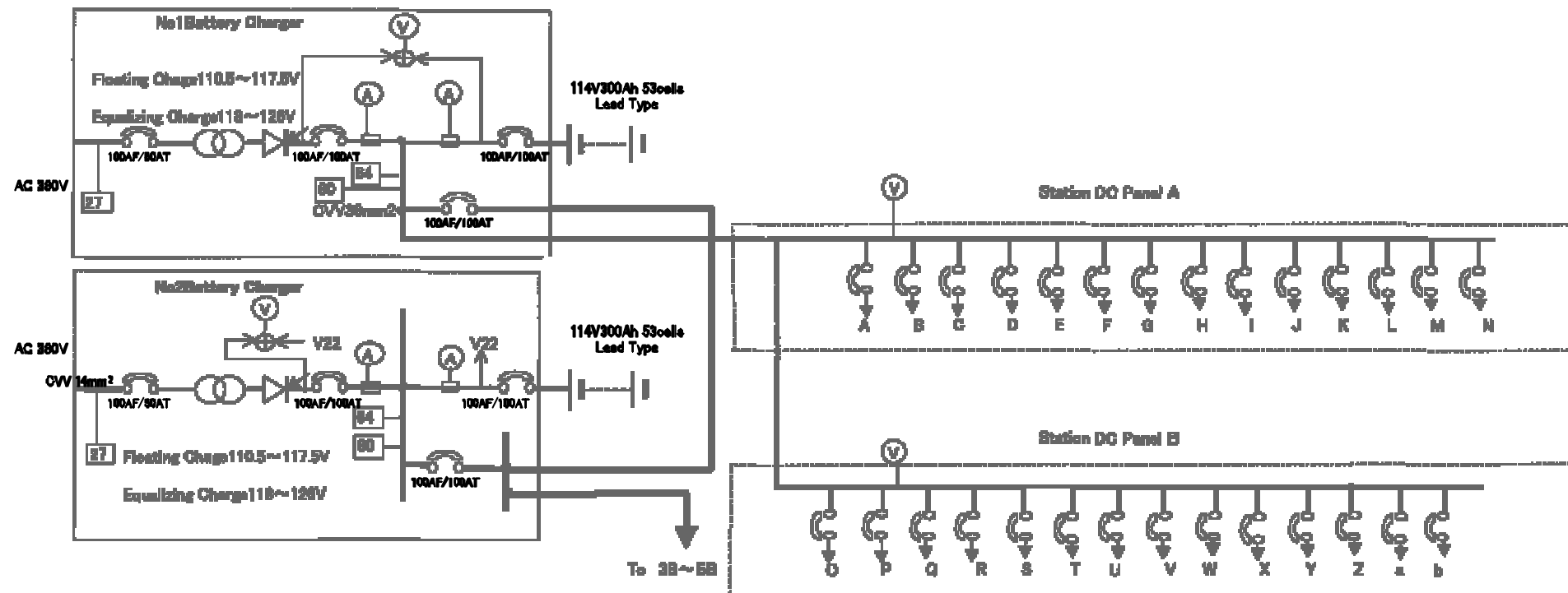


DRAWINGS

List of Drawings

No.	Drawing No.	Title
1	JCOP106-1	Power Station System Diagram
2	JCOP106-2	Single Line Diagram - Units No. 1 and No. 2
3	JCOP106-3	Single Line Diagram – DC Distribution Circuit
4	JCOP106-4	Single Line Diagram – AC Distribution Circuit
5	JCOP106-5	Nam Ngum I Power Station - Plan
6	JCOP106-6	Nam Ngum I Power Station - Elevation
7	JCOP106-7	Nam Ngum I Power Station - Section
8	JCOP106-8	115kV Outdoor Switchyard for Units No. 1 and No. 2 - Plan
9	JCOP106-9	115kV Outdoor Switchyard for Units No. 1 and No. 2 - Section
10	JCOP106-10	115kV Outdoor Switchyard for Units No. 1 and No. 2 - Section
11	JCOP106-11	11 kV Switchgear for Units No. 1 and No. 2, Layout Drawing
12	JCOP106-12	Main Transformer Connection, Outline Drawing
13	JCOP106-13	Control Room, Control Panel Layout Drawing
14	JCOP106-14	Existing Main Control Board
15	JCOP106-15	Stator Assembly
16	JCOP106-16	Foundation for Existing Main Transformer
17	JCOP106-17	Piping Diagram for Generator Air Coolers
18	JCOP106-18	Arrangement of 115 kV Busbars and Fittings
19	JCOP106-21	Sectional View of Water Turbine
20	JCOP106-22	Turbine Floor Plan (EL. 168.50)
21	JCOP106-23	Turbine Floor Plan (EL. 161.50)
22	JCOP106-24	Transverse Section of Units 1 and 2
23	JCOP106-25	Piping Diagram for Oil-Air pressure System
24	JCOP106-26	Outline of Oil Pressure Tank
25	JCOP106-27	Piping for Cooling Water (1)
26	JCOP106-28	Piping for Cooling Water (2)
27	JCOP106-29	General Assembly of Gate Leaf
28	JCOP106-30	Details of Side Guide Roller
29	JCOP106-31	Details of Seal Rubber
30	JCOP106-32	Outline of Local Control Panel
31	JCOP106-33	Outline of Remote Control Panel
32	JCOP106-34	Sequence Diagram of Intake Gate (1)
33	JCOP106-35	Sequence Diagram of Intake Gate (2)
34	JCOP106-36	Sequence Diagram of Intake Gantry Crane (1)
35	JCOP106-37	Sequence Diagram of Intake Gantry Crane (2)
36	JCOP106-38	Sequence Diagram of Tailrace Gantry Crane (1)
37	JCOP106-39	Sequence Diagram of Tailrace Gantry Crane (2)

