.51	73.8	2 × 60 ×	120	68.32	88.53	73.8
13	BK	Bangplakod	69-12	3 × (40) ×	120	62.82	81.46	67.9	3 × (40) ×	120	61.57	79.78	66.5
			69-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
14	BP	Bangplee	69-24	2 × 60 ×	120	53.70	69.63	58.0	2 × 60 ×	120	55.85	72.37	60.3
			115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
15	PG	Bangpongpang	69-12	1 × 40 ×	40	19.12	24.79	62.0	× ×	0	0.00	0.00	0.0
			69-24	1 × 60 ×	60	30.00	38.90	64.8	× ×	0	0.00	0.00	0.0
			115-24	× ×	0	0.00	0.00	0.0	2 × 60 ×	120	51.12	66.24	55.2
16	BD	Bangpood	69-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
			115-24	2 × 60 ×	120	51.11	66.28	55.2	2 × 60 ×	120	53.15	68.87	57.4
17	BU	Bangpu	115-24	2 × 40 ×	80	45.04	58.40	73.0	2 × 40 ×	80	45.03	58.35	72.9
18	KY	Bangrakyai	115-24	2 × 60 ×	120	44.08	57.16	47.6	2 × 60 ×	120	48.84	63.28	52.7
19	BS	Bangsaotong	115-24	1 × 60 ×	60	33.59	43.55	72.6	1 × 60 ×	60	34.94	45.27	75.5
20	BY	Bangyeekhan	69-12	1 × 40 ×	40	21.70	28.14	70.4	1 × 40 ×	40	21.30	27.60	69.0
			69-24	1 × 40 ×	40	24.00	31.12	77.8	1 × 40 ×	40	24.18	31.33	78.3
21	CG	Chalongkrung	115-24	1 × 60 ×	60	30.70	39.81	66.4	1 × 60 ×	60	31.93	41.37	69.0
22	CK	Chankasem	69-12	2 × 40 ×	80	31.67	41.07	51.3	1 × 40 ×	40	16.59	21.50	53.7
			69-24	1 × 60 ×	60	33.13	42.96	71.6	1 × 60 1 × 40	100	18.80	63.23	63.2
23	CL	Chidlom	230-12	2 × 50 ×	100	49.45	61.12	64.1	2 × 50 ×	100	50.96	66.03	66.0
			69-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
24	DM	Donmuang	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
			115-24	2 × 60 ×	120	46.94	60.87	50.7	2 × 60 ×	120	48.81	63.21	52.7
25	HK	Huaykwang	69-24	2 × 60 ×	120	51.67	67.00	55.8	2 × 60 ×	120	53.91	69.89	58.2
26	KP	Kingpetch	69-12	3 × (40) ×	120	69.14	89.66	74.7	3 × (40) ×	120	65.16	81.13	70.1
			69-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
27	KJ	Klongjan	69-12	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
			69-24	1 × 40 2 × 60	160	59.24	76.82	48.0	1 × 40 2 × 60	160	52.99	68.66	42.9
28	KN	Klongnai	69-12	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
			69-24	1 × 40 ×	40	22.69	29.42	73.6	1 × 40 ×	40	23.60	30.58	76.5
29	SC	Klongsamanchai	69-12	1 × 40 1 × (40)	80	42.42	55.01	68.8	1 × 40 ×	40	15.55	20.15	50.1

Appendix 6.3-4 Load and Installed Capacity of Distribution Substations (JICA Study Team Plan, Planning Year = 1997 - 2001)

No	ABB	Substation	Voltage (KV)	2000 Bank configuration	Capacity (MVA)	coincident (MW)	non-coinci (MVA)	utilization factor (%)	2001 Bank configuration	Capacity (MVA)	coincident (MW)	non-coinci (MVA)	utilization factor (%)
1	BB	Bangbon	69-12	2 × 40 ×	80	35.32	45.78	57.2	× ×	0	0.00	0.00	0.0
			69-24	1 × 40 ×	40	20.00	25.92	64.8	3 × 40 ×	120	64.08	82.90	69.1
2	BN	Bangchalong	115-24	2 × 60 ×	120	63.76	82.64	68.9	2 × 60 ×	120	65.67	84.96	70.8
3	BA	Bangkapi	69-12	2 × 40 ×	80	36.22	46.95	58.7	2 × 40 ×	80	31.49	44.62	55.8
			69-24	1 × 60 ×	60	30.00	38.89	64.8	1 × 60 ×	60	33.72	43.63	72.7
4	KA	Bangkhaen	115-24	2 × 60 ×	120	36.98	47.93	39.9	2 × 60 ×	120	36.91	47.79	39.8
5	BR	Bangkhunprom	69-12	3 × 40 ×	120	73.40	95.14	79.3	3 × 40 ×	120	56.50	73.10	60.9
6	BL	Bangklo	69-12	1 × 40 ×	40	17.50	22.68	56.7	× ×	0	0.00	0.00	0.0
			69-24	1 × 40 ×	40	22.45	29.10	72.8	2 × 40 ×	80	41.15	53.21	66.6
7	BO	Bangkok noi	69-12	1 × 40 ×	40	19.97	25.88	64.7	1 × 40 ×	40	18.72	24.22	60.6
			69-24	1 × 60 ×	60	25.00	32.40	54.0	1 × 60 ×	60	27.60	35.71	59.5
8	BC	Bangkruchao	69-12	2 × 10 ×	20	8.67	11.24	56.2	2 × 10 ×	20	8.93	11.55	57.8
			69-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
9	BN	Bangmod	69-12	2 × (40) ×	80	41.22	53.43	66.8	2 × (40) ×	80	39.53	51.14	63.9
			69-24	1 × 60 ×	60	28.00	36.29	60.5	1 × 60 ×	60	31.77	41.10	68.5
10	BG	Bangna	69-12	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
			69-24	2 × 40 ×	80	40.27	52.20	65.3	2 × 40 ×	80	41.27	53.39	66.7
11	BJ	Bangnamjued	115-24	1 × 20 2 × 60	140	75.17	97.43	69.6	1 × 20 2 × 60	140	70.52	91.24	65.2
12	BI	Bangping	115-24	2 × 60 ×	120	63.63	82.48	68.7	2 × 60 ×	120	66.57	86.13	71.8
13	BK	Bangplakod	69-12	3 × (40) ×	120	63.51	82.32	68.6	3 × (40) ×	120	68.51	88.64	73.9
			69-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
14	BP	Bangplee	69-24	2 × 60 ×	120	62.65	81.21	67.7	2 × 60 ×	120	59.25	76.66	63.9
			115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
15	PG	Bangpongpang	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
			115-24	2 × 60 ×	120	52.69	68.30	56.9	2 × 60 ×	120	62.18	80.15	67.0
16	BD	Bangpood	69-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
			115-24	2 × 60 ×	120	54.75	70.97	59.1	2 × 60 ×	120	48.00	62.10	51.8
17	BU	Bangpu	115-24	2 × 40 ×	80	44.48	57.65	72.1	2 × 40 ×	80	45.82	59.28	74.1
18	RY	Bangrakyai	115-24	2 × 60 ×	120	50.22	65.09	54.2	2 × 60 ×	120	42.27	54.69	45.6
19	BS	Bangsaotong	115-24	1 × 60 ×	60	31.94	41.39	69.0	1 × 60 ×	60	32.89	42.55	70.9
20	BY	Bangyeekhan	69-12	1 × 40 ×	40	18.00	23.33	58.3	× ×	0	0.00	0.00	0.0
			69-24	1 × 40 ×	40	24.00	31.11	77.8	2 × 40 ×	80	40.78	52.76	66.0
21	CG	Chaloongkrung	115-24	1 × 60 ×	60	32.88	42.62	71.0	1 × 60 ×	60	33.87	43.82	73.0
22	CK	Chankasem	69-12	1 × 40 ×	40	17.09	22.15	55.4	1 × 40 ×	40	17.60	22.77	56.9
			69-24	1 × 60 1 × 40	100	49.33	63.94	63.9	1 × 40 1 × 60	100	48.68	62.98	63.0
23	CL	Chidlom	230-12	2 × 50 ×	100	52.48	68.03	68.0	2 × 50 ×	100	51.06	69.91	69.9
			69-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
24	DM	Donmuang	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
			115-24	2 × 60 ×	120	50.28	65.17	54.3	2 × 60 ×	120	51.79	67.00	55.8
25	HK	Huaykwang	69-24	2 × 60 ×	120	55.71	72.21	60.2	3 × 60 ×	180	74.53	96.12	53.6
26	KP	Kingpetch	69-12	3 × (40) ×	120	67.12	87.00	72.5	2 × (40) ×	80	41.91	54.26	67.8
			69-24	× ×	0	0.00	0.00	0.0	1 × 60 ×	60	27.19	35.18	58.6
27	KJ	Klongjan	69-12	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
			69-24	1 × 40 2 × 60	160	54.58	70.75	44.2	1 × 40 2 × 60	160	56.22	72.71	45.5
28	KN	Klongsai	69-12	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
			69-24	2 × 60 ×	120	34.30	44.46	37.1	2 × 60 ×	120	13.33	56.06	46.7
29	SC	Klongsanamchai	69-12	1 × 40 ×	40	16.02	20.77	51.9	1 × 40 ×	40	16.19	21.33	53.3

Appendix 6.3-4 Load and Installed Capacity of Distribution Substations (JICA Study Team Plan, Planning Year = 1997 - 2001)

No	ABB	Substation	Voltage (KV)	1996 Bank configuration	Capacity (MVA)	coincident (MW)	non-coinci (MVA)	utilization factor (%)	1997 Bank configuration	Capacity (MVA)	coincident (MW)	non-coinci (MVA)	utilization factor (%)
			69-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
			115-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
30	KS	Klongsanpasamit	69-12	2 × 20 1 × 40	80	39.95	52.00	65.0	2 × 20 1 × 40	80	44.95	58.33	72.9
			69-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
31	KN	Klongsarn	69-12	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
			69-24	2 × 40 ×	80	43.23	56.27	70.3	2 × 40 ×	80	43.61	56.59	70.7
32	KT	Klongtoey	69-12	2 × 40 ×	80	39.29	51.14	63.9	2 × 40 ×	80	31.19	40.48	50.6
			69-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
33	WG	Klongwatsing	69-12	2 × (40) ×	80	29.39	38.25	47.8	2 × (40) ×	80	31.85	41.34	51.7
			69-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
34	KU	Krunai	69-12	1 × 40 1 × (40)	80	39.65	51.61	64.5	1 × 40 1 × (40)	80	32.07	41.61	52.0
			69-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
35	LK	Lardplakao	115-24	1 × 60 ×	60	24.88	32.38	54.0	1 × 60 ×	60	28.15	36.53	60.9
36	LP	Lardprao	69-12	2 × 20 ×	40	26.93	35.05	87.6	2 × (40) ×	80	34.41	57.64	72.0
			69-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
37	LN	Lumpini	69-12	4 × 40 ×	160	85.39	111.14	69.5	4 × 40 ×	160	87.55	113.61	71.0
			69-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
38	MN	Mahaisawan	69-12	2 × 40 ×	80	16.00	20.83	26.0	2 × 40 ×	80	17.57	22.80	28.5
			69-24	1 × 60 ×	60	20.14	26.21	43.7	1 × 60 ×	60	23.75	30.82	51.4
39	MM	Mahamek	69-12	2 × 40 1 × (40)	120	54.16	70.49	58.7	2 × 40 1 × (40)	120	65.73	85.30	71.1
			115-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
40	MA	Mai-ad	69-12	2 × 40 ×	80	39.64	51.59	64.5	2 × 40 ×	80	43.11	55.94	69.9
			69-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
41	MS	Makasan	69-12	2 × 40 ×	80	53.14	69.16	86.5	2 × 40 1 × (40)	120	67.22	87.23	72.7
			69-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
42	NB	Ninburi	115-24	2 × 60 ×	120	52.90	68.85	57.4	2 × 60 ×	120	50.76	65.87	54.9
43	NC	Nochit	69-12	2 × 40 1 × (40)	120	44.52	57.95	48.3	2 × 40 1 × (40)	120	49.99	64.87	54.1
			69-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
44	NG	Nuangnain	115-24	2 × 60 ×	120	59.63	77.61	64.7	2 × 60 ×	120	55.31	71.78	59.8
45	NI	Nuangthong 1	115-24	1 × 60 ×	60	41.64	54.20	90.3	2 × 60 ×	120	50.67	65.75	54.8
46	NN	Na-na	69-12	1 × (40) ×	40	14.79	19.25	48.1	1 × (40) ×	40	16.00	20.76	51.9
			69-24	2 × 60 ×	120	17.18	22.36	18.6	2 × 60 ×	120	23.35	30.30	25.3
			115-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
47	NK	Nongkham	69-12	1 × 40 ×	40	22.00	28.63	71.6	1 × 40 ×	40	21.05	31.21	78.0
			69-24	1 × 60 ×	60	24.24	31.55	52.6	1 × 60 ×	60	25.00	32.14	54.1
48	NR	Nonthaburi	69-12	2 × 20 1 × 40	80	48.81	63.53	79.4	2 × 20 1 × 40	80	44.71	58.02	72.5
			115-12	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
			115-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
49	NK	North Bangkok	69-12	2 × 20 ×	40	13.70	17.83	44.6	× ×	0	0.00	0.00	0.0
			69-24	3 × 40 ×	120	17.11	22.27	18.6	3 × 40 ×	120	32.94	42.75	35.6
50	PE	Pakkred	69-12	2 × 40 ×	80	38.36	49.93	62.4	× ×	0	0.00	0.00	0.0
			69-24	1 × 60 ×	60	35.60	46.34	77.2	× ×	0	0.00	0.00	0.0
			115-12	× ×	0		0.00	0.0	1 × 40 ×	40	23.00	29.85	74.6
			115-24	× ×	0		0.00	0.0	2 × 60 ×	120	40.11	52.09	43.4
51	PN	Paknam	115-24	2 × 40 ×	80	48.81	63.53	79.4	2 × 40 ×	80	42.96	55.75	69.7
52	PS	Petchkasem	69-12	1 × 40 2 × 22.4	84.8	44.76	58.26	68.7	1 × 40 2 × 22.4	84.8	50.63	65.70	77.5
			69-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
53	PI	Phaisingto	69-12	1 × 40 ×	40	20.86	27.15	67.9	1 × 40 ×	40	18.43	23.92	59.8
			69-24	2 × 60 ×	120	48.00	62.47	52.1	2 × 60 ×	120	59.79	77.59	64.7

Appendix 6.3-4 Load and Installed Capacity of Distribution Substations (JICA Study Team Plan, Planning Year = 1997 - 2001) (5／21)

No	ABB	Substation	Voltage (KV)	1998 Bank configuration	Capacity (MVA)	coincident (MW)	non-coinci (MVA)	utilization factor (%)	1999 Bank configuration	Capacity (MVA)	coincident (MW)	non-coinci (MVA)	utilization factor (%)
			69-24	× ×	0	0.00	0.00	0.0	1 × 60 ×	60	26.22	33.97	56.6
			115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
30	KS	Klongsanpasamit	69-12	2 × 20 1 × 40	80	47.72	61.88	77.1	2 × 20 1 × 40	80	44.91	58.19	72.7
			69-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
31	KN	Klongsarn	69-12	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
			69-24	2 × 40 ×	80	45.36	58.82	73.5	2 × 40 ×	80	41.93	51.33	67.9
32	KT	Klongtoey	69-12	1 × 40 ×	40	14.44	18.72	46.8	1 × 40 ×	40	15.00	19.44	48.6
			69-24	1 × 40 ×	40	20.00	25.93	64.8	1 × 40 ×	40	20.82	26.98	67.4
33	KG	Klongwatsing	69-12	2 × (40) ×	80	34.20	44.35	55.4	2 × (40) ×	80	41.06	53.20	66.5
			69-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
34	KU	Krunai	69-12	1 × 40 1 × (40)	80	33.20	43.05	53.8	1 × 40 1 × (40)	80	34.53	44.71	55.9
			69-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
35	LK	Lardplakao	115-24	1 × 60 ×	60	25.08	32.52	54.2	1 × 60 ×	60	35.04	45.40	75.7
36	LP	Lardprao	69-12	2 × (40) ×	80	33.56	43.52	54.4	1 × (40) ×	40	14.90	19.31	48.3
			69-24	× ×	0	0.00	0.00	0.0	1 × 60 ×	60	20.00	25.91	43.2
37	LN	Lumpini	69-12	4 × 40 ×	160	91.04	118.05	73.8	4 × 40 ×	160	94.68	122.68	76.7
			69-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
38	MN	Mahaisawan	69-12	2 × 40 ×	80	18.07	23.43	29.3	2 × 40 ×	80	18.60	21.10	30.1
			69-24	1 × 60 ×	60	24.70	32.03	53.4	1 × 60 ×	60	25.69	33.29	55.5
39	MM	Mahamek	69-12	2 × 40 1 × (40)	120	69.83	90.62	75.5	2 × 40 1 × (40)	120	72.68	91.18	78.5
			115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
40	MA	Mai-ad	69-12	2 × 40 ×	80	38.71	50.20	62.8	2 × 40 ×	80	40.26	52.17	65.2
			69-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
41	MS	Makasan	69-12	2 × 40 1 × (40)	120	69.91	90.65	75.5	2 × 40 1 × (40)	120	72.71	94.21	78.5
			69-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
42	MB	Minburi	115-24	2 × 60 ×	120	45.97	59.61	49.7	2 × 60 ×	120	47.83	61.97	51.6
43	MC	Mochit	69-12	2 × 40 1 × (40)	120	45.41	58.88	49.1	2 × 40 1 × (40)	120	47.52	61.57	51.3
			69-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
44	MG	Muanggnain	115-24	2 × 60 ×	120	51.69	67.03	55.9	2 × 60 ×	120	53.76	69.66	58.1
45	MT	Muangthong 1	115-24	2 × 60 ×	120	56.86	73.73	61.4	2 × 60 ×	120	57.13	74.03	61.7
46	NN	Na-na	69-12	1 × (40) ×	40	16.35	21.20	53.0	1 × (40) ×	40	16.56	21.46	53.6
			69-24	2 × 60 ×	120	24.57	31.86	26.6	2 × 60 ×	120	26.00	33.69	28.1
			115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
47	NH	Nongkham	69-12	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
			69-24	2 × 60 ×	120	47.99	62.23	51.9	2 × 60 ×	120	49.71	64.41	53.7
48	NR	Nonthaburi	69-12	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
			115-12	1 × 40 ×	40	21.58	27.98	70.0	1 × 40 ×	40	22.44	29.08	72.7
			115-24	1 × 60 ×	60	20.36	26.40	44.0	1 × 60 ×	60	29.17	37.80	63.0
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	34.26	44.43	37.0	3 × 40 ×	120	38.17	49.85	41.5
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	1 × 40 ×	40	20.60	26.71	66.8	1 × 40 ×	40	21.29	27.59	69.0
			115-24	2 × 60 ×	120	44.66	57.91	48.3	2 × 60 ×	120	47.00	60.90	50.8
51	PN	Paknam	115-24	2 × 40 ×	80	45.98	59.62	74.5	2 × 40 ×	80	43.00	55.71	69.6
52	PS	Petchkasem	69-12	1 × 40 2 × 22.4	84.8	51.66	66.99	79.0	1 × 40 2 × 22.4	84.8	51.03	66.13	78.0
			69-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
53	PI	Phaisingto	69-12	1 × 40 ×	40	19.17	24.86	62.2	1 × 40 ×	40	19.91	25.81	64.5
			69-24	2 × 60 ×	120	52.18	67.66	56.4	2 × 60 ×	120	54.67	70.81	59.0

No.	ABB	Substation	Voltage (KV)	2000 Bank configuration	Capacity (MVA)	coincident (MW)	non-coinci (MVA)	utilization factor (%)	2001 Bank configuration	Capacity (MVA)	coincident (MW)	non-coinci (MVA)	utilization factor (%)
			69-24	1 × 60 ×	60	27.00	35.00	58.3	1 × 60 ×	60	27.82	35.99	60.0
			115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
30	KS	Klongsanpasamit	69-12	2 × 20 1 × 40	80	46.26	59.96	75.0	2 × 20 1 × 40	80	47.65	61.65	77.1
			69-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
31	KN	Klongsarn	69-12	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
			69-24	2 × 40 ×	80	42.59	55.20	69.0	2 × 40 ×	80	43.86	56.74	70.9
32	KT	Klongtoey	69-12	1 × 40 ×	40	14.89	19.30	48.3	× ×	0	0.00	0.00	0.0
			69-24	1 × 40 ×	40	22.00	28.52	71.3	2 × 40 ×	80	38.00	49.16	61.5
33	KG	Klongvatsing	69-12	2 × (40) ×	80	45.70	59.23	74.0	× ×	0	0.00	0.00	0.0
			69-24	× ×	0	0.00	0.00	0.0	2 × 60 ×	120	13.20	55.89	46.6
34	KU	Krunai	69-12	1 × 40 1 × (40)	80	35.57	46.10	57.6	1 × 40 1 × (40)	80	36.63	47.39	59.2
			69-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
35	LK	Lardplakao	115-24	1 × 60 ×	60	35.85	46.47	77.5	1 × 60 ×	60	21.69	31.94	53.2
36	LP	Lardprao	69-12	1 × (40) ×	40	15.45	20.03	50.1	2 × (40) ×	80	30.67	39.68	49.6
			69-24	1 × 60 ×	60	20.50	26.57	44.3	1 × 60 ×	60	18.36	23.75	39.6
37	LM	Lumpini	69-12	4 × 40 ×	160	97.52	126.40	79.0	1 × 40 ×	40	22.38	28.95	72.4
			69-24	× ×	0	0.00	0.00	0.0	2 × 40 1 × 60	140	71.70	92.76	66.3
38	MH	Mahaisawan	69-12	1 × 40 ×	40	14.47	18.76	46.9	× ×	0	0.00	0.00	0.0
			69-24	1 × 60 1 × 40	100	36.82	47.73	47.7	2 × 40 1 × 60	140	62.04	80.27	57.3
39	MM	Mahamek	69-12	2 × 40 1 × (40)	120	71.70	92.94	77.5	× ×	0	0.00	0.00	0.0
			115-24	× ×	0	0.00	0.00	0.0	3 × 60 ×	180	73.85	95.54	53.1
40	MA	Mai-ad	69-12	2 × 40 ×	80	41.47	53.75	67.2	× ×	0	0.00	0.00	0.0
			69-24	× ×	0	0.00	0.00	0.0	2 × 40 ×	80	42.71	55.26	69.1
41	MS	Makasan	69-12	2 × 40 1 × (40)	120	64.09	83.07	69.2	2 × 40 ×	80	41.99	54.33	67.9
			69-24	× ×	0	0.00	0.00	0.0	1 × 60 ×	60	28.85	37.33	62.2
42	MB	Minburi	115-24	2 × 60 ×	120	40.08	51.95	43.3	2 × 60 ×	120	52.13	67.44	56.2
43	MC	Mochit	69-12	2 × 40 1 × (40)	120	50.50	65.46	54.6	2 × 40 1 × (40)	120	65.63	84.91	70.8
			69-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
44	MG	Muangmain	115-24	2 × 60 ×	120	55.27	71.77	59.8	2 × 60 ×	120	57.01	73.80	61.5
45	MT	Muangthong 1	115-24	2 × 60 ×	120	60.85	78.87	65.7	2 × 60 ×	120	67.66	87.53	72.9
46	NN	Na-na	69-12	1 × (40) ×	40	17.00	22.04	55.1	1 × (40) ×	40	16.99	21.98	55.0
			69-24	2 × 60 ×	120	39.96	51.79	43.2	2 × 60 ×	120	28.16	36.13	30.4
			115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
47	NH	Nongkham	69-12	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
			69-24	2 × 60 ×	120	52.05	67.47	56.2	2 × 60 ×	120	59.55	77.01	61.2
48	NR	Nonthaburi	69-12	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
			115-12	1 × 40 ×	40	19.11	24.77	61.9	× ×	0	0.00	0.00	0.0
			115-24	1 × 60 ×	60	36.56	47.39	79.0	2 × 60 ×	120	65.05	84.16	70.1
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	40.70	52.75	44.0	3 × 40 ×	120	11.92	54.24	45.2
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	75.43	97.77	54.3	3 × 60 ×	180	72.15	93.73	52.1
51	PN	Paknam	115-24	2 × 40 ×	80	42.67	55.31	69.1	2 × 60 ×	120	50.89	65.84	54.9
52	PS	Petchkasem	69-12	1 × 40 2 × 22.4	84.8	44.86	58.14	68.6	2 × 22.4 ×	44.8	25.71	33.30	74.3
			69-24	× ×	0	0.00	0.00	0.0	1 × 40 ×	40	16.81	21.79	54.5
53	PI	Phaisingto	69-12	1 × 40 ×	40	17.15	22.23	55.6	× ×	0	0.00	0.00	0.0
			69-24	2 × 60 ×	120	59.11	76.61	63.8	3 × 60 ×	180	89.76	116.13	64.5

No	ABB	Substation	Voltage (KV)	1996 Bank configuration	1996 Capacity (MVA)	1996 coincident (MW)	1996 non-coinci (MVA)	1996 utilization factor (%)	1997 Bank configuration	1997 Capacity (MVA)	1997 coincident (MW)	1997 non-coinci (MVA)	1997 utilization factor (%)
54	PJ	Poojao	69-12	3 × 40 ×	120	63.12	82.15	68.5	3 × 40 ×	120	61.97	80.12	67.0
			69-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
55	PC	Prachachuen	69-12	2 × 40 ×	80	38.35	49.91	62.4	2 × 40 ×	80	41.37	53.69	67.1
			69-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
56	PK	Prakanong	69-12	2 × 40 ×	80	42.86	55.78	69.7	2 × 40 ×	80	43.11	55.91	69.9
			69-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
57	PR	Prakasa	115-24	2 × 40 1 × 60	140	67.15	87.40	62.4	2 × 40 1 × 60	140	59.61	77.39	55.3
58	PO	Prannok	69-12	2 × 40 ×	80	41.09	53.48	66.9	2 × 40 ×	80	45.73	59.34	74.2
			69-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
59	PD	Prapradaeng	69-12	3 × 40 ×	120	58.20	75.75	63.1	3 × 40 ×	120	52.79	68.51	57.1
			69-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
60	PA	Prasanmit	69-12	3 × 40 ×	120	61.15	79.59	66.3	3 × 40 ×	120	50.45	65.47	54.6
			69-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
61	PM	Prathumwan	69-12	3 × 40 ×	120	65.10	84.73	70.6	3 × 40 ×	120	69.71	90.46	75.4
			69-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
62	RT	Ramintra	115-24	2 × 60 ×	120	40.57	52.80	44.0	2 × 60 ×	120	43.51	56.50	47.1
63	RH	Rankhamhaeng	69-12	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
			69-24	2 × 40 1 × 60	140	52.12	67.84	48.5	2 × 40 1 × 60	140	55.06	71.15	51.0
64	RN	Rasburana	69-12	3 × 40 ×	120	60.12	78.25	65.2	3 × 40 ×	120	64.85	84.16	70.1
			69-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
65	RK	Ronklao	115-24	2 × 60 ×	120	55.73	72.54	60.5	2 × 60 ×	120	57.60	74.75	62.3
66	RC	Rungpracha	69-12	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
			69-24	3 × 60 ×	180	65.00	84.60	47.0	3 × 60 ×	180	85.44	110.88	61.6
67	SM	Sailom	69-12	2 × 40 ×	80	45.29	58.95	73.7	2 × 40 ×	80	38.96	50.56	63.2
			69-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
68	SR	Samrong	69-12	2 × 40 ×	80	20.00	26.03	32.5	2 × 40 ×	80	19.15	24.85	31.1
			69-24	1 × 60 ×	60	19.19	24.98	41.6	1 × 60 ×	60	20.00	25.95	43.3
69	SN	Samsen	69-12	3 × 40 ×	120	59.22	77.08	64.2	3 × 40 ×	120	62.36	80.92	67.4
			69-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
70	SS	Sansab	69-12	1 × 40 ×	40	16.44	21.40	53.5	1 × 40 ×	40	19.92	25.85	64.6
			69-24	2 × 40 ×	80	38.95	50.70	63.4	2 × 40 ×	80	45.69	59.29	74.1
71	SD	Sapandam	69-12	4 × 40 ×	160	85.96	111.88	69.9	4 × 40 ×	160	88.59	114.96	71.9
72	SP	Sapanmai	69-12	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
			69-24	2 × 60 ×	120	51.70	67.29	56.1	2 × 60 ×	120	46.31	60.10	50.1
73	SL	Silom	69-12	2 × 40 ×	80	42.44	55.24	69.1	2 × 40 ×	80	37.73	48.96	61.2
			69-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
74	SY	Sipraya	69-12	2 × 40 ×	80	41.06	53.44	66.8	2 × 40 ×	80	41.35	53.66	67.1
			69-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
75	SV	Soonvijai	69-12	1 × 40 ×	40	16.95	22.06	55.2	1 × 40 ×	40	22.56	29.28	73.2
			69-24	2 × 60 ×	120	43.43	56.53	47.1	2 × 60 ×	120	45.39	58.90	49.1
76	SK	South Bangkok	69-12	2 × 20 ×	40	11.51	14.98	37.5	2 × 20 ×	40	12.16	15.78	39.5
			69-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
77	ST	South Thonburi	69-12	2 × (40) ×	80	39.98	52.04	65.1	2 × (40) ×	80	44.27	57.45	71.8
			69-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
78	YA	Srithanya	69-12	1 × (40) ×	40	20.61	26.83	67.1	1 × (40) ×	40	23.81	30.90	77.3
			115-12	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
			115-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
79	SO	Suanson	69-12	2 × 40 ×	80	38.04	49.51	61.9	2 × 40 ×	80	44.09	57.21	71.5
			69-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0

No.	ABB	Substation	Voltage (KV)	1998 Bank configuration	Capacity (MVA)	coincident (MW)	non-coinci (MVA)	utilization factor (%)	1999 Bank configuration	Capacity (MVA)	coincident (MW)	non-coinci (MVA)	utilization factor (%)
51	PJ	Poojao	69-12	3 × 40 ×	120	64.46	83.58	69.7	3 × 40 ×	120	70.96	91.91	76.6
			69-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
55	PC	Prachachuen	69-12	2 × 40 ×	80	38.51	49.93	62.4	2 × 40 ×	80	35.16	45.95	57.4
			69-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
56	PK	Prakanong	69-12	1 × 40 ×	40	20.43	26.50	66.3	1 × 40 ×	40	23.48	30.12	76.1
			69-24	1 × 40 ×	40	20.69	26.84	67.1	1 × 40 ×	40	21.21	31.36	78.1
57	PR	Prakasa	115-24	2 × 40 1 × 60	140	61.03	79.14	56.5	2 × 40 1 × 60	140	63.51	82.29	58.8
58	PO	Prannok	69-12	2 × 40 ×	80	45.59	59.11	73.9	2 × 40 ×	80	45.34	58.75	73.4
			69-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
59	PD	Prapradaeng	69-12	3 × 40 ×	120	66.35	86.04	71.7	3 × 40 ×	120	49.76	64.18	53.7
			69-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
60	PA	Prasanmit	69-12	2 × 40 ×	80	41.79	54.19	67.7	2 × 40 ×	80	41.00	53.13	66.4
			69-24	1 × 40 ×	40	21.08	27.34	68.3	1 × 40 ×	40	21.38	31.59	79.0
61	PN	Prathumwan	69-12	3 × 40 ×	120	54.58	70.77	59.0	3 × 40 ×	120	73.17	91.81	79.0
			69-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
62	RT	Rasintra	115-24	2 × 60 ×	120	45.36	58.82	49.0	2 × 60 ×	120	46.26	59.94	50.0
63	RH	Rankhamhaeng	69-12	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
			69-24	2 × 40 1 × 60	140	56.53	73.30	52.4	2 × 40 1 × 60	140	57.30	71.25	53.0
64	RN	Rasburana	69-12	3 × 40 ×	120	69.52	90.15	75.1	3 × 40 ×	120	72.30	93.68	78.1
			69-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
65	RK	Ronklao	115-24	2 × 60 ×	120	59.13	77.06	64.2	2 × 60 ×	120	62.36	80.80	67.3
66	RC	Rungprucha	69-12	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
			69-24	3 × 60 ×	180	72.33	93.79	52.1	3 × 60 ×	180	78.59	101.83	56.6
67	SM	Sailom	69-12	2 × 40 ×	80	38.71	50.20	62.8	2 × 40 ×	80	40.54	52.53	65.7
			69-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
68	SR	Samrong	69-12	2 × 40 ×	80	22.52	29.20	36.5	1 × 40 ×	40	12.00	15.55	38.9
			69-24	1 × 60 ×	60	11.00	14.26	23.8	2 × 60 ×	120	29.82	38.64	32.2
69	SN	Samsen	69-12	3 × 40 ×	120	65.05	84.35	70.3	3 × 40 ×	120	67.87	87.94	73.3
			69-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
70	SS	Sansab	69-12	1 × 40 ×	40	20.71	26.86	67.1	1 × 40 ×	40	21.54	27.91	69.8
			69-24	2 × 40 ×	80	41.52	53.84	67.3	2 × 40 ×	80	43.18	55.95	69.9
71	SD	Sapandam	69-12	4 × 40 ×	160	93.52	121.27	75.8	4 × 40 ×	160	96.72	125.32	78.3
72	SP	Supunnai	69-12	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
			69-24	2 × 60 ×	120	48.16	62.45	52.0	2 × 60 ×	120	50.09	64.90	54.1
73	SL	Silom	69-12	2 × 40 ×	80	35.49	46.02	57.5	2 × 40 ×	80	31.80	45.09	56.4
			69-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
74	SY	Sipraya	69-12	2 × 40 ×	80	42.21	54.73	68.4	2 × 40 ×	80	39.79	51.56	64.5
			69-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
75	SV	Soonvijai	69-12	1 × 40 ×	40	23.47	30.43	76.1	1 × 40 ×	40	21.32	27.63	69.1
			69-24	2 × 60 ×	120	47.21	61.22	51.0	2 × 60 ×	120	52.10	67.51	56.3
76	SK	South Bangkok	69-12	2 × 20 ×	40	12.65	16.40	41.0	2 × 20 ×	40	14.15	18.33	45.8
			69-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
77	ST	South Thonburi	69-12	2 × (40) ×	80	44.30	57.44	71.8	1 × (40) ×	40	21.78	28.22	70.6
			69-24	× ×	0	0.00	0.00	0.0	1 × 60 ×	60	26.09	33.81	56.3
78	YA	Srithanya	69-12	1 × (40) ×	40	23.69	30.72	76.8	× ×	0	0.00	0.00	0.0
			115-12	× ×	0	0.00	0.00	0.0	1 × (40) ×	40	20.38	26.11	66.0
			115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
79	SO	Suanson	69-12	2 × 40 ×	80	46.14	59.83	74.8	2 × 40 ×	80	45.37	58.78	73.5
			69-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0