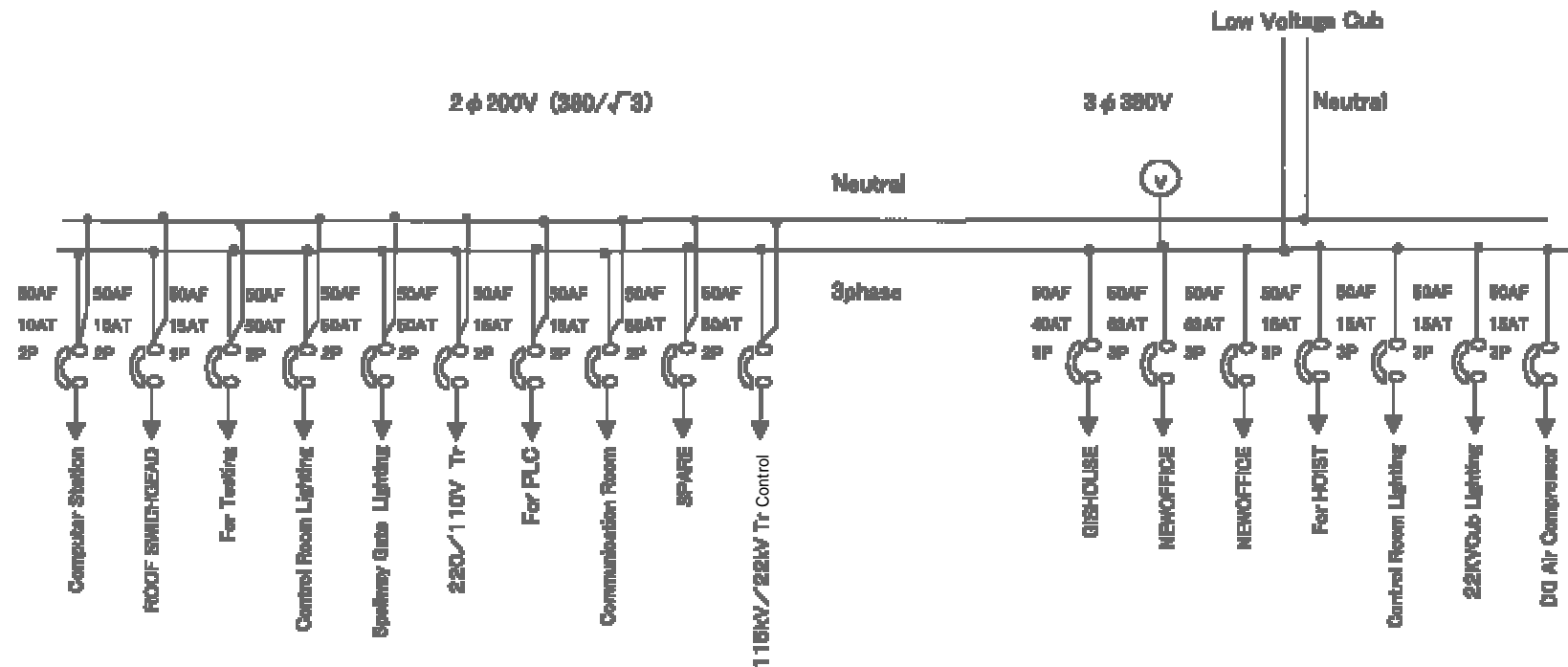
Station DC Power Single-line Diagram



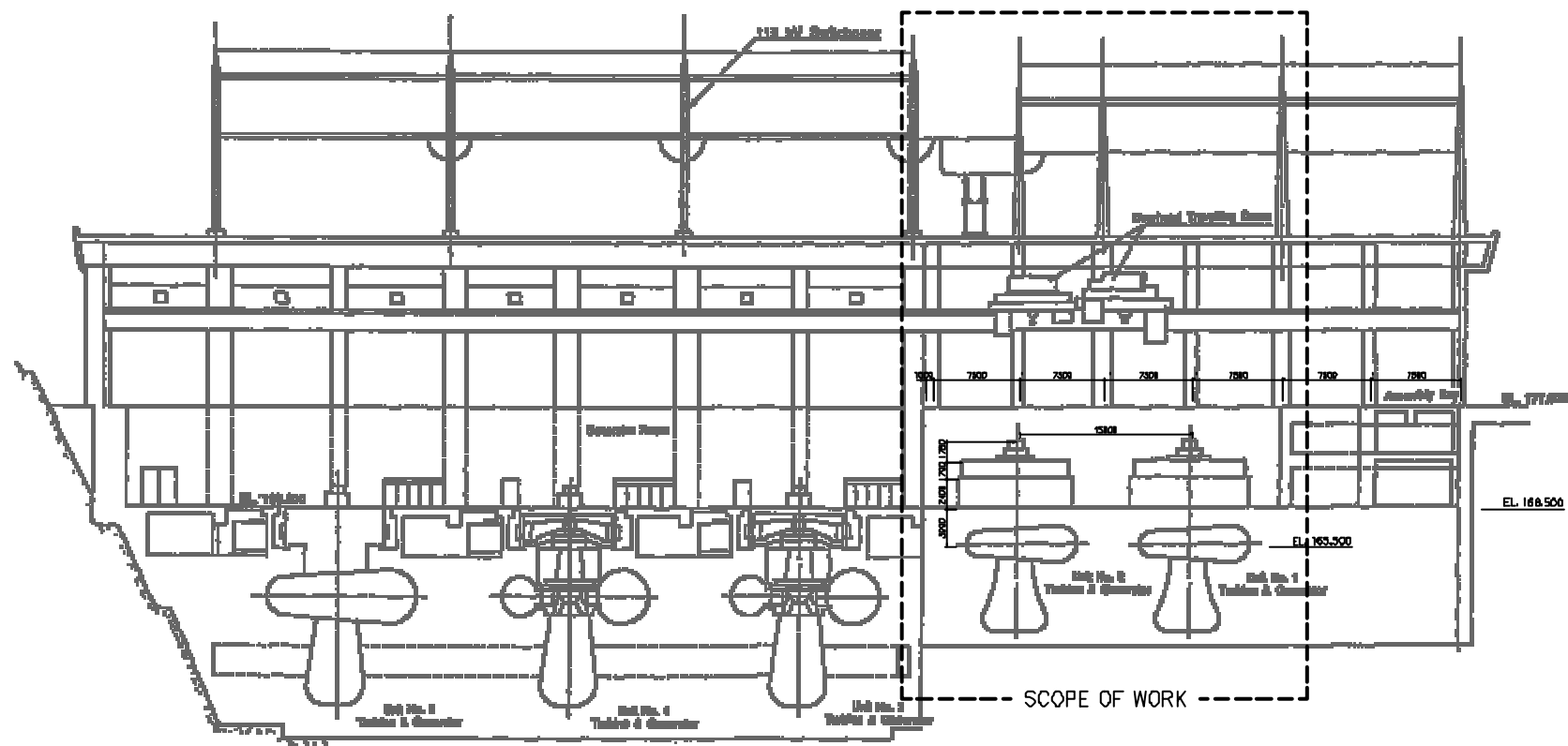
- | | | |
|--|-------------------------------------|---|
| A: 100AF100AT No1G AVR | K: 100AF15AT TO MARSHALLING KIOSK | U: 100AF30AT DIESEL |
| B: 100AF30AT No1G Equipment Control | L: 100AF15AT TEST | V: 100AF30AT Emergency Lighting |
| C: 100AF15AT No1G Control Board | M: 100AF30AT Spare | W: 100AF30AT TO GIS1 |
| D: 100AF15AT TL1 Control & Relay | N: 100AF100AT Spare | X: 100AF30AT TO Spare |
| E: 100AF30AT Station Power Control Board | O: 100AF100AT NO2G AVR | Y: 100AF30AT INTAKE GATE NO3 |
| F: 100AF15AT Fault Target | P: 100AF30AT No2G Equipment Control | Z: 100AF16AT TO MARSHALLING KIOSK GIS INTERFACE |
| G: 100AF30AT SFB G1-2 TL1 | Q: 100AF15AT No2G Control Board | a: 100AF100AT Spare |
| H: 100AF30AT SFB G3-4-5 TL2-3 | R: 100AF15AT 280V OUB | b: 100AF16AT Spare |
| I: 100AF30AT TO GIS2 | S: 100AF30AT INTAKE GATE NO1~NO4 | |
| J: 100AF30AT No1G AVR | T: 100AF30AT 22kV Oub | |

Electricite du Laos The Nam Ngum I Hydropower Station Rehabilitation Project			
DWN	K.Yasuyuki	SCALE	TITLE
CHKD	N.Nakato	—	Single Line Diagram
APPD	N.Nakato	DATE	- DC Distribution Circuit
NIPPON KOEI CO.,LTD. TOKYO, JAPAN		16 th March, 2001	DWG NO JCOP106-S

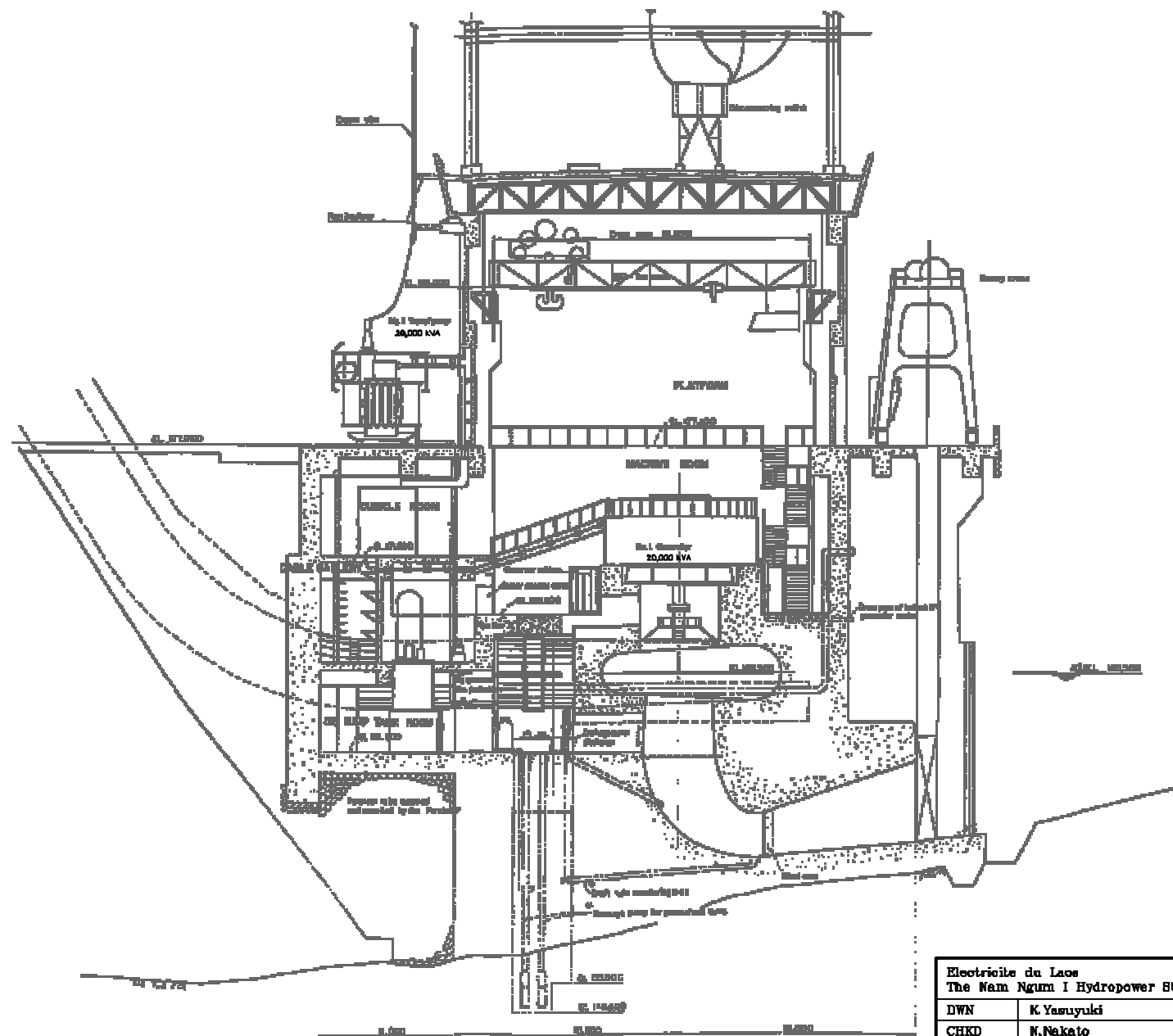
Station AC power Single-line Diagram



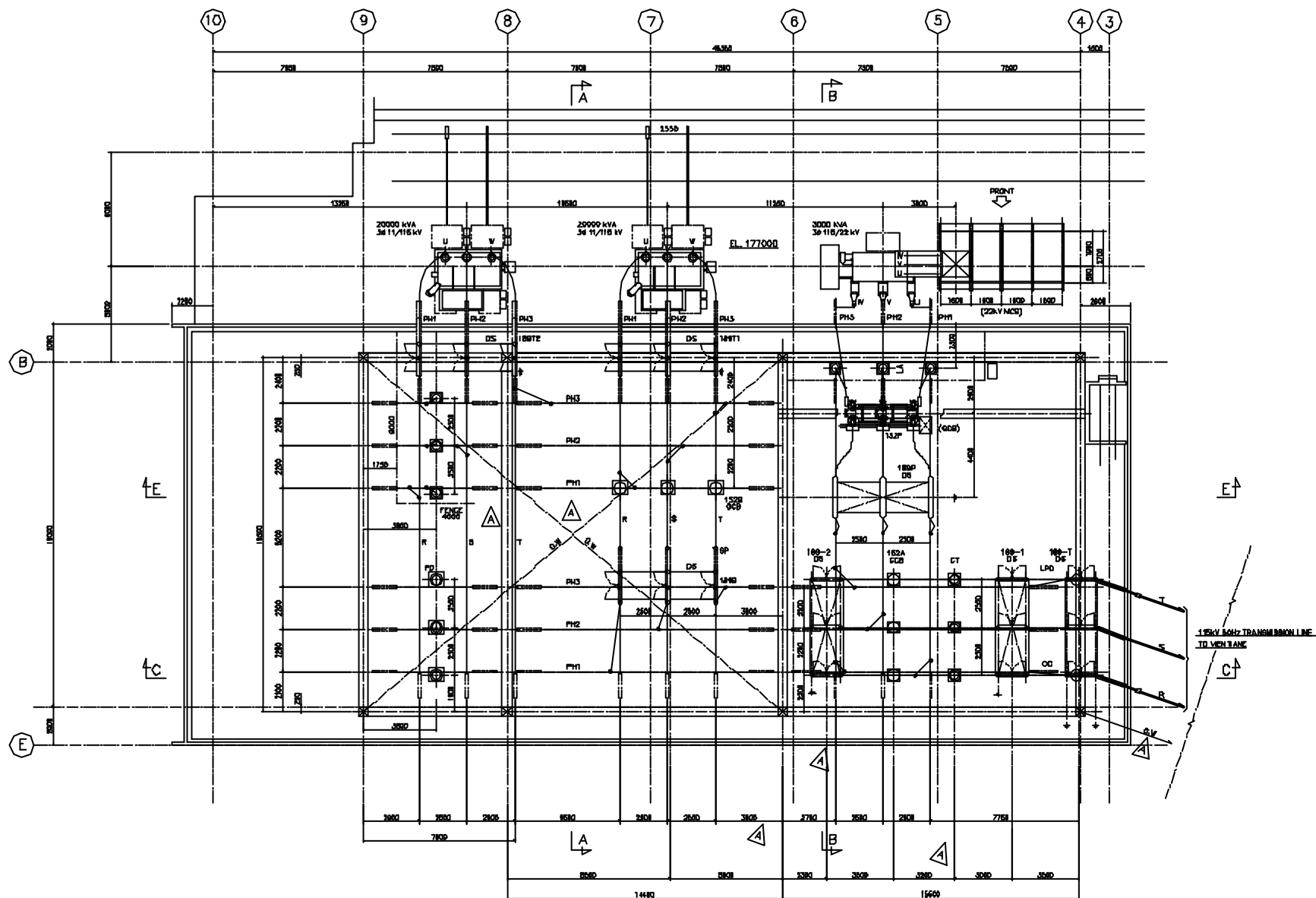
Electricite du Laos The Nam Ngum I Hydropower Station Rehabilitation Project			