No	ABB	Substation	Voltage (KV)	2000 Bank configuration	Capacity (MVA)	coincident (MW)	non-coinci (MVA)	utilization factor (%)	2001 Bank configuration	Capacity (MVA)	coincident (MW)	non coinci (MVA)	utilization factor (%)
54	PJ	Poojao	69-12	3 × 40 ×	120	72.01	93.38	77.8	× ×	0	0.00	0.00	0.0
			69-24	× ×	0	0.00	0.00	0.0	3 × 40 ×	120	69.15	89.17	74.6
55	PC	Prachachuen	69-12	2 × 40 ×	80	45.04	58.38	73.0	× ×	0	0.00	0.00	0.0
			69-24	× ×	0	0.00	0.00	0.0	1 × 40 1 × 60	100	37.63	48.68	48.7
56	PK	Prakanong	69-12	1 × 40 ×	40	23.59	30.57	76.4	× ×	0	0.00	0.00	0.0
			69-24	1 × 40 ×	40	22.25	28.84	72.1	2 × 40 ×	80	40.19	52.00	65.0
57	PR	Prakasa	115-24	2 × 40 1 × 60	140	65.11	81.82	60.6	2 × 40 1 × 60	140	68.11	88.55	63.3
58	PO	Prannok	69-12	1 × 40 ×	40	22.59	29.28	73.2	× ×	0	0.00	0.00	0.0
			69-24	1 × 40 ×	40	12.01	15.57	38.9	2 × 40 ×	80	35.64	46.11	57.6
59	PD	Prapradaeng	69-12	3 × 40 ×	120	51.40	66.62	55.5	3 × 40 ×	120	58.09	75.16	62.6
			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	3 × 40 ×	120	61.00	79.07	65.9	3 × 40 ×	120	62.83	81.29	67.7
61	PN	Prathumwan	69-12	3 × 40 ×	120	67.12	87.00	72.5	1 × 40 ×	40	23.81	30.81	77.0
			69-24	× ×	0	0.00	0.00	0.0	2 × 40 ×	80	45.32	58.63	73.3
62	RT	Ramintra	115-24	2 × 60 ×	120	49.74	64.47	53.7	2 × 60 ×	120	44.02	56.95	47.5
63	RH	Rankhamhaeng	69-12	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
			69-24	2 × 40 1 × 60	140	58.87	76.31	54.5	2 × 40 1 × 60	140	55.49	71.79	51.3
64	RN	Rasburana	69-12	3 × 40 ×	120	64.47	83.56	69.6	3 × 40 ×	120	66.41	85.92	71.6
			69-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
65	RK	Ronklao	115-24	2 × 60 ×	120	55.65	72.13	60.1	2 × 60 ×	120	56.05	72.52	60.1
66	RC	Rungpracha	69-12	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
			69-24	3 × 60 ×	180	84.02	108.90	60.5	3 × 60 ×	180	75.50	97.68	54.3
67	SN	Sailom	69-12	2 × 40 ×	80	45.11	58.48	73.1	2 × 40 ×	80	45.86	59.34	74.2
			69-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
68	SR	Samrong	69-12	1 × 40 ×	40	12.82	16.62	41.5	× ×	0	0.00	0.00	0.0
			69-24	2 × 60 ×	120	38.25	49.58	41.3	3 × 60 ×	180	61.91	80.10	44.5
69	SN	Samsen	69-12	3 × 40 ×	120	67.36	87.31	72.8	2 × 40 ×	80	41.21	53.32	66.7
			69-24	× ×	0	0.00	0.00	0.0	1 × 40 ×	40	23.31	30.20	75.5
70	SS	Sansab	69-12	1 × 40 ×	40	20.00	25.92	64.8	1 × 40 ×	40	18.86	24.40	61.0
			69-24	2 × 40 ×	80	33.33	43.20	54.0	2 × 40 ×	80	41.81	54.09	67.6
71	SD	Sapandam	69-12	4 × 40 ×	160	98.12	127.18	79.5	4 × 40 ×	160	84.58	109.13	68.1
72	SP	Sapanmai	69-12	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
			69-24	2 × 60 ×	120	51.59	66.87	55.7	2 × 60 ×	120	53.14	68.75	57.3
73	SL	Silom	69-12	2 × 40 ×	80	46.19	59.87	74.8	2 × 40 ×	80	37.10	48.00	60.0
			69-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
74	SY	Sipraya	69-12	2 × 40 ×	80	40.98	53.12	66.4	1 × 40 ×	40	21.02	27.20	68.0
			69-24	× ×	0	0.00	0.00	0.0	1 × 40 ×	40	21.19	27.12	68.5
75	SV	Soonvijai	69-12	1 × 40 ×	40	23.76	30.80	77.0	1 × 40 ×	40	22.95	29.69	74.2
			69-24	2 × 60 ×	120	60.00	77.77	64.8	2 × 60 ×	120	46.57	60.25	50.2
76	SK	South Bangkok	69-12	2 × 20 ×	40	17.03	22.08	55.2	× ×	0	0.00	0.00	0.0
			69-24	× ×	0	0.00	0.00	0.0	1 × 60 ×	60	15.02	19.13	32.1
77	ST	South Thonburi	69-12	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
			69-24	2 × 60 ×	120	54.16	70.20	58.5	2 × 60 ×	120	53.18	69.19	57.7
78	YA	Srithanya	69-12	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
			115-12	1 × (40) ×	40	24.05	31.18	77.9	1 × (40) ×	40	19.12	24.71	61.8
			115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
79	SO	Suanson	69-12	2 × 40 ×	80	44.21	57.30	71.6	× ×	0	0.00	0.00	0.0
			69-24	× ×	0	0.00	0.00	0.0	2 × 60 ×	120	55.11	71.30	59.1

Appendix 6.3-4 Load and Installed Capacity of Distribution Substations (JICA Study Team Plan, Planning Year = 1997 - 2001)

No.	ABB	Substation	Voltage (KV)	1996 Bank configuration	1996 Capacity (MVA)	1996 coincident (MW)	1996 non-coinci (MVA)	1996 utilization factor (%)	1997 Bank configuration	1997 Capacity (MVA)	1997 coincident (MW)	1997 non-coinci (MVA)	1997 utilization factor (%)
80	SU	Surawong	69-12	3 × 40 ×	120	60.74	79.06	65.9	3 × 40 ×	120	71.42	92.68	77.2
			69-24	×	0		0.00	0.0	×	0	0.00	0.00	0.0
81	TS	Taksin	69-12	1 × 40 ×	40	18.68	24.31	60.8	1 × 40 ×	40	20.63	26.77	66.9
			69-24	1 × 40 ×	40	16.00	20.83	52.1	1 × 40 ×	40	19.00	24.66	61.6
82	TP	Teparak	69-24	2 × 40 1 × 60	140	77.54	100.92	72.1	2 × 40 1 × 60	140	68.71	89.16	63.7
83	TT	Thanontok	69-12	1 × 40 ×	40	28.61	37.24	93.1	1 × 40 ×	40	21.31	31.55	78.9
			69-24	×	0		0.00	0.0	×	0	0.00	0.00	0.0
84	TB	Thonburi	69-12	2 × 40 ×	80	44.00	57.27	71.6	2 × 40 ×	80	38.09	49.43	61.8
			69-24	1 × 60 ×	60	20.04	26.08	43.5	1 × 60 ×	60	17.72	23.00	38.3
85	TK	Tongkung	69-12	2 × 40 ×	80	41.63	54.18	67.7	2 × 40 ×	80	43.26	56.14	70.2
			69-24	×	0		0.00	0.0	×	0	0.00	0.00	0.0
86	WB	Wangpetchaboon	69-12	2 × 40 ×	80	56.60	73.67	92.1	2 × 40 ×	80	39.77	51.61	64.5
			69-24	×	0		0.00	0.0	×	0	0.00	0.00	0.0
87	WT	Wangthonglang	69-12	×	0		0.00	0.0	×	0	0.00	0.00	0.0
			69-24	3 × 60 ×	180	64.73	84.25	46.8	3 × 60 ×	180	70.72	91.77	51.0
88	WL	Watlieb	69-12	3 × 40 ×	120	64.34	83.74	69.8	3 × 40 ×	120	69.63	90.36	75.3
89	YT	Yothee	69-12	2 × 40 ×	80	34.63	45.07	56.3	2 × 40 ×	80	39.92	51.80	64.8
			69-24	×	0		0.00	0.0	×	0	0.00	0.00	0.0
90	BE	Bangkae	69-12	1 × 40 ×	40	22.49	29.27	73.2	1 × 40 ×	40	23.90	31.02	77.5
			115-12	×	0		0.00	0.0	×	0	0.00	0.00	0.0
			115-24	×	0		0.00	0.0	×	0	0.00	0.00	0.0
91	BZ	Bangson	69-12	1 × (40) ×	40	32.00	41.65	104.1	2 × (40) ×	80	33.04	42.88	53.6
			69-24	×	0		0.00	0.0	×	0	0.00	0.00	0.0
92	RI	Bearing	69-24	1 × 60 ×	60	44.05	57.33	95.6	×	0	0.00	0.00	0.0
			115-24	×	0		0.00	0.0	2 × 60 ×	120	50.51	65.55	54.6
93	EM	Ekamai	69-12	1 × (40) ×	40	30.31	39.45	98.6	2 × (40) ×	80	40.97	53.17	66.5
			69-24	×	0		0.00	0.0	1 × 60 ×	60	32.57	42.40	70.7
			115-24	×	0		0.00	0.0	×	0	0.00	0.00	0.0
94	EB	Ekburi	115-24	1 × 60 ×	60	16.00	20.83	34.7	1 × 60 ×	60	18.00	23.36	38.9
95	HA	Huamak	69-12	1 × 40 ×	40	19.51	25.39	63.5	×	0	0.00	0.00	0.0
			69-24	×	0		0.00	0.0	1 × 40 ×	40	22.28	28.91	72.3
			115-24	×	0		0.00	0.0	×	0	0.00	0.00	0.0
96	IN	Intamara	69-24	2 × 60 ×	120	36.03	46.90	39.1	2 × 60 ×	120	40.10	52.01	43.4
97	JR	Jangron	69-12	1 × (40) ×	40	16.33	21.25	53.1	1 × (40) ×	40	17.68	22.91	57.4
			69-24	×	0		0.00	0.0	×	0	0.00	0.00	0.0
98	KO	Khotor	115-24	1 × 60 ×	60	40.46	52.66	87.8	2 × 60 ×	120	45.99	59.68	49.7
99	KI	Kingkaew	115-24	2 × 60 ×	120	40.47	52.67	43.9	2 × 60 ×	120	41.83	54.28	45.2
100	KH	Klongsuhusawad	115-24	2 × 60 ×	120	41.20	53.62	44.7	2 × 60 ×	120	47.30	61.38	51.2
101	LB	Lardkrabang	115-24	2 × 60 ×	120	31.98	41.62	34.7	2 × 60 ×	120	40.65	52.75	44.0
102	NG	Nuangthong 3	115-24	1 × 60 ×	60	34.00	44.25	73.8	2 × 60 ×	120	42.06	54.58	45.5
103	NS	Nonsee	69-12	2 × (40) ×	80	30.69	39.94	49.9	2 × (40) ×	80	33.67	43.69	54.6
			69-24	×	0		0.00	0.0	×	0	0.00	0.00	0.0
104	PP	Pradipat	69-12	2 × (40) ×	80	37.76	49.15	61.4	2 × (40) ×	80	40.22	52.20	65.3
			69-24	×	0		0.00	0.0	×	0	0.00	0.00	0.0
105	SA	Sainamtip	69-12	×	0		0.00	0.0	1 × (40) ×	40	18.23	23.66	59.1
			69-24	1 × 60 ×	60	36.54	47.56	79.3	1 × 60 ×	60	22.00	28.55	47.6
			115-24	×	0		0.00	0.0	×	0	0.00	0.00	0.0
106	SB	Sanambinnam	69-12	1 × (40) ×	40	20.22	26.32	65.8	×	0	0.00	0.00	0.0
			69-24	1 × 60 ×	60	18.00	23.43	39.1	×	0	0.00	0.00	0.0

Appendix 6.3-4 Load and Installed Capacity of Distribution Substations (JICA Study Team Plan, Planning Year = 1997 - 2001)

No	ABB	Substation	Voltage (KV)	1998 Bank configuration	Capacity (MVA)	coincident (MW)	non-coinci (MVA)	utilization factor (%)	1999 Bank configuration	Capacity (MVA)	coincident (MW)	non-coinci (MVA)	utilization factor (%)
80	SU	Surawong	69-12	3 × 40 ×	120	72.63	94.18	78.5	3 × 40 ×	120	65.71	85.11	71.0
			69-24	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
81	TS	Taksin	69-12	1 × 40 ×	40	19.21	24.91	62.3	×	0	0.00	0.00	0.0
			69-24	1 × 40 ×	40	22.00	28.53	71.3	2 × 40 ×	80	42.86	55.54	69.1
82	TP	Teparak	69-24	2 × 40 1 × 60	140	75.90	98.42	70.3	2 × 40 1 × 60	140	83.21	107.82	77.0
83	TT	Thanontok	69-12	1 × 40 1 × (40)	80	43.31	56.16	70.2	1 × 40 1 × (40)	80	45.14	58.49	73.1
			69-24	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
84	TB	Thonburi	69-12	2 × 40 ×	80	36.98	47.96	60.0	2 × 40 ×	80	36.54	47.34	59.2
			69-24	1 × 60 ×	60	23.23	30.12	50.2	1 × 60 ×	60	29.48	38.20	63.7
85	TK	Tongkung	69-12	2 × 40 ×	80	41.99	58.34	72.9	2 × 40 ×	80	45.29	58.68	73.4
			69-24	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
86	VB	Vangpetchaboon	69-12	2 × 40 ×	80	41.37	53.64	67.1	2 × 40 1 × (40)	120	63.70	82.54	68.8
			69-24	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
87	VT	Vangthonglang	69-12	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
			69-24	3 × 60 ×	180	74.56	96.68	53.7	3 × 60 ×	180	67.86	87.93	48.9
88	WL	Watlieb	69-12	3 × 40 ×	120	72.26	93.70	78.1	3 × 40 ×	120	69.65	90.25	75.2
89	YT	Yothee	69-12	2 × 40 ×	80	41.52	53.84	67.3	2 × 40 ×	80	43.18	55.95	69.9
			69-24	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
90	BE	Bangkae	69-12	1 × 40 ×	40	24.65	31.97	79.9	×	0	0.00	0.00	0.0
			115-12	×	0	0.00	0.00	0.0	2 × (40) ×	80	44.33	57.43	71.8
			115-24	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
91	BZ	Bangson	69-12	2 × (40) ×	80	37.16	48.19	60.2	1 × (40) ×	40	24.37	31.58	78.9
			69-24	×	0	0.00	0.00	0.0	1 × 60 ×	60	23.92	30.99	51.7
92	BI	Bearing	69-24	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
			115-24	2 × 60 ×	120	52.73	68.38	57.0	2 × 60 ×	120	55.04	71.32	59.4
93	EK	Ekamai	69-12	1 × (40) ×	40	21.81	28.28	70.7	1 × (40) ×	40	22.68	29.39	73.5
			69-24	2 × 60 ×	120	54.77	71.02	59.2	2 × 60 ×	120	56.97	73.82	61.5
			115-24	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
94	EB	Ekburi	115-24	1 × 60 ×	60	20.54	26.63	44.4	1 × 60 ×	60	21.36	27.68	46.1
95	HA	Hamak	69-12	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
			69-24	1 × 40 ×	40	23.17	30.05	75.1	1 × 40 ×	40	20.10	26.01	65.1
			115-24	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
96	IN	Intamara	69-24	2 × 60 ×	120	41.71	54.09	45.1	2 × 60 ×	120	43.37	56.20	46.8
97	JR	Jangron	69-12	1 × (40) ×	40	18.39	23.85	59.6	1 × (40) ×	40	19.13	24.79	62.0
			69-24	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
98	KO	Khotor	115-24	2 × 60 ×	120	49.77	64.54	53.8	2 × 60 ×	120	55.57	72.00	60.0
99	KI	Kingkaew	115-24	2 × 60 ×	120	42.50	55.11	45.9	2 × 60 ×	120	50.87	65.91	54.9
100	KH	Klongmahasawad	115-24	2 × 60 ×	120	50.90	66.00	55.0	2 × 60 ×	120	52.82	68.11	57.0
101	LB	Lardkrabang	115-24	2 × 60 ×	120	49.54	64.24	53.5	2 × 60 ×	120	44.70	57.92	48.3
102	NJ	Nuangthong 3	115-24	2 × 60 ×	120	54.14	70.20	58.5	2 × 60 ×	120	56.31	72.96	60.8
103	NS	Nonsee	69-12	1 × (40) ×	40	15.79	20.48	51.2	1 × (40) ×	40	11.23	14.55	36.4
			69-24	1 × 60 ×	60	20.10	26.06	43.4	1 × 60 ×	60	26.10	33.82	56.4
104	PP	Pradipat	69-12	2 × (40) ×	80	38.59	50.04	62.6	2 × (40) ×	80	42.17	54.64	68.3
			69-24	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
105	SA	Sainamtip	69-12	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
			69-24	2 × 60 ×	120	46.41	60.17	50.2	2 × 60 ×	120	48.81	63.25	52.7
			115-24	×	0	0.00	0.00	0.0	×	0	0.00	0.00	0.0
106	SB	Sanambinnam	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

No	ABB	Substation	Voltage (KV)	2000 Bank configuration	Capacity (MVA)	coincident (MW)	non-coinci (MVA)	utilization factor (%)	2001 Bank configuration	Capacity (MVA)	coincident (MW)	non-coinci (MVA)	utilization factor (%)
80	SU	Surawong	69-12	3 × 40 ×	120	67.68	87.72	73.1	1 × 40 ×	40	23.51	30.12	76.0
			69-24	× ×	0	0.00	0.00	0.0	2 × 60 ×	120	46.20	59.77	49.8
81	TS	Taksin	69-12	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
			69-24	2 × 40 ×	80	44.15	57.23	71.5	2 × 40 ×	80	37.47	48.48	60.6
82	TP	Teparak	69-24	2 × 40 1 × 60	140	79.14	102.57	73.3	2 × 40 1 × 60	140	70.60	91.31	65.2
83	TT	Thanontok	69-12	1 × 40 1 × (40)	80	40.94	53.07	66.3	× ×	0	0.00	0.00	0.0
			69-24	× ×	0	0.00	0.00	0.0	2 × 60 ×	120	47.79	61.83	51.5
84	TB	Thonburi	69-12	2 × 40 ×	80	40.75	52.82	66.0	2 × 40 ×	80	42.45	54.92	68.7
			69-24	1 × 60 ×	60	27.05	35.06	58.4	1 × 60 ×	60	29.45	38.10	63.5
85	TK	Tongkung	69-12	2 × 40 ×	80	42.64	55.27	69.1	× ×	0	0.00	0.00	0.0
			69-24	× ×	0	0.00	0.00	0.0	2 × 40 ×	80	41.40	53.56	67.0
86	WB	Wangpetchaboon	69-12	2 × 40 1 × (40)	120	65.74	85.21	71.0	× ×	0	0.00	0.00	0.0
			69-24	× ×	0	0.00	0.00	0.0	3 × 60 ×	180	83.28	107.75	59.9
87	WT	Wangthonglang	69-12	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
			69-24	3 × 60 ×	180	69.90	90.60	50.3	3 × 60 ×	180	77.22	99.90	55.5
88	WL	Watlieb	69-12	3 × 40 ×	120	73.22	94.90	79.1	3 × 40 ×	120	66.82	86.45	72.0
89	YT	Yothee	69-12	2 × 40 ×	80	44.48	57.65	72.1	2 × 40 ×	80	44.10	57.05	71.3
			69-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
90	BE	Bangkae	69-12	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
			115-12	2 × (40) ×	80	45.94	59.55	74.4	1 × (40) ×	40	22.52	29.14	72.8
			115-24	× ×	0	0.00	0.00	0.0	1 × 60 ×	60	30.24	39.12	65.2
91	BZ	Bangson	69-12	1 × (40) ×	40	23.54	30.52	76.3	× ×	0	0.00	0.00	0.0
			69-24	1 × 60 ×	60	28.64	37.12	61.9	2 × 60 ×	120	42.80	55.37	46.1
92	BI	Bearing	69-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
			115-24	2 × 60 ×	120	56.84	73.67	61.4	2 × 60 ×	120	63.69	82.40	68.7
93	EM	Ekamai	69-12	1 × (40) ×	40	21.67	28.09	70.2	1 × (40) ×	40	19.94	25.80	64.5
			69-24	2 × 60 ×	120	58.00	75.18	62.7	2 × 60 ×	120	62.12	80.37	67.0
			115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
94	EB	Ekburi	115-24	2 × 60 ×	120	30.00	38.89	32.4	2 × 60 ×	120	41.20	53.30	44.4
95	HA	Huamak	69-12	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
			69-24	1 × 40 ×	40	20.70	26.83	67.1	1 × 60 ×	60	21.32	27.58	46.0
			115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
96	IN	Intamara	69-24	2 × 60 ×	120	44.68	57.91	48.3	2 × 60 ×	120	46.02	59.54	49.6
97	JR	Jangron	69-12	1 × (40) ×	40	23.70	30.72	76.8	1 × (40) ×	40	24.41	31.58	79.0
			69-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
98	KO	Khotor	115-24	2 × 60 ×	120	51.08	66.21	55.2	3 × 60 ×	180	71.51	96.10	53.6
99	KI	Kingkaew	115-24	2 × 60 ×	120	53.57	69.44	57.9	2 × 60 ×	120	56.79	73.17	61.2
100	KH	Klongnahasawad	115-24	2 × 60 ×	120	50.41	65.34	54.5	2 × 60 ×	120	51.92	67.17	56.0
101	LB	Lardkrabang	115-24	2 × 60 ×	120	46.72	60.56	50.5	2 × 60 ×	120	49.27	63.74	53.1
102	M3	Muangthong 3	115-24	2 × 60 ×	120	58.00	75.18	62.7	2 × 60 ×	120	60.74	78.58	65.5
103	NS	Nonsee	69-12	1 × (40) ×	40	14.72	19.08	47.7	× ×	0	0.00	0.00	0.0
			69-24	1 × 60 ×	60	26.88	34.84	58.1	2 × 60 ×	120	43.04	55.68	46.4
104	PP	Pradipat	69-12	2 × (40) ×	80	45.24	58.63	73.3	1 × (40) ×	40	22.25	28.79	72.0
			69-24	× ×	0	0.00	0.00	0.0	1 × 60 ×	60	31.07	40.20	67.0
105	SA	Sainamtip	69-12	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
			69-24	2 × 60 ×	120	64.81	84.00	70.0	3 × 60 ×	180	62.29	80.59	44.8
			115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
106	SB	Sanambinnam	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 6.3-4 Load and Installed Capacity of Distribution Substations (JICA Study Team Plan, Planning Year = 1997 - 2001)

No	ABB	Substation	Voltage (KV)	1996 Bank configuration	1996 Capacity (MVA)	1996 coincident (MW)	1996 non-coinci (MVA)	1996 utilization factor (%)	1997 Bank configuration	1997 Capacity (MVA)	1997 coincident (MW)	1997 non-coinci (MVA)	1997 utilization factor (%)
			115-12	× ×	0		0.00	0.0	1 × (40) ×	40	21.02	31.17	77.9
			115-24	× ×	0		0.00	0.0	1 × 60 ×	60	20.00	25.95	43.3
107	RG	Saorahong	115-24	1 × 60 ×	60	23.16	30.14	50.2	1 × 60 ×	60	30.40	39.15	65.8
108	OB	South Bangplee	115-24	1 × 60 ×	60	36.22	47.14	78.6	2 × 60 ×	120	43.33	56.23	46.9
109	SE	Srieiam	115-24	2 × 60 ×	120	42.13	54.83	45.7	2 × 60 ×	120	60.69	78.76	65.6
110	SG	Suanluang	69-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
			115-24	3 × 60 ×	180	78.55	102.21	56.8	3 × 60 ×	180	65.04	84.40	46.9
111	UK	Surasak	69-12	1 × (40) ×	40	24.34	31.68	79.2	2 × (40) ×	80	37.86	49.13	61.4
			69-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
112	TN	Taiban	115-24	× ×	0		0.00	0.0	1 × 60 ×	60	32.26	41.86	69.8
113	TW	Taweesattana	115-24	1 × 60 ×	60	20.44	26.60	44.3	1 × 60 ×	60	22.28	28.91	48.2
114	TR	Thonburirom	69-12	1 × (40) ×	40	21.00	27.33	68.3	1 × (40) ×	40	23.39	30.36	75.9
			115-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
115	TH	Tungsonghong	69-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
			115-24	2 × 60 ×	120	34.20	44.51	37.1	2 × 60 ×	120	43.95	57.03	47.5
116	YK	Yenarkart	69-12	2 × (40) ×	80	45.60	59.35	74.2	2 × (40) ×	80	44.55	57.81	72.3
			69-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
117	AB	Bangbor	115-24	1 × 60 ×	60	16.10	20.96	34.9	2 × 60 ×	120	20.00	25.95	21.6
118	JK	Bangjak	69-12	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
			115-12	1 × (40) ×	40	16.32	21.24	53.1	1 × (40) ×	40	13.00	16.87	42.2
			115-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
119	KD	Bangkradee	69-12	1 × (40) ×	40	12.10	15.75	39.4	1 × (40) ×	40	11.50	14.92	37.3
			115-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
120	BH	Bangshan	115-24	1 × 60 ×	60	17.18	22.36	37.3	1 × 60 ×	60	17.82	23.13	38.5
121	MI	Banmai	69-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
122	DD	Dindaeng	69-12	× ×	0		0.00	0.0	1 × (40) ×	40	17.36	22.53	56.3
			115-12	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
			115-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
123	EC	Ekachai	69-12	1 × (40) ×	40	10.40	13.54	33.8	1 × (40) ×	40	11.00	14.28	35.7
			115-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
124	CK	Chaaklang	69-24	1 × 60 ×	60	16.00	20.83	34.7	2 × 60 ×	120	17.00	22.06	18.4
			115-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
125	JW	Jangwatana	115-24	1 × 60 ×	60	42.97	55.93	93.2	2 × 60 ×	120	46.36	60.16	50.1
126	JJ	Jatujag	69-12	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
			69-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
			115-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
127	KE	Kaset	69-12	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
			69-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
128	KG	Klongkum	115-24	× ×	0		0.00	0.0	1 × 60 ×	60	22.00	28.55	47.6
129	KL	Klongprapa	115-24	1 × 60 ×	60	8.24	10.73	17.9	1 × 60 ×	60	12.00	15.57	26.0
130	MU	Mitr-udom	69-12	1 × 40 ×	40	26.16	34.05	85.1	1 × 40 ×	40	10.00	12.98	32.4
			69-24	× ×	0		0.00	0.0	× ×	0	0.00		0.0
131	M4	Muangthong 4	115-24	× ×	0		0.00	0.0	1 × 60 ×	60	28.56	37.06	61.8
132	M5	Muangthong 5	115-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
133	M6	Muangthong 6	115-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
134	M7	Muangthong 7	115-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
135	NL	Nanglerng	69-12	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
136	TA	Patanakarn	115-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0
137	PL	Plubpla	115-24	× ×	0		0.00	0.0	× ×	0	0.00	0.00	0.0

No	ABB	Substation	Voltage (KV)	1998 Bank configuration	Capacity (MVA)	coincident (MW)	non-coinci (MVA)	utilization factor (%)	1999 Bank configuration	Capacity (MVA)	coincident (MW)	non-coinci (MVA)	utilization factor (%)
			115-12	1 × (40) ×	40	20.49	26.57	66.4	1 × (40) ×	40	23.05	29.87	74.7
			115-24	1 × 60 ×	60	26.32	34.13	56.9	1 × 60 ×	60	29.63	38.39	64.0
107	RG	Saorahong	115-24	1 × 60 ×	60	28.57	37.04	61.7	1 × 60 ×	60	31.36	40.63	67.7
108	OB	South Bangplee	115-24	2 × 60 ×	120	45.24	58.66	48.9	2 × 60 ×	120	49.04	63.55	53.0
109	SE	Sricjan	115-24	2 × 60 ×	120	68.32	88.59	73.8	2 × 60 ×	120	66.67	86.39	72.0
110	SG	Suanluang	69-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
			115-24	3 × 60 ×	180	70.98	92.04	51.1	3 × 60 ×	180	66.84	86.60	48.1
111	UK	Surasak	69-12	2 × (40) ×	80	44.10	57.19	71.5	2 × (40) ×	80	43.00	55.72	69.7
			69-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
112	TN	Taiban	115-24	1 × 60 ×	60	31.48	40.83	68.0	1 × 60 ×	60	36.18	46.88	78.1
113	TW	Taweewattana	115-24	2 × 60 ×	120	42.52	55.14	46.0	2 × 60 ×	120	50.34	65.23	54.4
114	TR	Thonburirom	69-12	2 × (40) ×	80	43.53	56.44	70.6	2 × (40) ×	80	40.61	52.62	65.8
			115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
115	TH	Tungsonghong	69-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
			115-24	2 × 60 ×	120	37.39	48.48	40.4	2 × 60 ×	120	38.89	50.39	42.0
116	YK	Yenarkart	69-12	2 × (40) ×	80	44.39	57.56	72.0	2 × (40) ×	80	46.13	59.77	74.7
			69-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
117	AB	Bangbor	115-24	2 × 60 ×	120	22.23	28.83	24.0	2 × 60 ×	120	23.12	29.96	25.0
118	JK	Bangjak	69-12	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
			115-12	1 × (40) ×	40	16.93	21.95	54.9	1 × (40) ×	40	18.14	23.51	58.8
			115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
119	KD	Bangkradee	69-12	1 × (40) ×	40	12.00	15.56	38.9	× ×	0	0.00	0.00	0.0
			115-24	× ×	0	0.00	0.00	0.0	2 × 60 ×	120	19.74	25.58	21.3
120	BH	Bangshan	115-24	2 × 60 ×	120	26.35	34.17	28.5	2 × 60 ×	120	35.61	46.14	38.5
121	NI	Bannai	69-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
122	DD	Dindaeng	69-12	1 × (40) ×	40	18.85	24.44	61.1	1 × (40) ×	40	19.61	25.41	63.5
			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
123	EC	Ekachai	69-12	1 × (40) ×	40	13.00	16.86	42.1	× ×	0	0.00	0.00	0.0
			115-24	× ×	0	0.00	0.00	0.0	1 × 60 ×	60	15.00	19.41	32.4
124	GK	Ghouklang	69-24	2 × 60 ×	120	18.71	24.26	20.2	2 × 60 ×	120	34.36	44.52	37.1
			115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
125	JW	Jangwatana	115-24	2 × 60 ×	120	59.49	77.14	64.3	2 × 60 ×	120	59.87	77.58	64.7
126	JJ	Jatujag	69-12	2 × (40) ×	80	25.00	32.42	40.5	2 × (40) ×	80	29.00	37.58	47.0
			69-24	× ×	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
127	KE	Kaset	69-12	1 × (40) ×	40	16.77	21.75	54.4	× ×	0	0.00	0.00	0.0
			69-24	1 × 60 ×	60	26.19	33.96	56.6	2 × 60 ×	120	48.69	63.09	52.6
128	KG	Klongkum	115-24	1 × 60 ×	60	33.12	42.95	71.6	2 × 60 ×	120	44.44	57.58	48.0
129	KL	Klongpraga	115-24	1 × 60 ×	60	16.18	21.37	35.6	1 × 60 ×	60	19.14	21.80	41.3
130	NU	Nitr udom	69-12	1 × 40 ×	40	12.36	16.03	40.1	1 × 40 ×	40	12.85	16.65	41.6
			69-24	× ×	0	0.00		0.0	× ×	0	0.00		0.0
131	N4	Nuangthong 4	115-24	2 × 60 ×	120	60.00	77.80	64.8	2 × 60 ×	120	59.40	76.97	64.1
132	N5	Nuangthong 5	115-24	× ×	0	0.00	0.00	0.0	2 × 60 ×	120	57.00	73.86	61.6
133	N6	Nuangthong 6	115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
134	N7	Nuangthong 7	115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
135	NL	Nangleng	69-12	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
136	TA	Patanakarn	115-24	× ×	0	0.00	0.00	0.0	1 × 60 ×	60	14.36	18.61	31.0
137	PL	Plubpla	115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0