DWN	K. Yasuyuki	SCALE	TITLE Single Line Diagram - AC Distribution Circuit
CHKD	N. Nakato	—	
APPD	N. Nakato	DATE	
NIPPON KOEI CO., LTD. TOKYO, JAPAN		15 th March, 2001	DWG NO JCOP106-4



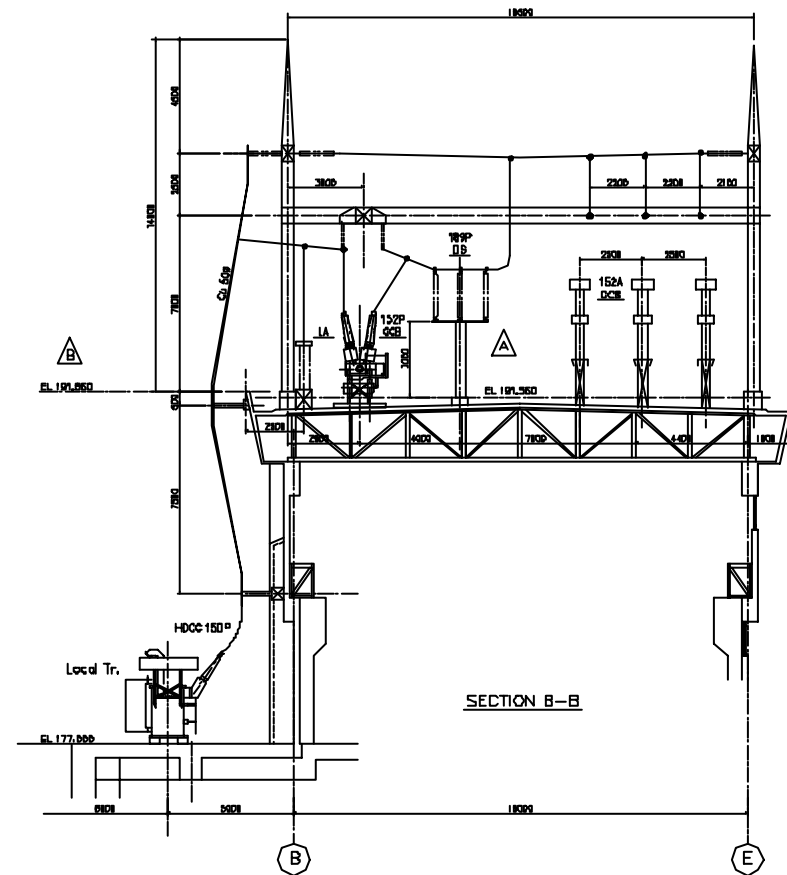
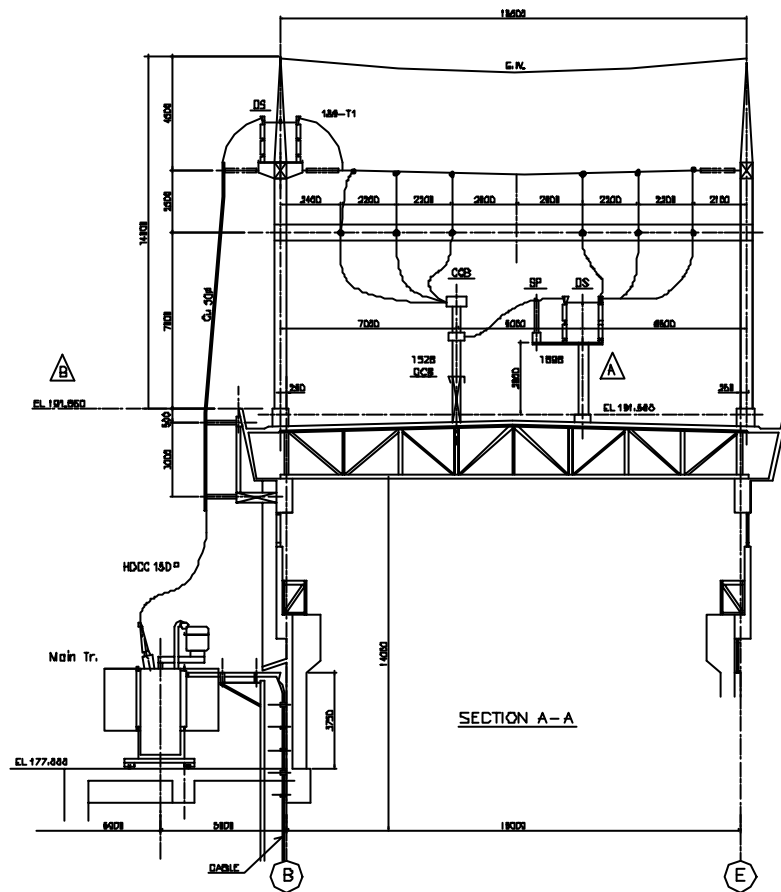
Electricite du Laos The Nam Ngum I Hydropower Station Rehabilitation Project			
DWN	K. Yasuyuki	SCALE	TITLE
CHKD	N. Nakato	—	Nam Ngum I Power Station - Elevation
APPD	N. Nakato	DATE	
NIPPON KOHI CO., LTD. TOKYO, JAPAN		16 th March, 2001	DWG NO. JCOP106-6