No.	ABB	Substation	Voltage (KV)	2000 Bank configuration	Capacity (MVA)	coincident (MW)	non-coinci (MVA)	utilization factor (%)	2001 Bank configuration	Capacity (MVA)	coincident (MW)	non-coinci (MVA)	utilization factor (%)
			115-12	1 × (40) ×	40	23.75	30.78	77.0	×	0	0.00	0.00	0.0
			115-24	1 × 60 ×	60	30.51	39.55	65.9	2 × 60 ×	120	55.89	72.31	60.3
107	RG	Saorahong	115-24	1 × 60 ×	60	24.30	31.50	52.5	1 × 60 ×	60	25.02	32.37	54.0
108	OB	South Bangplee	115-24	2 × 60 ×	120	52.61	68.19	56.8	2 × 60 ×	120	59.31	76.77	64.0
109	SE	Sriejam	115-24	2 × 60 ×	120	67.06	86.92	72.4	3 × 60 ×	180	85.68	110.85	61.6
110	SG	Suanluang	69-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
			115-24	3 × 60 ×	180	68.61	88.94	49.4	3 × 60 ×	180	56.47	73.06	40.6
111	UK	Surasak	69-12	2 × (40) ×	80	23.88	30.95	38.7	× ×	0	0.00	0.00	0.0
			69-24	× ×	0	0.00	0.00	0.0	2 × 60 ×	120	34.90	45.15	37.6
112	TN	Taiban	115-24	2 × 60 ×	120	65.13	84.42	70.4	2 × 60 ×	120	62.39	80.72	67.3
113	TW	Taweewattana	115-24	2 × 60 ×	120	54.47	70.60	58.8	2 × 60 ×	120	61.26	79.26	66.1
114	TR	Thonburirom	69-12	2 × (40) ×	80	41.82	54.21	67.8	2 × (40) ×	80	43.08	55.74	69.7
			115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
115	TH	Tungsonghong	69-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
			115-24	2 × 60 ×	120	43.44	56.31	46.9	2 × 60 ×	120	41.26	53.38	44.5
116	YK	Yenarkart	69-12	2 × (40) ×	80	44.31	57.44	71.8	× ×	0	0.00		0.0
			69-24	× ×	0	0.00	0.00	0.0	2 × 60 ×	120	44.81	57.98	48.3
117	AB	Bangbor	115-24	2 × 60 ×	120	41.81	54.19	45.2	2 × 60 ×	120	43.07	55.72	46.4
118	JK	Bangjak	69-12	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
			115-12	1 × (40) ×	40	17.73	22.98	57.5	1 × (40) ×	40	13.02	16.85	42.1
			115-24	1 × 60 ×	60	18.60	24.11	40.2	1 × 60 ×	60	19.16	24.79	41.3
119	KD	Bangkradee	69-12	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
			115-24	2 × 60 ×	120	27.72	35.93	29.9	2 × 60 ×	120	35.28	45.81	38.0
120	BH	Bangshan	115-24	2 × 60 ×	120	36.68	47.54	39.6	2 × 60 ×	120	37.78	48.88	40.7
121	MI	Banmai	69-24	× ×	0	0.00	0.00	0.0	2 × 60 ×	120	28.39	36.73	30.6
122	DD	Dindaeng	69-12	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
			115-12	2 × (40) ×	80	40.20	52.11	65.1	2 × (40) ×	80	45.40	58.74	73.4
			115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
123	EC	Ekachai	69-12	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
			115-24	1 × 60 ×	60	17.00	22.04	36.7	2 × 60 ×	120	21.35	31.50	26.3
124	CK	Chouklang	69-24	2 × 60 ×	120	35.39	45.87	38.2	2 × 60 ×	120	48.45	62.68	52.2
			115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
125	JW	Jangwatana	115-24	2 × 60 ×	120	61.67	79.93	66.6	2 × 60 ×	120	59.52	77.01	64.2
126	JJ	Jatujag	69-12	2 × (40) ×	80	38.29	49.63	62.0	× ×	0	0.00	0.00	0.0
			69-24	× ×	0	0.00	0.00	0.0	2 × 60 ×	120	23.16	29.96	25.0
			115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
127	KE	Kaset	69-12	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
			69-24	2 × 60 ×	120	50.14	64.99	54.2	2 × 60 ×	120	51.65	66.92	55.7
128	KG	Klongkum	115-24	2 × 60 ×	120	45.78	59.34	49.5	2 × 60 ×	120	47.15	61.00	50.8
129	KL	Klongprapa	115-24	1 × 60 ×	60	19.71	25.55	42.6	2 × 60 ×	120	32.30	41.79	34.8
130	MU	Mitr udom	69-12	1 × 40 ×	40	13.46	17.45	43.6	1 × 40 ×	40	21.53	27.85	69.6
			69-24	× ×	0	0.00		0.0	× ×	0	0.00		0.0
131	M4	Muangthong 4	115-24	2 × 60 ×	120	55.82	72.35	60.3	2 × 60 ×	120	59.50	76.98	64.2
132	M5	Muangthong 5	115-24	2 × 60 ×	120	61.35	79.52	66.3	2 × 60 ×	120	59.19	76.58	63.8
133	M6	Muangthong 6	115-24	2 × 60 ×	120	60.72	78.70	65.6	2 × 60 ×	120	59.51	77.03	64.2
134	M7	Muangthong 7	115-24	× ×	0	0.00	0.00	0.0	2 × 60 ×	120	63.01	81.52	67.9
135	NL	Nanglerng	69-12	× ×	0	0.00	0.00	0.0	2 × 40 ×	80	44.19	57.17	71.5
136	TA	Patanakarn	115-24	1 × 60 ×	60	18.25	23.66	39.1	2 × 60 ×	120	31.80	45.02	37.5
137	PL	Plubpla	115-24	× ×	0	0.00	0.00	0.0	2 × 60 ×	120	42.70	55.25	46.0

No	ABB	Substation	Voltage (KV)	1996 Bank configuration		Capacity (MVA)	coincident (MW)	non-coinci (MVA)	utilization factor (%)	1997 Bank configuration		Capacity (MVA)	coincident (MW)	non-coinci (MVA)	utilization factor (%)
138	PW	Prawes	115-24	×	×	0	0.00	0.00	0.0	×	×	0	0.00	0.00	0.0
139	RP	Prompong	115-24	×	×	0	0.00	0.00	0.0	×	×	0	0.00	0.00	0.0
140	SI	Sainoi	115-24	×	×	0	0.00	0.00	0.0	×	×	0	0.00	0.00	0.0
141	YN	Sawyarn	115-12	×	×	0	0.00	0.00	0.0	1 × (40)	×	40	23.88	30.99	77.5
			115-24	×	×	0	0.00	0.00	0.0	×	×	0	0.00	0.00	0.0
142	SH	Satorn	115-24	×	×	0	0.00	0.00	0.0	×	×	0	0.00	0.00	0.0
143	HP	Shimplee	115-24	×	×	0	0.00	0.00	0.0	×	×	0	0.00	0.00	0.0
144	SW	Sriwiang	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
145	YI	Suanyai	115-24	×	×	0	0.00	0.00	0.0	×	×	0	0.00	0.00	0.0
146	WY	Suwintawong	115-24	×	×	0	0.00	0.00	0.0	×	×	0	0.00	0.00	0.0
147	TI	Tha-kwian	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
148	TC	Trokchan	115-12	×	×	0	0.00	0.00	0.0	1 × (40)	×	40	21.80	28.30	70.7
			115-24	×	×	0	0.00	0.00	0.0	×	×	0	0.00	0.00	0.0
149	TY	Tubyao	115-24	×	×	0	0.00	0.00	0.0	×	×	0	0.00	0.00	0.0
150	WK	Watkampaeng	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
151	WR	Wuttakart	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
152	AK	Asoke	115-24	×	×	0	0.00	0.00	0.0	×	×	0	0.00	0.00	0.0
153	BT	Bangbuatong	115-24	×	×	0	0.00	0.00	0.0	×	×	0	0.00	0.00	0.0
154	BS	Banghuasae	115-24	×	×	0	0.00	0.00	0.0	×	×	0	0.00	0.00	0.0
155	BK	Bangkaew	115-24	×	×	0	0.00	0.00	0.0	×	×	0	0.00	0.00	0.0
156	PY	Bangpleeyai	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	×	×	0	0.00	0.00	0.0
158	JB	Jorakabuo	115-24	×	×	0	0.00	0.00	0.0	×	×	0	0.00	0.00	0.0
159	KB	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	×	×	0	0.00	0.00	0.0
161	GP	Klongpune	115-24	×	×	0	0.00	0.00	0.0	×	×	0	0.00	0.00	0.0
162	KR	Krungtepkreeta	115-24	×	×	0	0.00	0.00	0.0	×	×	0	0.00	0.00	0.0
163	LH	Land & House	115-24	×	×	0	0.00	0.00	0.0	×	×	0	0.00	0.00	0.0
164	M8	Muangthong 8	115-24	×	×	0	0.00	0.00	0.0	×	×	0	0.00	0.00	0.0
165	M9	Muangthong 9	115-24	×	×	0	0.00	0.00	0.0	×	×	0	0.00	0.00	0.0
166	RL	Praramkao	115-24	×	×	0	0.00	0.00	0.0	×	×	0	0.00	0.00	0.0
167	RJ	Rajchaprarop	115-24	×	×	0	0.00	0.00	0.0	×	×	0	0.00	0.00	0.0
168	NP	Sanampao	115-24	×	×	0	0.00	0.00	0.0	×	×	0	0.00	0.00	0.0
169	SN	Sananikom	115-24	×	×	0	0.00	0.00	0.0	×	×	0	0.00	0.00	0.0
170	SS	Songsunikom	115-24	×	×	0	0.00	0.00	0.0	×	×	0	0.00	0.00	0.0
171	SR	Srinakarin	115-24	×	×	0	0.00	0.00	0.0	×	×	0	0.00	0.00	0.0
172	TO	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	Watdeedod	69-24	×	×	0	0.00	0.00	0.0	×	×	0	0.00	0.00	0.0
175	GY	Bangkruay	115-24	×	×	0	0.00	0.00	0.0	×	×	0	0.00	0.00	0.0
176	GG	Bangpong	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)	Bank configuration	1998 Capacity (MVA)	coincident (MW)	non-coinci (MVA)	utilization factor (%)	Bank configuration	1999 Capacity (MVA)	coincident (MW)	non-coinci (MVA)	utilization factor (%)
138	PW	Prawes	115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
139	RP	Prompong	115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
140	SI	Sainoi	115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
141	YN	Sanyarn	115-12	2 × (40) ×	80	37.35	48.44	60.6	2 × (40) ×	80	44.79	58.01	72.6
			115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
142	SR	Satorn	115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
143	SP	Shimplee	115-24	1 × 60 ×	60	23.84	30.91	51.5	1 × 60 ×	60	22.88	29.65	49.4
144	SW	Sriwiang	69-12	× ×	0	0.00	0.00	0.0	2 × (40) ×	80	23.00	29.80	37.3
			69-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
145	YI	Suanyai	115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
146	YW	Suwintawong	115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
147	TI	Tha-kwian	69-12	× ×	0	0.00	0.00	0.0	2 × (40) ×	80	36.71	47.57	59.5
			69-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
148	TC	Trokchan	115-12	2 × (40) ×	80	41.24	53.47	66.8	2 × (40) ×	80	44.32	57.43	71.8
			115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
149	TY	Tubyao	115-24	1 × 60 ×	60	17.74	23.00	38.3	1 × 60 ×	60	20.40	26.43	44.1
150	WK	Watkampaeng	69-12	1 × 40 ×	40	16.32	21.16	52.9	1 × 40 ×	40	20.97	27.17	67.9
			69-24	× ×	0	0.00		0.0	× ×	0	0.00		0.0
151	WK	Wattakart	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
152	AK	Asoke	115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
153	BT	Bangbuatong	115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
154	BS	Banghuasae	115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
155	BK	Bangkaew	115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
156	PY	Bangpleeyai	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	× ×	0	0.00	0.00	0.0
158	JB	Jorakabuo	115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
159	KB	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	× ×	0	0.00	0.00	0.0
161	GP	Klongpone	115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
162	KR	Krungtepkreeta	115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
163	LH	Land & House	115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
164	N8	Nuangthong 8	115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
165	N9	Nuangthong 9	115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
166	RL	Praramkao	115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
167	RJ	Rajchaprarop	115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
168	NP	Sanampao	115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
169	SN	Sananikom	115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
170	SS	Songsunikom	115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
171	SR	Srinakarin	115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
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	Watdeedod	69-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
175	GY	Bangkruay	115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
176	GG	Bangpang	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)	2000 Bank configuration	Capacity (MVA)	coincident (MW)	non-coinci (MVA)	utilization factor (%)	2001 Bank configuration	Capacity (MVA)	coincident (MW)	non-coinci (MVA)	utilization factor (%)
138	PW	Prawes	115-24	2 × 60 ×	120	32.63	42.29	35.3	2 × 60 ×	120	43.61	56.12	47.0
139	RP	Prompong	115-24	2 × 60 ×	120	48.04	62.27	51.9	2 × 60 ×	120	35.75	46.25	38.5
140	SI	Sainoi	115-24	× ×	0	0.00	0.00	0.0	2 × 60 ×	120	22.36	28.93	24.1
141	YN	Samyarn	115-12	2 × (40) ×	80	41.57	53.88	67.4	2 × (40) ×	80	42.50	54.99	68.7
			115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
142	SN	Satorn	115-24	× ×	0	0.00	0.00	0.0	2 × 60 ×	120	53.35	69.02	57.5
143	HP	Shimplee	115-24	2 × 60 ×	120	48.92	63.41	52.8	2 × 60 ×	120	55.51	71.86	59.9
144	SW	Sriwiang	69-12	2 × (40) ×	80	44.70	57.94	72.4	2 × (40) ×	80	34.88	45.13	56.4
			69-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
145	YI	Suanyai	115-24	× ×	0	0.00	0.00	0.0	2 × 60 ×	120	21.36	27.64	23.0
146	WW	Suwintawong	115-24	2 × 60 ×	120	14.00	18.15	15.1	2 × 60 ×	120	16.36	21.17	17.6
147	TI	Tha-kwian	69-12	2 × (40) ×	80	37.81	49.01	61.3	2 × (40) ×	80	38.95	50.39	63.0
			69-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
148	TC	Trokchan	115-12	2 × (40) ×	80	43.31	56.14	70.2	2 × (40) ×	80	34.72	44.92	56.2
			115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
149	TV	Tubvao	115-24	1 × 60 ×	60	20.00	25.92	43.2	2 × 60 ×	120	30.36	39.28	32.7
150	WK	Watkampaeng	69-12	1 × 40 ×	40	21.60	28.00	70.0	× ×	0	0.00		0.0
			69-24	× ×	0	0.00		0.0	2 × 60 ×	120	34.25	44.31	36.9
151	WK	Wattakart	69-12	1 × (40) ×	40	17.00	22.04	55.1	× ×	0	0.00	0.00	0.0
			69-24	1 × 60 ×	60	15.35	19.90	33.2	2 × 60 ×	120	33.32	43.11	35.9
152	AK	Asoke	115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
153	BT	Bangbuotong	115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
154	BS	Banghuasae	115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
155	BK	Bangkaew	115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
156	PY	Bangpleeyai	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	× ×	0	0.00	0.00	0.0
158	JB	Jorakabuo	115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
159	KB	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	× ×	0	0.00	0.00	0.0
161	GP	Klongpuac	115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
162	KR	Krungtepkreeta	115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
163	LH	Land & House	115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
164	M8	Muangthong 8	115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
165	M9	Muangthong 9	115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
166	RL	Praramkao	115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
167	RJ	Rajchaprarop	115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
168	NP	Sanampao	115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
169	ON	Sanunikom	115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
170	OS	Songsunikom	115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
171	IR	Srinakarin	115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
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	Watdeedod	69-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
175	GY	Bungkruay	115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
176	GG	Banggang	115-24	× ×	0	0.00	0.00	0.0	× ×	0	0.00	0.00	0.0
177	AA	Banggla	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	Klonggratium	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

Appendix 6.3-4 Load and Installed Capacity of Distribution Substations (JICA Study Team Plan, Planning Year = 1997 - 2001)

No	ABB	Substation	Voltage (KV)	Bank configuration		1996 Capacity (MVA)	coincident (MW)	non-coinci (MVA)	utilization factor (%)	Bank configuration		1997 Capacity (MVA)	coincident (MW)	non-coinci (MVA)	utilization factor (%)
181	LS	Lumpagshe	115-24	×	×	0		0.00	0.0	×	×	0	0.00	0.00	0.0
182	NI	Nimitmai	115-24	×	×	0		0.00	0.0	×	×	0	0.00	0.00	0.0
183	NY	Nongyai	115-24	×	×	0		0.00	0.0	×	×	0	0.00	0.00	0.0
184	PL	Pinklao	115-24	×	×	0		0.00	0.0	×	×	0	0.00	0.00	0.0
185	PH	Pongpetch	115-24	×	×	0		0.00	0.0	×	×	0	0.00	0.00	0.0
186	PT	Puttamonton	115-24	×	×	0		0.00	0.0	×	×	0	0.00	0.00	0.0
187	RO	Rajchatru	115-24	×	×	0		0.00	0.0	×	×	0	0.00	0.00	0.0
188	RR	Rajdamri	115-24	×	×	0		0.00	0.0	×	×	0	0.00	0.00	0.0
189	AT	Satorntai	115-24	×	×	0		0.00	0.0	×	×	0	0.00	0.00	0.0
190	TL	Talingchan	115-24	×	×	0		0.00	0.0	×	×	0	0.00	0.00	0.0
191	TM	Tiamruammit	115-24	×	×	0		0.00	0.0	×	×	0	0.00	0.00	0.0
192	RM	Trimit	69-12	×	×	0		0.00	0.0	×	×	0	0.00	0.00	0.0
		Total				11,645	5,267.77	6,856.23	58.9			12,825	5,745.69	7,456.16	58.1

Diversity Factor		1.1805	1.1809
Power Factor		0.9070	0.9100
Number of Bank	a	257	277
Number of Substation	b	124	130
Ratio	a/b	2.0726	2.1308

Appendix 6.3-4 Load and Installed Capacity of Distribution Substations (JICA Study Team Plan, Planning Year = 1997 - 2001)

No	ABB	Substation	Voltage (KV)	1998 Bank configuration		Capacity (MVA)	coincident (MW)	non-coinci (MVA)	utilization factor (%)	1999 Bank configuration		Capacity (MVA)	coincident (MW)	non-coinci (MVA)	utilization factor (%)
181	LS	Lumpagshe	115-24	×	×	0	0.00	0.00	0.0	×	×	0	0.00	0.00	0.0
182	NI	Nimitmai	115-24	×	×	0	0.00	0.00	0.0	×	×	0	0.00	0.00	0.0
183	NY	Nongyai	115-24	×	×	0	0.00	0.00	0.0	×	×	0	0.00	0.00	0.0
184	PL	Pinklao	115-24	×	×	0	0.00	0.00	0.0	×	×	0	0.00	0.00	0.0
185	PH	Pongpetch	115-24	×	×	0	0.00	0.00	0.0	×	×	0	0.00	0.00	0.0
186	PT	Puttamonton	115-24	×	×	0	0.00	0.00	0.0	×	×	0	0.00	0.00	0.0
187	RO	Rajchakru	115-24	×	×	0	0.00	0.00	0.0	×	×	0	0.00	0.00	0.0
188	RR	Rajdamri	115-24	×	×	0	0.00	0.00	0.0	×	×	0	0.00	0.00	0.0
189	AT	Satorntai	115-24	×	×	0	0.00	0.00	0.0	×	×	0	0.00	0.00	0.0
190	TL	Talingchan	115-24	×	×	0	0.00	0.00	0.0	×	×	0	0.00	0.00	0.0
191	TN	Tiamruammit	115-24	×	×	0	0.00	0.00	0.0	×	×	0	0.00	0.00	0.0
192	RM	Trimit	69-12	×	×	0	0.00	0.00	0.0	×	×	0	0.00	0.00	0.0
		Total				13,585	6,171.46	8,002.55	58.9			14,425	6,626.59	8,586.21	59.5