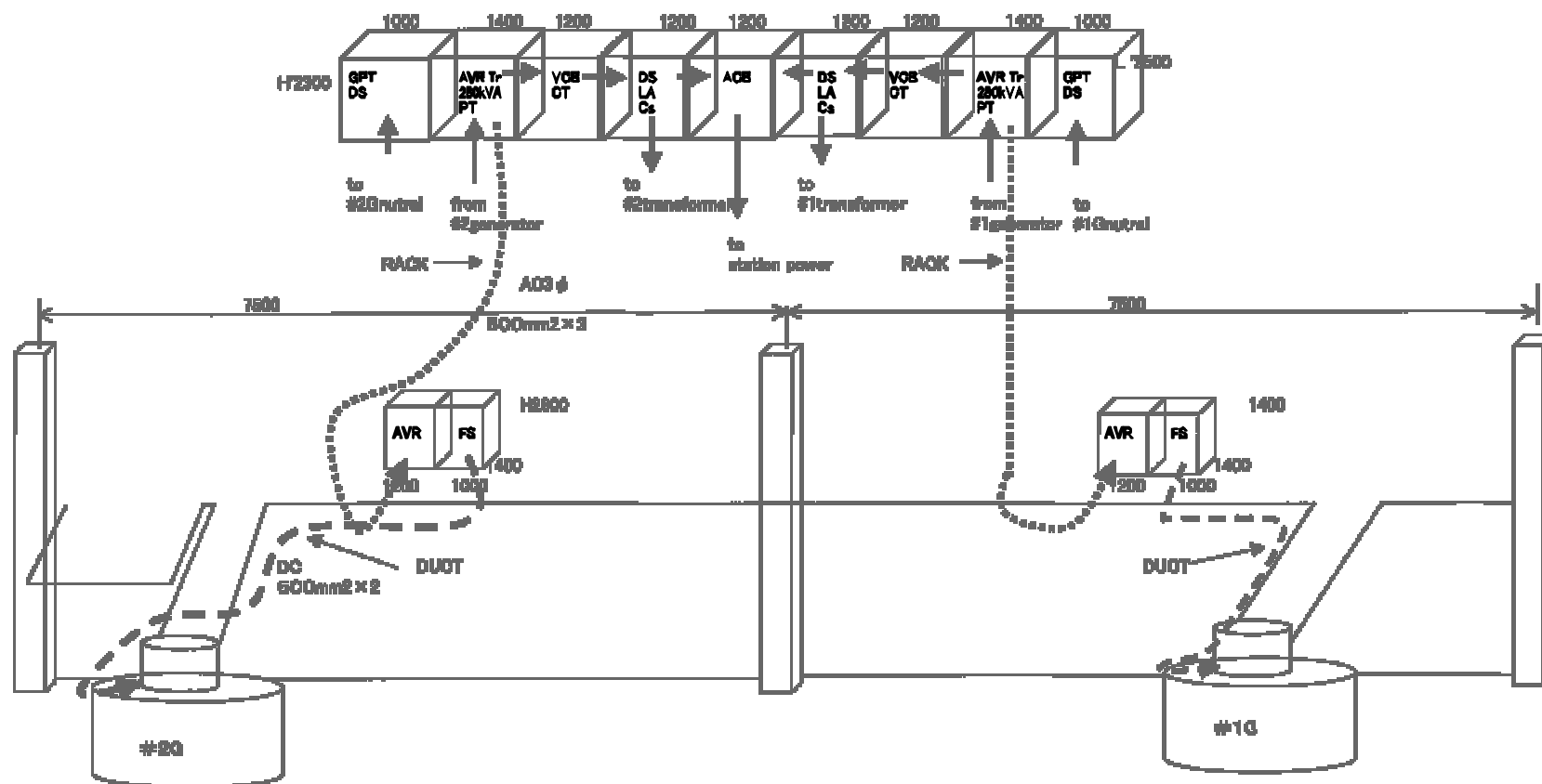
Electricite du Laos The Nam Ngum I Hydropower Station Rehabilitation Project			
DWN	K.Yasuyuki	SCALE	TITLE
CHKD	N.Nakato	—	Nam Ngum I Power Station - Section
APPD	N.Nakato	DATE	
NIPPON KOEI CO.,LTD. TOKYO, JAPAN		16 th March, 2001	DWG NO JCOP106-7