Diversity Factor		1.1813	1.1817
Power Factor		0.9110	0.9120
Number of Bank	a	289	302
Number of Substation	b	135	139
Ratio	a/b	2.1407	2.1727

Appendix 6.3-4 Load and Installed Capacity of Distribution Substations (JICA Study Team Plan, Planning Year = 1997 - 2001)

No	ABB	Substation	Voltage (KV)	Bank configuration		2000 Capacity (MVA)	coincident (MW)	non-coinci (MVA)	utilization factor (%)	Bank configuration		2001 Capacity (MVA)	coincident (MW)	non-coinci (MVA)	utilization factor (%)
181	LS	Lumpagshe	115-24	×	×	0	0.00	0.00	0.0	×	×	0	0.00	0.00	0.0
182	NI	Nimitmai	115-24	×	×	0	0.00	0.00	0.0	×	×	0	0.00	0.00	0.0
183	NY	Nongyai	115-24	×	×	0	0.00	0.00	0.0	×	×	0	0.00	0.00	0.0
184	IL	Pinklao	115-24	×	×	0	0.00	0.00	0.0	×	×	0	0.00	0.00	0.0
185	PH	Pongpetch	115-24	×	×	0	0.00	0.00	0.0	×	×	0	0.00	0.00	0.0
186	PT	Puttamonton	115-24	×	×	0	0.00	0.00	0.0	×	×	0	0.00	0.00	0.0
187	RO	Rajchakru	115-24	×	×	0	0.00	0.00	0.0	×	×	0	0.00	0.00	0.0
188	RR	Rajdamri	115-24	×	×	0	0.00	0.00	0.0	×	×	0	0.00	0.00	0.0
189	AT	Satorntai	115-24	×	×	0	0.00	0.00	0.0	×	×	0	0.00	0.00	0.0
190	TL	Talingchan	115-24	×	×	0	0.00	0.00	0.0	×	×	0	0.00	0.00	0.0
191	TM	Tiamruammit	115-24	×	×	0	0.00	0.00	0.0	×	×	0	0.00	0.00	0.0
192	RN	Trimit	69-12	×	×	0	0.00	0.00	0.0	×	×	0	0.00	0.00	0.0
		Total				15,405	7,131.03	9,243.91	60.0			17,545	7,664.89	9,916.55	56.5

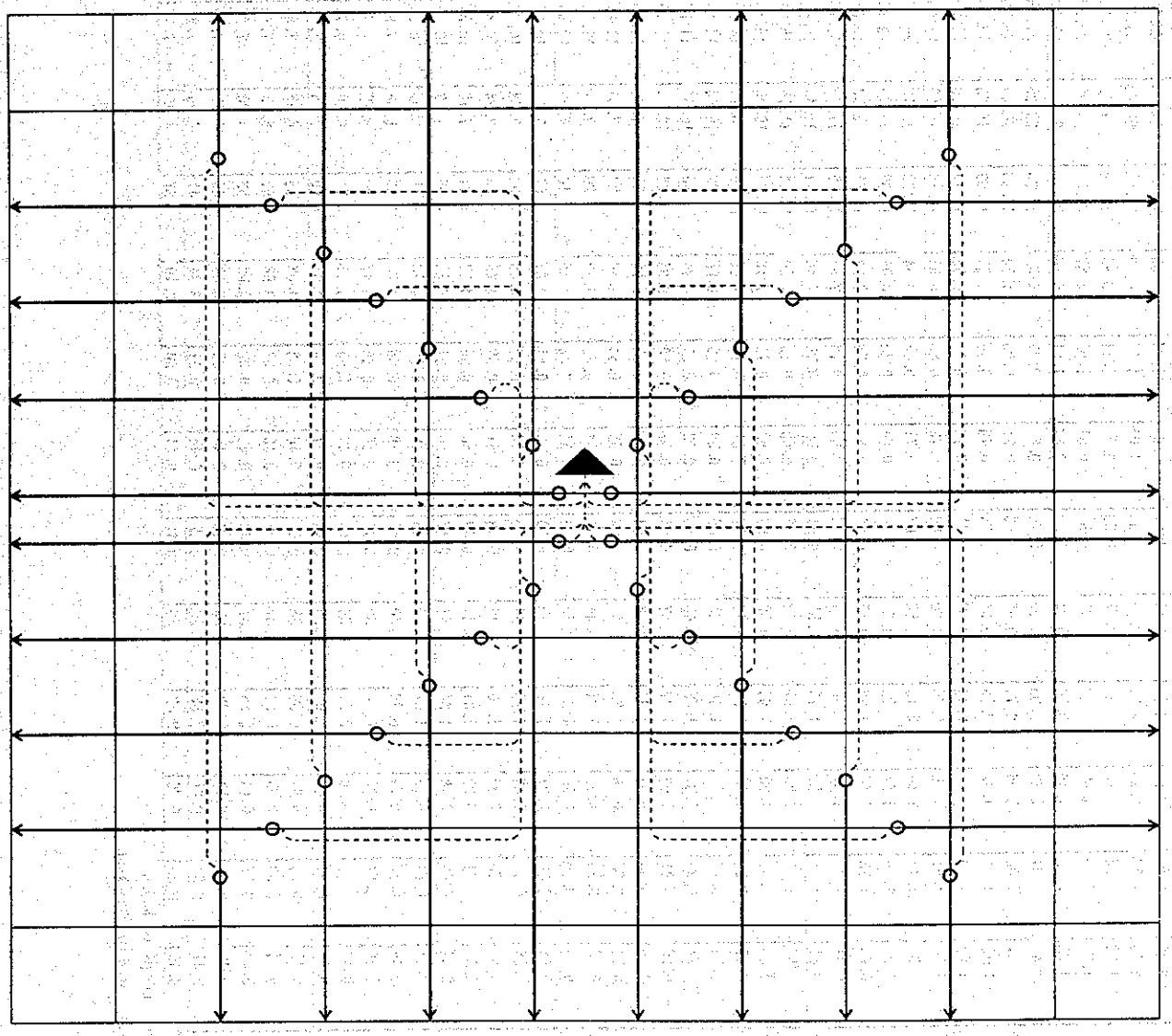
Diversity Factor		1.1821	1.1825
Power Factor		0.9120	0.9140
Number of Bank	a	318	341
Number of Substation	b	144	151
Ratio	a/b	2.2083	2.2583

APPENDIX

for

CHAPTER 9

Appendix 9.3-1



Model of Feeder Rising Point (In case of 200m mesh)

No of Feeder	Length of UG Cable
1	75 m
2	150 m
3	275 m
4	400 m
5	625 m
6	850 m
7	1,125 m
8	1,400 m
9	1,825 m
10	2,250 m
11	2,725 m
12	3,200 m
13	3,825 m
14	4,450 m
15	5,125 m
16	5,800 m
17	6,625 m
18	7,450 m
19	8,325 m
20	9,200 m
21	10,225 m
22	11,250 m
23	12,325 m
24	13,400 m
25	14,625 m
26	15,850 m
27	17,125 m
28	18,400 m
29	19,825 m
30	21,250 m
31	22,725 m
32	24,200 m

Supply Area of Substation (In case of 200m mesh)

Density (MVA/sq.km)	Supply Area (sq.km)				Supply Reach (km)				Total Feeder Length (km)			
	3×40	4×40	3×60	3×80	3×40	4×40	3×60	3×80	3×40	4×40	3×60	3×80
1	96.00	128.00	144.00	192.00	5.53	6.38	6.77	7.82	940.60	1,267.14	1,416.00	1,912.18
2	48.00	64.00	72.00	96.00	3.91	4.51	4.79	5.53	471.12	624.00	712.76	940.60
3	32.00	42.67	48.00	64.00	3.19	3.69	3.91	4.51	316.78	418.06	471.12	624.00
4	24.00	32.00	36.00	48.00	2.76	3.19	3.39	3.91	235.15	316.78	348.00	471.12
5	19.20	25.60	28.80	38.40	2.47	2.85	3.03	3.50	184.03	252.98	279.06	371.81
6	16.00	21.33	24.00	32.00	2.26	2.61	2.76	3.19	152.00	212.45	235.15	316.78
7	13.71	18.29	20.57	27.43	2.09	2.41	2.56	2.95	133.30	179.62	199.56	272.34
8	12.00	16.00	18.00	24.00	1.95	2.26	2.39	2.76	117.78	152.00	178.19	235.15
9	10.67	14.22	16.00	21.33	1.84	2.13	2.26	2.61	104.53	135.75	152.00	212.45
10	9.60	12.80	14.40	19.20	1.75	2.02	2.14	2.47	92.95	121.64	136.61	184.03
15	6.40	8.53	9.60	12.80	1.43	1.65	1.75	2.02	60.72	81.78	92.95	121.64
20	4.80	6.40	7.20	9.60	1.24	1.43	1.51	1.75	43.82	60.72	69.77	92.95
25	3.84	5.12	5.76	7.68	1.11	1.28	1.35	1.56	35.27	49.78	52.80	72.05
30	3.20	4.27	4.80	6.40	1.01	1.17	1.24	1.43	28.62	41.33	43.82	60.72
35	2.74	3.66	4.11	5.49	0.93	1.08	1.14	1.32	26.48	34.44	40.55	51.55
40	2.40	3.20	3.60	4.80	0.87	1.01	1.07	1.24	21.69	28.62	34.15	43.82
45	2.13	2.84	3.20	4.27	0.82	0.95	1.01	1.17	20.43	26.96	28.62	41.33
50	1.92	2.56	2.88	3.84	0.78	0.90	0.96	1.11	16.63	22.40	27.15	35.27
55	1.75	2.33	2.62	3.49	0.75	0.86	0.91	1.05	15.87	21.37	25.90	33.63
60	1.60	2.13	2.40	3.20	0.71	0.82	0.87	1.01	15.18	20.43	21.69	28.62
65	1.48	1.97	2.22	2.95	0.69	0.79	0.84	0.97	14.60	19.65	20.86	27.48
70	1.37	1.83	2.06	2.74	0.66	0.76	0.81	0.93	11.70	16.23	20.09	26.48
75	1.28	1.71	1.92	2.56	0.64	0.74	0.78	0.90	11.31	15.69	16.63	22.40
80	1.20	1.60	1.80	2.40	0.62	0.71	0.76	0.87	10.95	15.18	16.10	21.69
85	1.13	1.51	1.69	2.26	0.60	0.69	0.73	0.85	10.63	14.75	15.60	21.05
90	1.07	1.42	1.60	2.13	0.58	0.67	0.71	0.82	10.34	11.92	15.18	20.43
95	1.01	1.35	1.52	2.02	0.57	0.65	0.69	0.80	10.05	11.62	14.79	19.90
100	0.96	1.28	1.44	1.92	0.55	0.64	0.68	0.78	7.84	11.31	12.00	16.63
105	0.91	1.22	1.37	1.83	0.54	0.62	0.66	0.76	7.63	11.05	11.70	16.23
110	0.87	1.16	1.31	1.75	0.53	0.61	0.65	0.75	7.46	10.77	11.45	15.87
115	0.83	1.11	1.25	1.67	0.52	0.60	0.63	0.73	7.29	10.54	11.18	15.51
120	0.80	1.07	1.20	1.60	0.50	0.58	0.62	0.71	7.16	10.34	10.95	15.18
125	0.77	1.02	1.15	1.54	0.49	0.57	0.61	0.70	7.02	10.10	10.72	14.89
130	0.74	0.98	1.11	1.48	0.48	0.56	0.59	0.69	6.88	7.92	10.54	14.60
135	0.71	0.95	1.07	1.42	0.48	0.55	0.58	0.67	6.74	7.80	10.34	11.92
140	0.69	0.91	1.03	1.37	0.47	0.54	0.57	0.66	6.65	7.63	10.15	11.70
145	0.66	0.88	0.99	1.32	0.46	0.53	0.56	0.65	6.50	7.50	7.96	11.49
150	0.64	0.85	0.96	1.28	0.45	0.52	0.55	0.64	4.80	7.38	7.84	11.31
155	0.62	0.83	0.93	1.24	0.44	0.51	0.54	0.63	4.72	7.29	7.71	11.14
160	0.60	0.80	0.90	1.20	0.44	0.50	0.54	0.62	4.65	7.16	7.59	10.95
165	0.58	0.78	0.87	1.16	0.43	0.50	0.53	0.61	4.57	7.07	7.46	10.77
170	0.56	0.75	0.85	1.13	0.42	0.49	0.52	0.60	4.49	6.93	7.38	10.63
175	0.55	0.73	0.82	1.10	0.42	0.48	0.51	0.59	4.45	6.84	7.24	10.49
180	0.53	0.71	0.80	1.07	0.41	0.48	0.50	0.58	4.37	6.74	7.16	10.34
185	0.52	0.69	0.78	1.04	0.41	0.47	0.50	0.57	4.33	6.65	7.07	10.20
190	0.51	0.67	0.76	1.01	0.40	0.46	0.49	0.57	4.28	6.55	6.97	10.05
195	0.49	0.66	0.74	0.98	0.40	0.46	0.48	0.56	4.20	6.50	6.88	7.92
200	0.48	0.64	0.72	0.96	0.39	0.45	0.48	0.55	4.16	4.80	6.79	7.84
205	0.47	0.62	0.70	0.94	0.39	0.45	0.47	0.55	4.11	4.72	6.69	7.76
210	0.46	0.61	0.69	0.91	0.38	0.44	0.47	0.54	4.07	4.69	6.65	7.69
215	0.45	0.60	0.67	0.89	0.38	0.44	0.46	0.53	4.02	4.65	6.55	7.55
220	0.44	0.58	0.65	0.87	0.37	0.43	0.46	0.53	3.98	4.57	6.45	7.46
225	0.43	0.57	0.64	0.85	0.37	0.43	0.45	0.52	3.93	4.53	4.80	7.38
230	0.42	0.56	0.63	0.83	0.36	0.42	0.45	0.52	3.89	4.49	4.76	7.29
235	0.41	0.54	0.61	0.82	0.36	0.42	0.44	0.51	3.84	4.41	4.69	7.24
240	0.40	0.53	0.60	0.80	0.36	0.41	0.44	0.50	3.79	4.37	4.65	7.16

Supply Reach : Length of Radius
Feeder Length : Road of 200m Mesh

Cost of Model Case (In case of 200m mesh)

Size of Conductor (sq.mm)	Bank Configulation	Capacity (MVA)	Maximum Loading (MVA)	Feeder Voltage (kV)	No. of Feeders (ckt)	UG Cable Length (m)	Overhead Length (km)	Unit Cost			Cost (Thousand Baht)				kVA Cost
								Feeder GIS (thousand Baht)	UG Cable (Baht/m)	Overhead (Baht/m)	Feeder GIS	UG Cable	Overhead	Total	(Baht/kVA)
185	3×40	120	96	12	3 × 5 = 15	5,125	10.95	8,700	3,960	2,880	18,640	20,300	31,540	70,480	734.2
				24	3 × 3 = 9	1,825	10.95	12,500	4,240	3,060	16,070	7,740	33,510	57,320	597.1
				36	3 × 2 = 6	850	10.95	17,500	5,460	3,230	15,000	4,640	35,370	55,010	573.0
	4×40	160	128	12	4 × 5 = 20	9,200	15.18	8,700	3,960	2,880	24,860	36,430	43,720	105,010	820.4
				24	4 × 3 = 12	3,200	15.18	12,500	4,240	3,060	21,430	13,570	46,450	81,450	636.3
				36	4 × 2 = 8	1,400	15.18	17,500	5,460	3,230	20,000	7,640	49,030	76,670	599.0
	3×60	180	144	12	3 × 8 = 24	13,400	16.10	8,700	3,960	2,880	29,830	53,060	46,370	129,260	897.6
				24	3 × 4 = 12	3,200	16.10	12,500	4,240	3,060	21,430	13,570	49,270	84,270	585.2
				36	3 × 3 = 9	1,825	16.10	17,500	5,460	3,230	22,500	9,960	52,000	84,460	586.5
	3×80	240	192	12	3 × 10 = 30	21,250	21.69	8,700	3,960	2,880	37,290	84,150	62,470	183,910	957.9
				24	3 × 5 = 15	5,125	21.69	12,500	4,240	3,060	26,790	21,730	66,370	114,890	598.4
				36	3 × 4 = 12	3,200	21.69	17,500	5,460	3,230	30,000	17,470	70,060	117,530	612.1
240	3×40	120	96	12	3 × 4 = 12	3,200	10.95	8,700	3,960	2,920	14,910	12,670	31,970	59,550	620.3
				24	3 × 2 = 6	850	10.95	12,500	4,240	3,100	10,710	3,600	33,950	48,260	502.7
				36	3 × 2 = 6	850	10.95	17,500	5,460	3,270	15,000	4,640	35,810	55,450	577.6
	4×40	160	128	12	4 × 4 = 16	5,800	15.18	8,700	3,960	2,920	19,890	22,970	44,330	87,190	681.2
				24	4 × 2 = 8	1,400	15.18	12,500	4,240	3,100	14,290	5,940	47,060	67,290	525.7
				36	4 × 2 = 8	1,400	15.18	17,500	5,460	3,270	20,000	7,640	49,640	77,280	603.8
	3×60	180	144	12	3 × 6 = 18	7,450	16.10	8,700	3,960	2,920	22,370	29,500	47,010	98,880	686.7
				24	3 × 3 = 9	1,825	16.10	12,500	4,240	3,100	16,070	7,740	49,910	73,720	511.9
				36	3 × 2 = 6	850	16.10	17,500	5,460	3,270	15,000	4,640	52,650	72,290	502.0
	3×80	240	192	12	3 × 8 = 24	13,400	21.69	8,700	3,960	2,920	29,830	53,060	63,330	146,220	761.6
				24	3 × 4 = 12	3,200	21.69	12,500	4,240	3,100	21,430	13,570	67,240	102,240	532.5
				36	3 × 3 = 9	1,825	21.69	17,500	5,460	3,270	22,500	9,960	70,930	103,390	538.5

Appendix 9.3-2

Determining transformer capacity

Maximum power demand is assumed and network transformer capacity determined using the following equation:
It is necessary that in the event power to one circuit is cut off, power supply to the load be maintained continuously, without load restriction, using the remaining transformers in overload operation.

$$\text{Transformer capacity (kVA)} = \frac{P}{N-1} \times \frac{100}{\alpha}$$

P : Maximum power demand (kVA)
N : Number of receiving circuits (ckt)
α : Allowable transformer overload ratio (%)

Example

Maximum power demand : 3,300 kVA
Number of receiving circuits : 3 ckt
Allowable transformer overload ratio : 130 %

$$\text{Transformer capacity} = \frac{3,300}{3-1} \times \frac{100}{130} = 1,270 \text{ kVA}$$

In consideration of the future load increase as well as the standard rating of a transformer, the network transformer capacity should be 1,500 kVA.

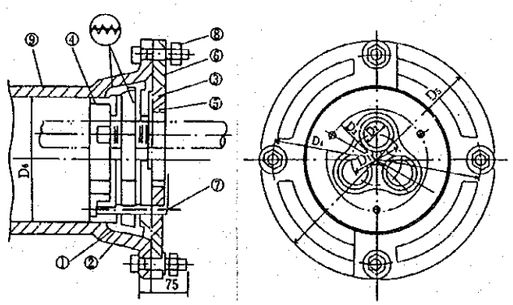
1. Countermeasure for protecting regular network transformer from flooding

Since the entire manhole is predicted to be inundated, the regular network transformer is of a construction having a water tightness sufficient to withstand the water pressure at a water depth of 5 m so as to make the transformer free from inflow of water into its internal parts.

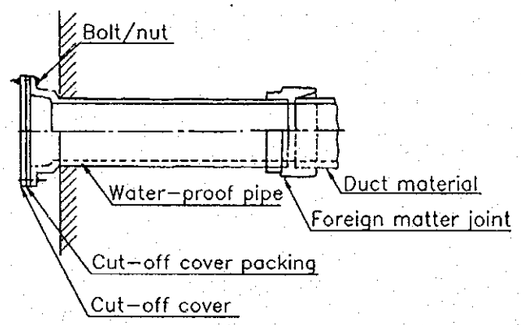
2. Countermeasure for protecting the manhole from flooding

To prevent inflow of water to manhole from the portion of duct as a countermeasure for protecting the manhole from flooding, a duct manhole water-proofing device and cut-off cover are applied.

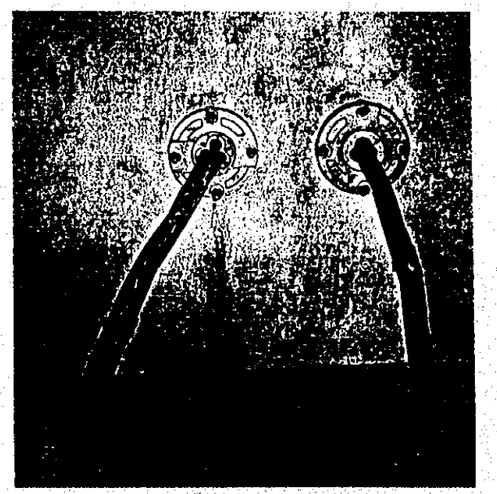
Duct manhole water-proofing device



Cut-off cover



No	Designations
①	Packing
②	Waterproof admixture
③	Support fitting Ⅰ
④	Support fitting Ⅱ
⑤	Center fitting
⑥	Clamp metal
⑦	Support bolt
⑧	Clamp bolt
⑨	Waterproof cast iron pipe



Application example of duct manhole water-proofing device.

3. Countermeasure for drainage from manhole

The following equipment and devices are installed for draining puddles collected in manhole:

(1) Submarine pump

Capacity : 0.75 kW
Pipe diameter : 50 mm
Pump capacity : 200 liter/min
Total head : 10 m or over

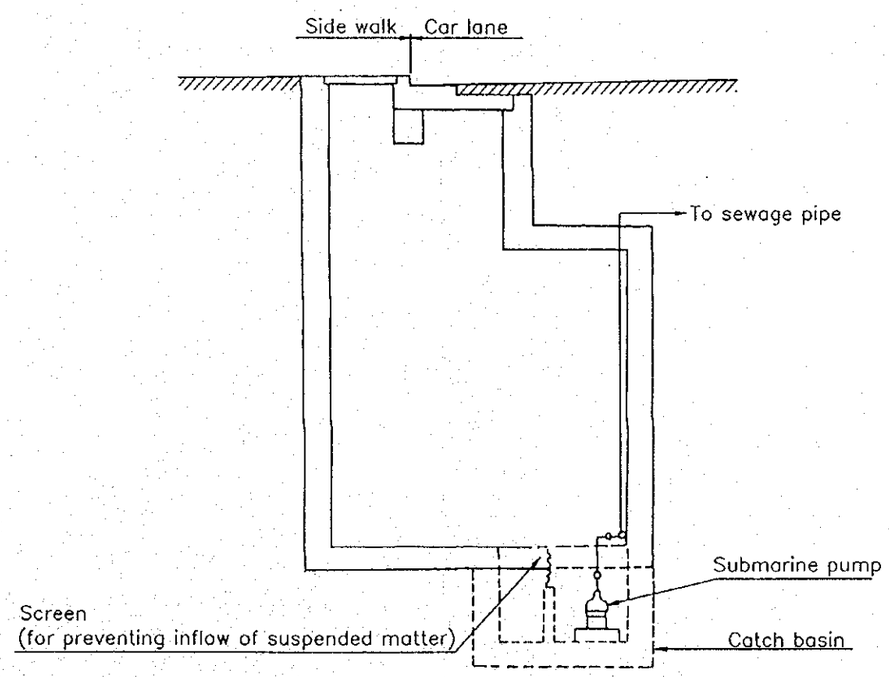
The submarine pump should be designed to enable manual operation and automatic operation according to the water level relay.

(2) Catch basin

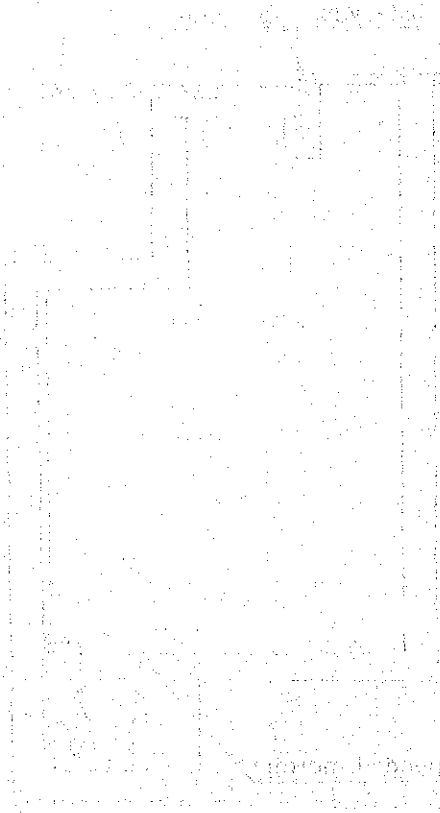
- Since a large amount of soil, sand and other foreign matter are contained in puddles, a screen for preventing inflow of suspended matter is installed in the catch basin to discharge only water into sewage pipe.
- The capacity of catch basin should be 0.2 m^3 or over.

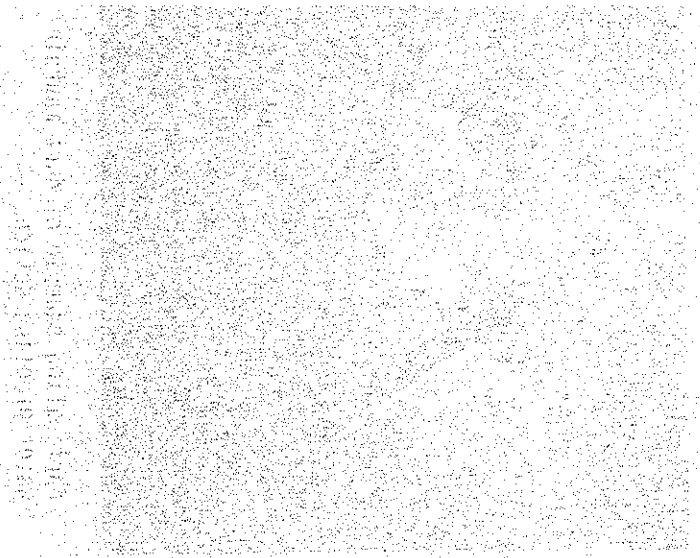
(3) Drain pipe

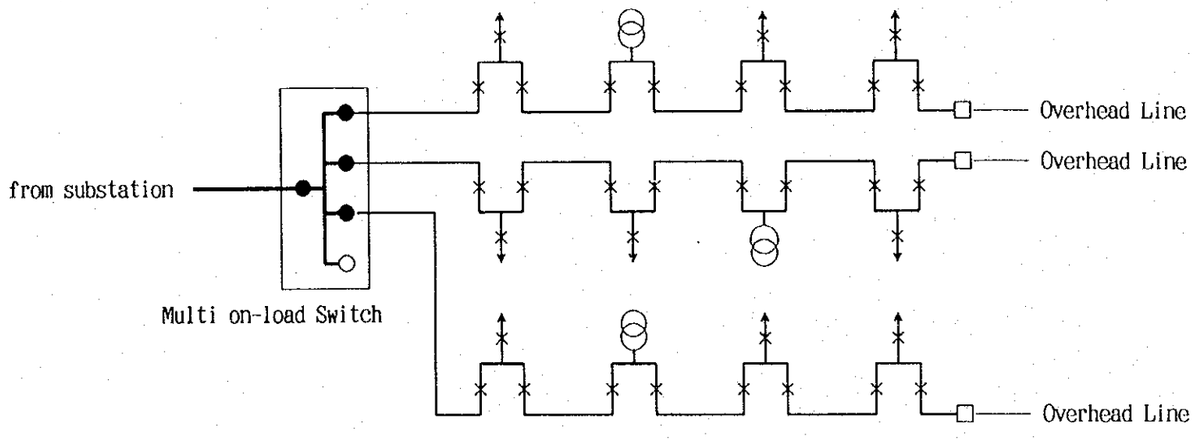
- The diameter of drain pipe should be 50 mm, and the pipe material be determined taking into account corrosion of the pipe.

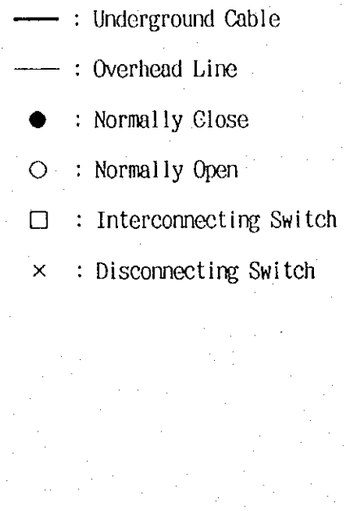


Appendix 9.3-3 Examples of water-proofing countermeasures in regular network system