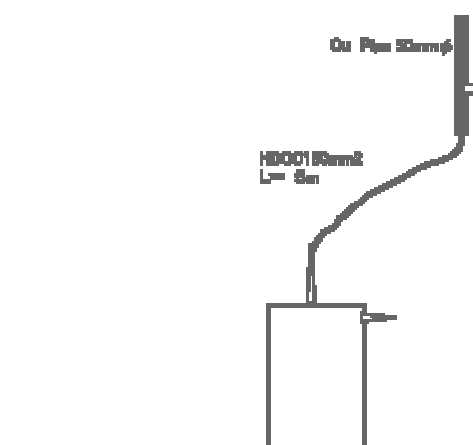
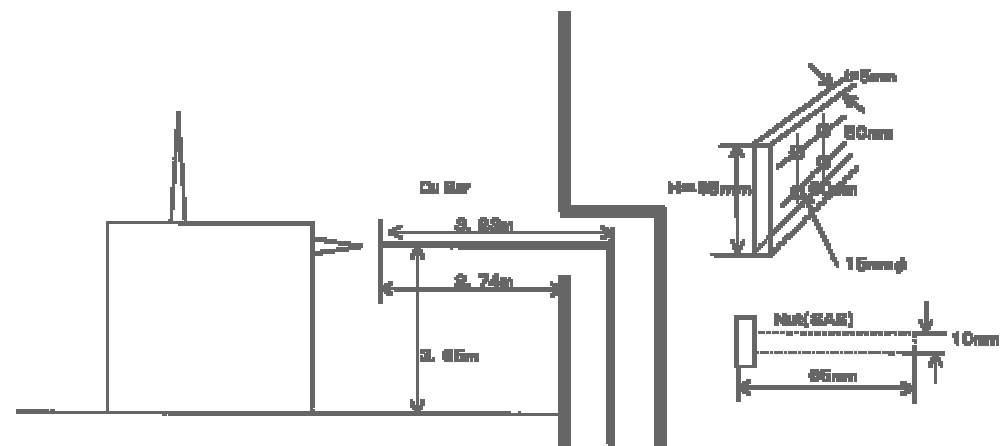
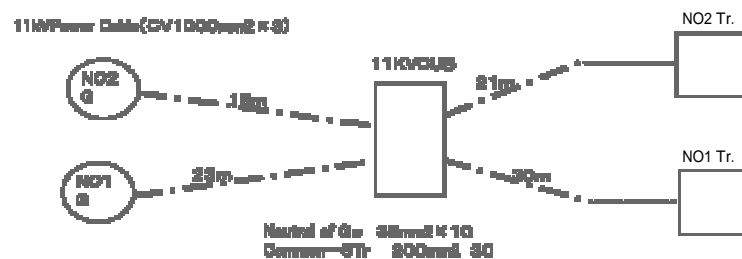
Electricite du Laos The Nam Ngum I Hydropower Station Rehabilitation Project			
DWN	K. Yasuyuki	SCALE	TITLE
CHKD	N. Nakato	—	115kV Outdoor Switchyard for Units No.1 and No.2 - Plan
APPD	N. Nakato	DATE	DWG NO
NIPPON KOHI CO., LTD. TOKYO, JAPAN		16 March, 2001	JCOP106-B



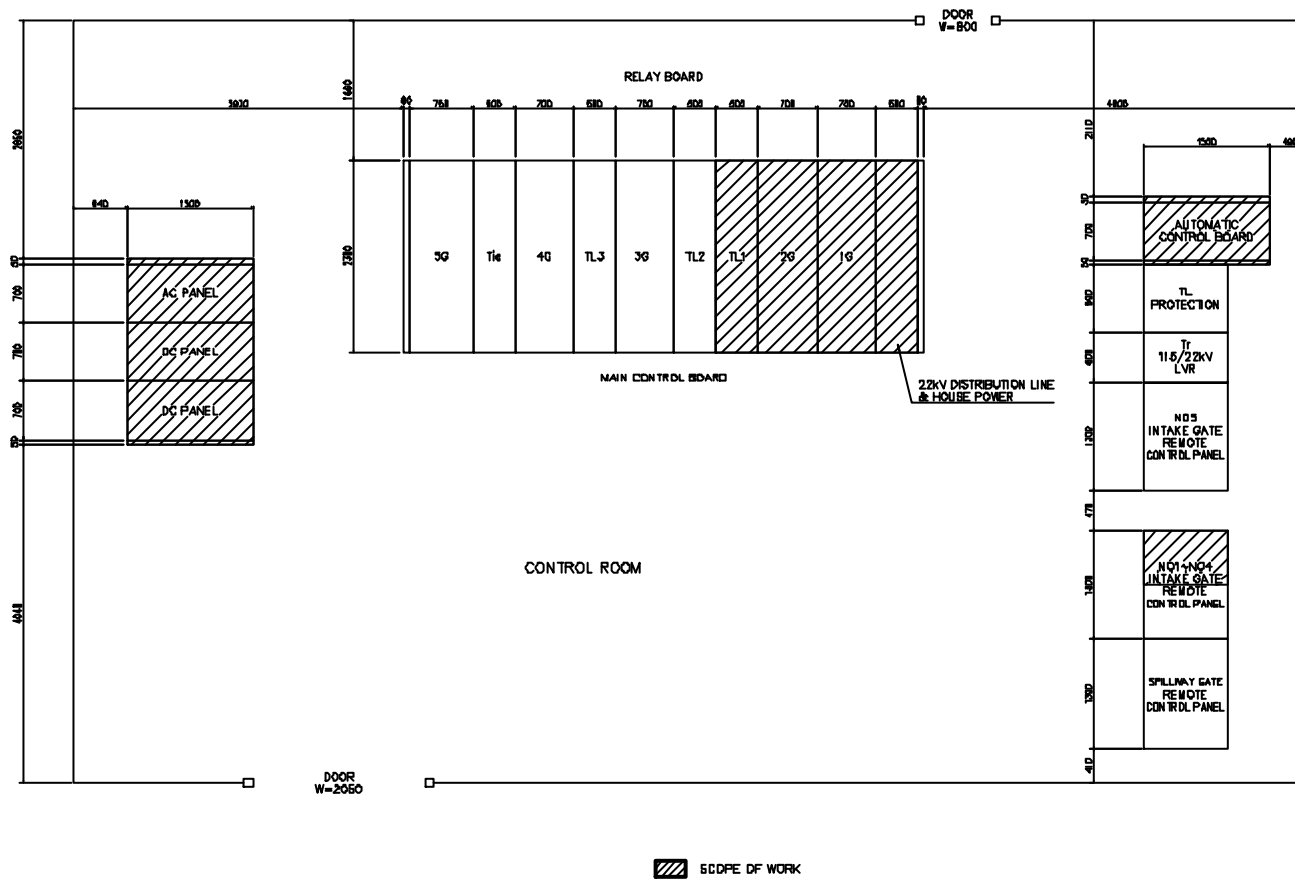
Electricite du Laos The Nam Ngum I Hydropower Station Rehabilitation Project			
DWN	K. Yasuyuki	SCALE	TITLE
CHKD	N. Nakato	—	110kV Outdoor Switchyard for Units No.1 and No.2 - Section
APPD	N. Nakato	DATE	DWG NO
NIPPON KOEI CO., LTD. TOKYO, JAPAN		15 th March, 2001	JCOP106-10



Electricite du Laos The Nam Ngum I Hydropower Station Rehabilitation Project			
DWN	K.Yasuyuki	SCALE	TITLE
CHKD	N.Nakato	—	11kV Switchgear
APPD	N.Nakato	DATE	for Units No.1 and No.2, Layout Drawing
NIPPON KOEI CO.,LTD. TOKYO, JAPAN		15 th March, 2001	DWG NO JCOP106-11

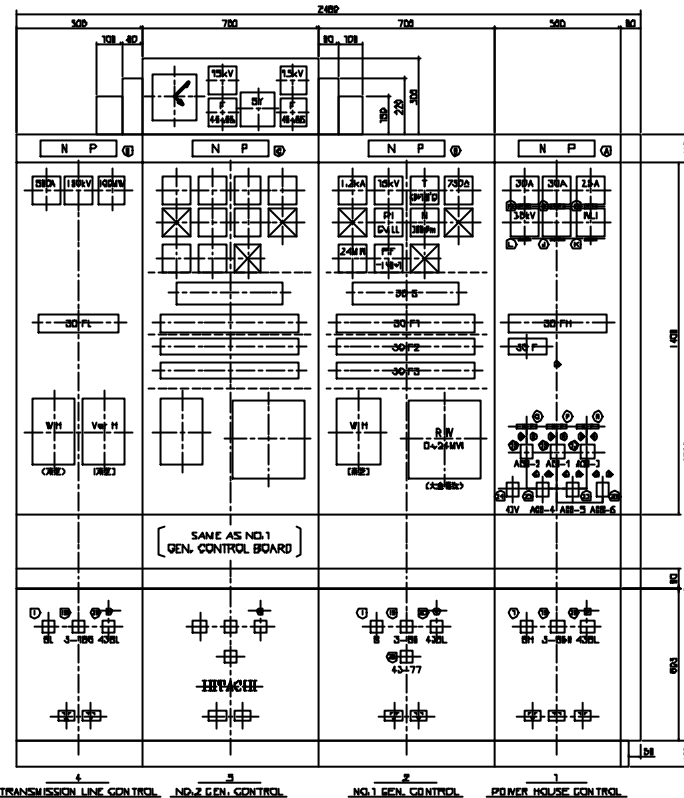


Electrielle du Laos The Nam Ngum I Hydropower Station Rehabilitation Project				
DWN	K. Yamayuki	SCALE	TITLE Main Transformer Connection, Outline Drawing	
CHKD	N. Nakato	—		
APPD	N. Nakato	DATE		
NIPPON KOEI CO.,LTD. TOKYO, JAPAN		15 th March, 2001	DWG NO	JCOP106-12

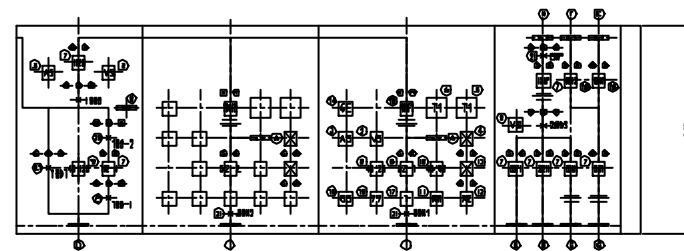


Electricite du Laos The Nam Ngum I Hydropower Station Rehabilitation Project			
DWN	K.Yasuyuki	SCALE	TITLE
CHKD	N.Nakato	—	Control Room, Control Panel Layout Drawing
APPD	N.Nakato	DATE	
NIPPON KOEI CO.,LTD. TOKYO, JAPAN		15 th March, 2001	DWG NO JCOP106-13

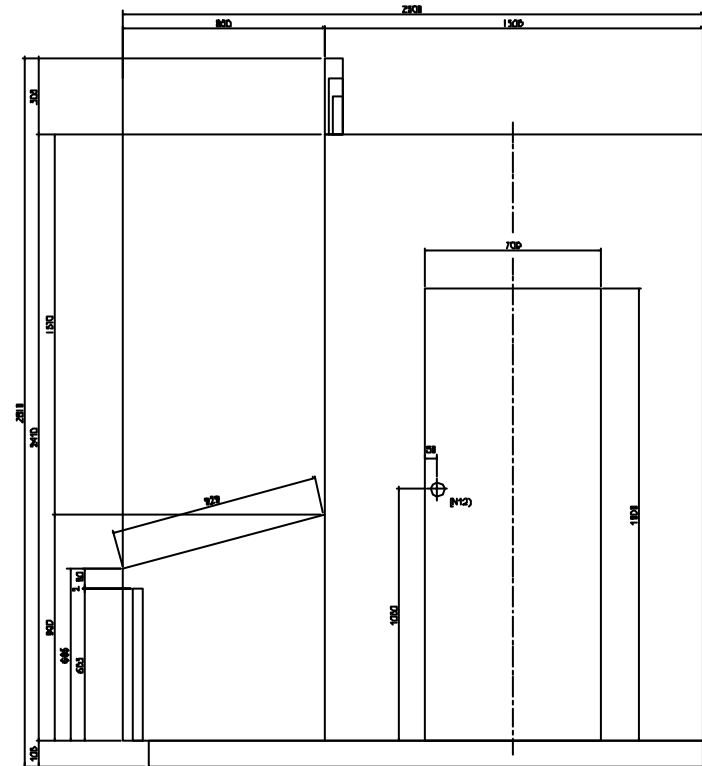
SCOPE OF WORK
BLIND PANEL



FRONT VIEW



SLANT PANEL



RIGHT SIDE VIEW

TEMPERATURE INDICATOR

Q	LETTER OF MARK PLATE	Q	LETTER OF MARK PLATE
Q	ON/OFF	Q	ON/OFF
1	MAIN THRUST BEARING METAL	1	MAIN TRANSFORMER OIL
2	GEN. BEARING OIL	2	
3	GEN. GUIDE BEARING METAL	3	
4	GEN. BEARING OIL	4	
5	GEN. GUIDE BEARING METAL	5	
6	GEN. WINDING-PHASE A	6	
7	GEN. WINDING-PHASE B	7	
8	GEN. WINDING-PHASE C	8	
9	AIR COOLER INLET	9	
10	AIR COOLER OUTLET	10	
11	NONE	11	
12	NONE	12	