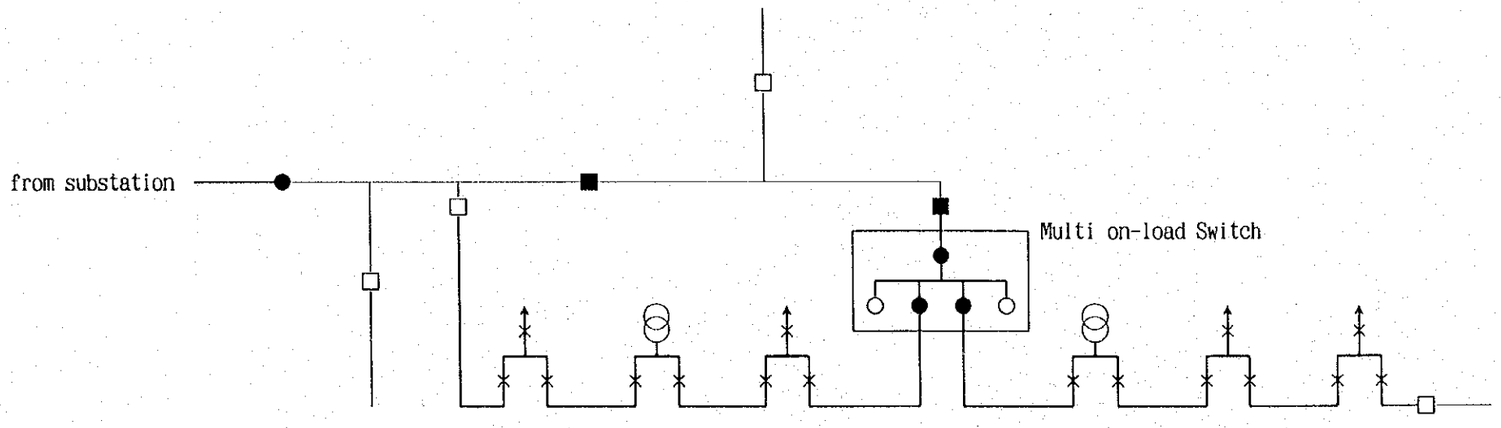






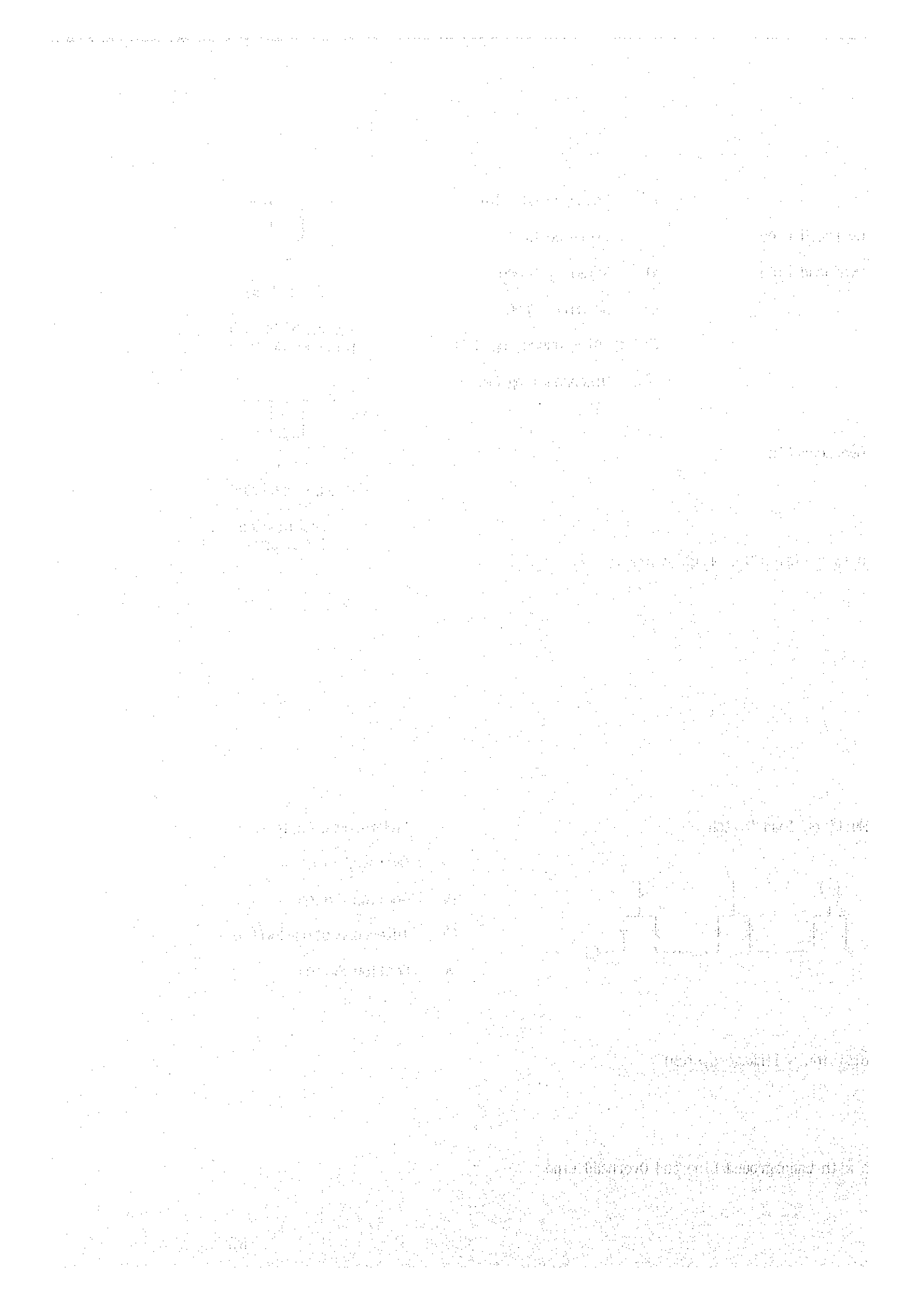


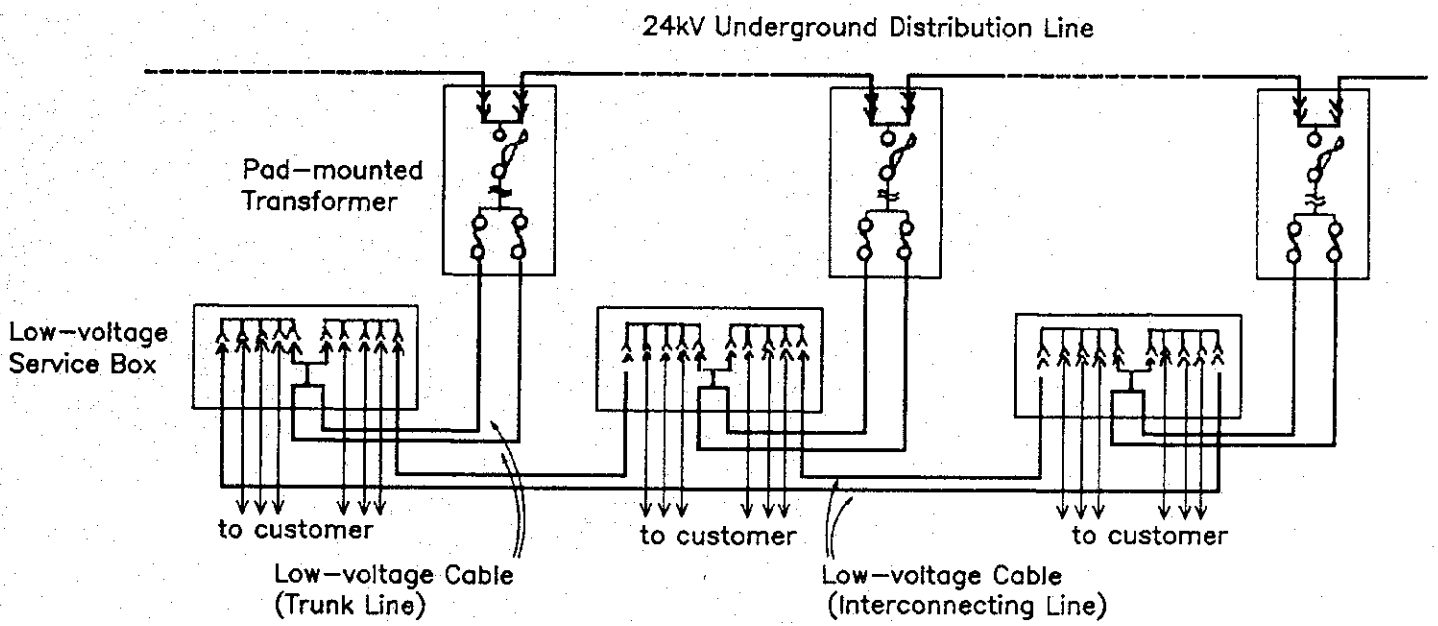
In Case of Interconnecting between Underground Line and Overhead Line (3-division 3-linkage system)



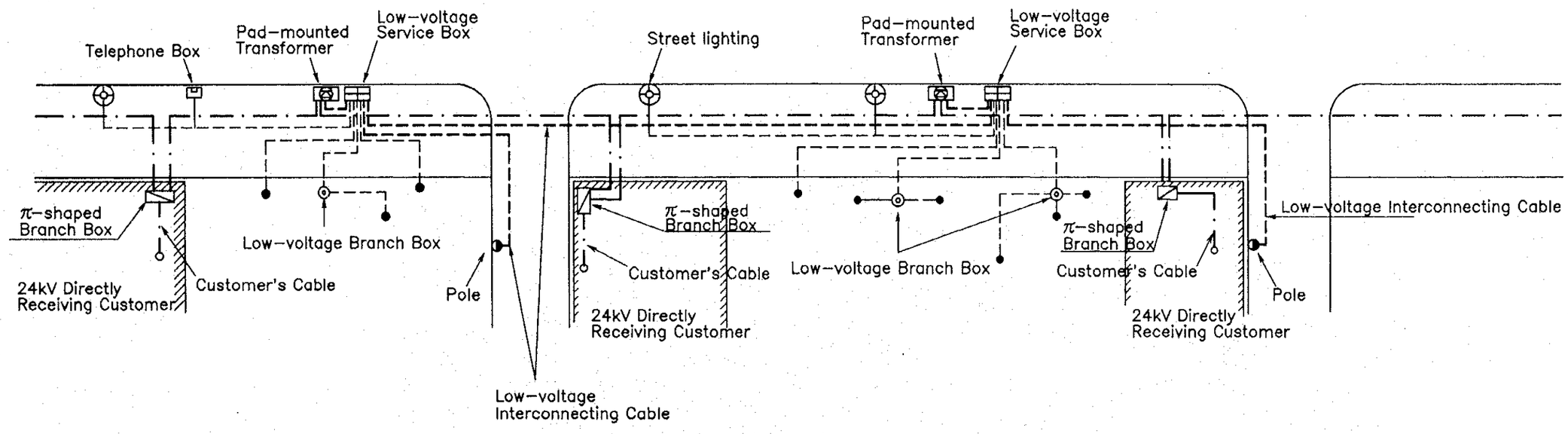
In Case of Mixture with Underground Line and Overhead Line (3-division 3-linkage system)

Appendix 9.3-4 Example of Basic Configuration as Mixture with Underground Line and Overhead Line





Appendix 9.3-5 Basic Configuration of Low-voltage Underground Distribution Line



— · — 24kV Underground Distribution Line

– – – – Low-voltage Underground Distribution Line

Appendix 9.3-6 Basic Combination of Underground Distribution Facilities

Appendix 9.3-7

Time-delay Fault Detecting System

The time-delay fault detecting system designed to function in collaboration with the reclosing system in the substation is a kind of the time relay, which functions with time for detecting and eliminating the faulty section of the distribution line, and used in combination with the automatic switches installed on the distribution line.

Outline of Fault Detection

When the fault has occurred in the distribution line, the fault is detected by the relay in the substation to cause the circuit breaker for the distribution feeder line to be tripped, thereby the power supply is discontinued.

Then, after 60 seconds, the circuit breaker will be closed to resume the power supply.

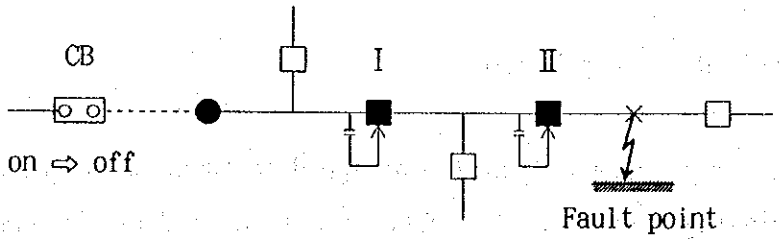
When the power supply is resumed, the time-delay fault detector causes the automatic switches to be closed sequentially based on the X-time interval(time interval for closing).

When the power is supplied to the faulty section, the relay of the substation detects the fault again to cause the circuit breaker to be retripped.

At this point, the time-delay fault detector set to Y-time interval(time interval for detection) is closed and locked in order to prevent it from causing the automatic switch to be closed again.

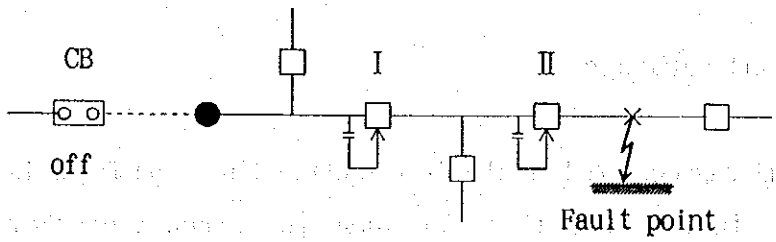
Then, the circuit breaker will be closed again after 60 seconds from the retripping to energize all the sound sections preceding the faulty section which will be separated.

①



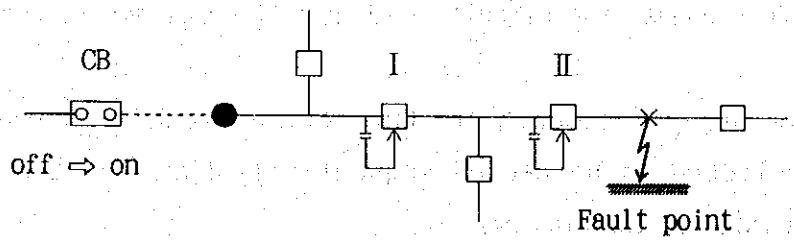
When the fault has occurred, the relay will be actuated to open the circuit breaker.

②



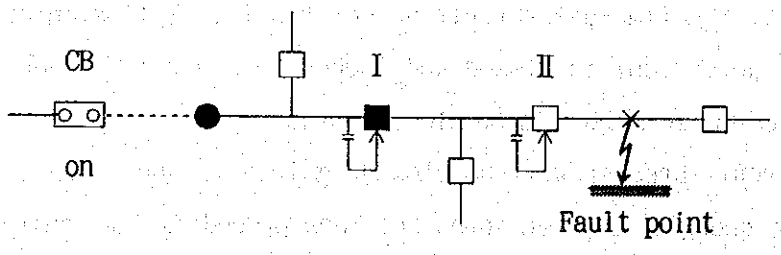
All the fault detecting relays are opened.

③



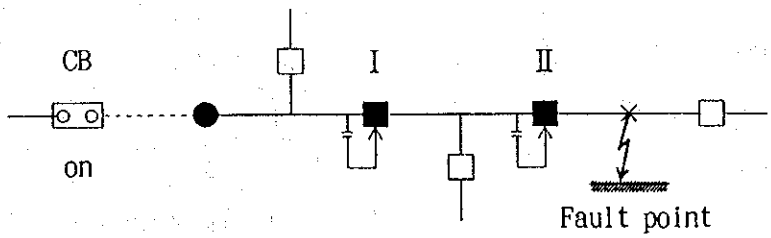
After 60 seconds, the power supply until automatic switch(I) will be resumed by reclosing the circuit breaker.

④



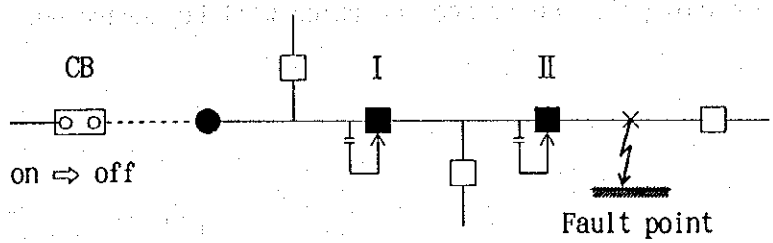
After 7 seconds, the automatic switch(I) is closed and the power supply is resumed until automatic switch (II).

⑤



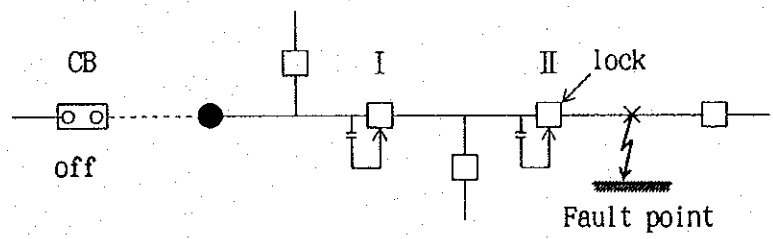
After 7 seconds, the automatic switch(Ⅱ) is closed and the power supply to the faulty point is resumed.

⑥



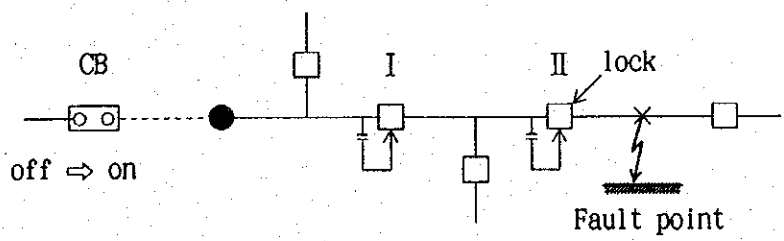
The relay is actuated to trip the circuit breaker.

⑦



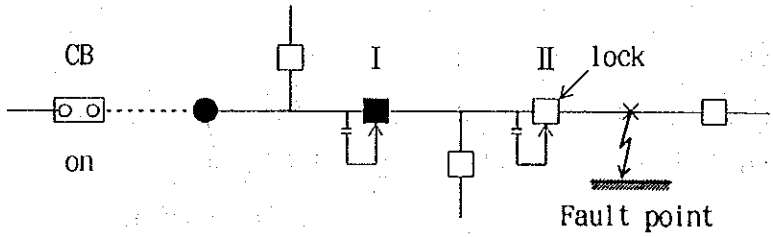
All the fault detecting relays are opened, and the automatic switch(Ⅱ) is locked.

⑧



After 60 seconds, the power supply until automatic switch(Ⅰ) will be resumed by reclosing the circuit breaker.

⑨

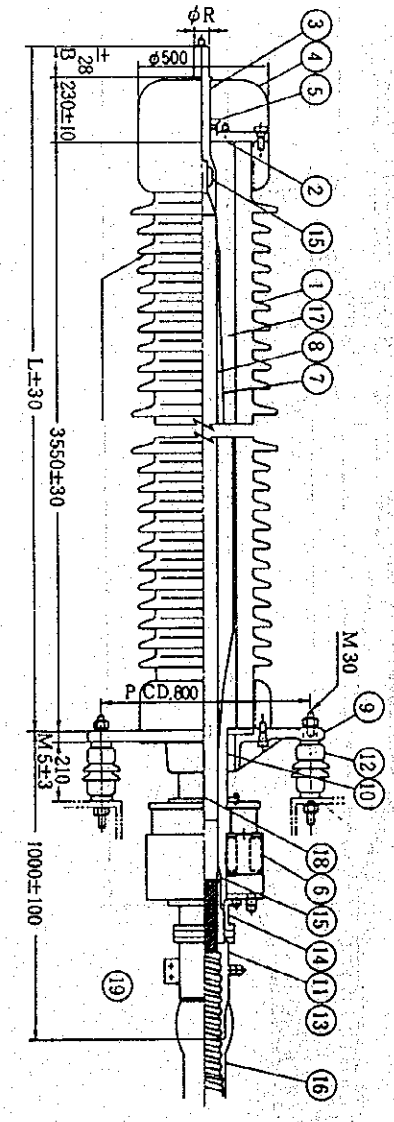


After 7 seconds, the automatic switch(Ⅰ) is closed and the power supply is resumed until automatic switch (Ⅱ).

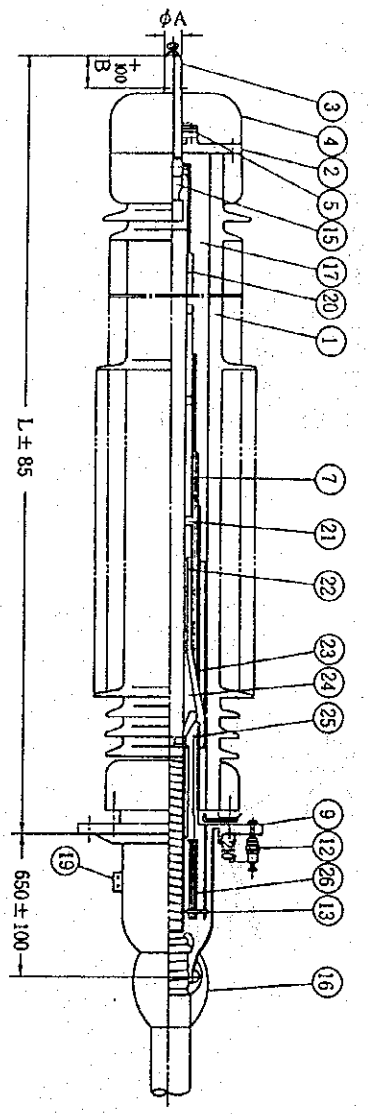
The automatic switch (Ⅱ) is left opened, and the power supply to all the sound sections preceding the faulty section which will be separated.

① Porcelain insulator
② Upper plate
③ Leading conductor
④ Shielding cover
⑤ Fixing plate
⑥ Oil reservoir
⑦ Condenser corn
⑧ Reinforced insulation
⑨ Support
⑩ Lower metal
⑪ Flange
⑫ Supporting insulator
⑬ Protective casing
⑭ Sealing metal
⑮ Sealing mold
⑯ Water proof tape
⑰ Insulating oil
⑱ Shielding
⑲ Earth terminal
⑳ Insulator
㉑ Spacer
㉒ Spacer
㉓ Epoxy resin support
㉔ Stress relief corn
㉕ Pressing pipe
㉖ Spring Unit

Wet type



Dry type



Appendix 9.5-1 Terminal Joint for 230kV XLPE cable