31F1 (TARGET TYPE INDICATOR)

478	191	191G	191G2	64AL		
CR-1	CR-1	CR-1	CR-1	CR-1	CR-1	CR-1

30F1

5K	87	84N	81	87	817	877	88-2	18-2	38	63G3	45
CR-1	CR-1	CR-1	CR-1	CR-1	CR-1	CR-1	CR-1	CR-1	CR-1	CR-1	CR-1

31F2

5 PPF		12-1	18-2	38D	49V1	48A8	63N	48AD	63A2	63A2	64V1
CR-1	CR-1	CR-1	CR-1	CR-1	CR-1	CR-1	CR-1	CR-1	CR-1	CR-1	CR-1

31F3

4302	4949	330P	330P	330P	68C	86-1	28T	88T	28T	88A8	88C
CR-1	CR-1	CR-1	CR-1	CR-1	CR-1	CR-1	CR-1	CR-1	CR-1	CR-1	CR-1

30S (LAMP INDICATOR)

STOP	INTAKE	REFILLING	COOLING	WATER	WANNING	EXHAUST	SYNCH.	AVR	LOAD	BRAKE
CR-1	CR-1	CR-1	CR-1	CR-1	CR-1	CR-1	CR-1	CR-1	CR-1	CR-1

31F4

33NH	28H1	84D	80	81A8	28H	81H1	67H2	NEB
CR-1	CR-1	CR-1	CR-1	CR-1	CR-1	CR-1	CR-1	CR-1

30F5G

31F	401	802	PR-1
PR-1	PR-1	PR-1	PR-1

LIST OF CONTROL & SELECTOR SWITCHES

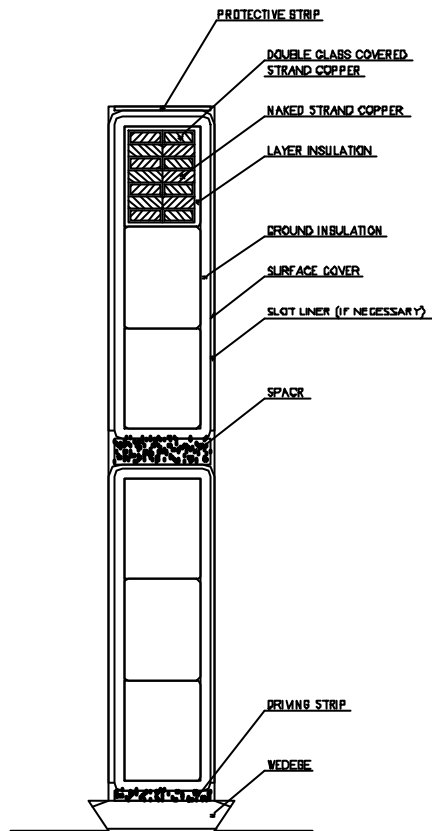
MARK	LETTER OF MARK PLATED	MARK OF HANDLE
①	POWER SUPPLY SWITCH, OFF-ON	B BH BL
②	PHASE SELECTOR SWITCH FOR AC VOLTMETER	V8
③	PHASE SELECTOR SWITCH FOR AC AMMETER	AS
④	PHASE SELECTOR SWITCH FOR AC VOLTMETER	V5
⑤	SELECTOR SWITCH FOR TEMPERATURE INDICATION	T1
⑥	CONTROL SW TO-1 FOR 16KV SYNCHRONIZING CIRCUIT BREAKER, OPEN-CLOSE	82-1, 82-2
⑦	CONTROL SW TO-1 FOR CIRCUIT BREAKER OPEN-CLOSE	80P, 80L, 80R, 80F, 80J, 80K, 80M
⑧	SELECTOR SWITCH FOR GENERATOR SYNCHRONIZING CONTROL, MAN. OFF-AUTO	43-25
⑨	SELECTOR SWITCH FOR GENERATOR SYNCHRONIZING CONTROL, MAN. OFF-AUTO	43-128
⑩	SELECTOR SWITCH FOR AVR, OFF-ON	43-80
⑪	CONTROL SW TO-1 FOR AVR, LOWER-RAISE	80R
⑫	CONTROL SW TO-1 FOR MANUAL VOLTAGE REGULATOR	70C
⑬	CONTROL SWITCH FOR FIELD RHIOSTAT FOR PILOT EXCITER, LOWER-RAISE	70S
⑭	MANUAL EMERGENCY STOP SWITCH	8E
⑮	CONTROL SW TO-1 FOR LOAD LIMITER SETTING, LOWER-RAISE	77
⑯	CONTROL SW TO-1 FOR TURBINE SPEED AND LOAD SETTING, LOWER-RAISE	86
⑰	MASTER CONTROL SWITCH FOR UNIT AUTOMATIC CONTROL, STOP-START	1
⑱	CONTROL SW TO-1 FOR DISCONNECTOR, OFF-ON	80P, 80L, 80R, 80F, 80J, 80K, 80M
⑲	RESET SWITCH FOR LOCKOUT RELAY	85, 150, 88H
⑳	SELECTOR SWITCH FOR ALARMING, LAMP-BELL	43R
㉑	INTERLOCK SWITCH	
㉒	SELECTOR SWITCH FOR LOAD LIMITER OPERATION PATTERN	43-77
㉓	CONTROL SW TO-1 FOR AIR CIRCUIT BREAKER, OFF-ON	ACB 1-4
㉔	SELECTOR SWITCH FOR POWER SUPPLY FROM DG	43V
㉕	CONTROL SW TO-1 FOR CIRCUIT BREAKER, OPEN-CLOSE	62

LIST OF NAME PLATES

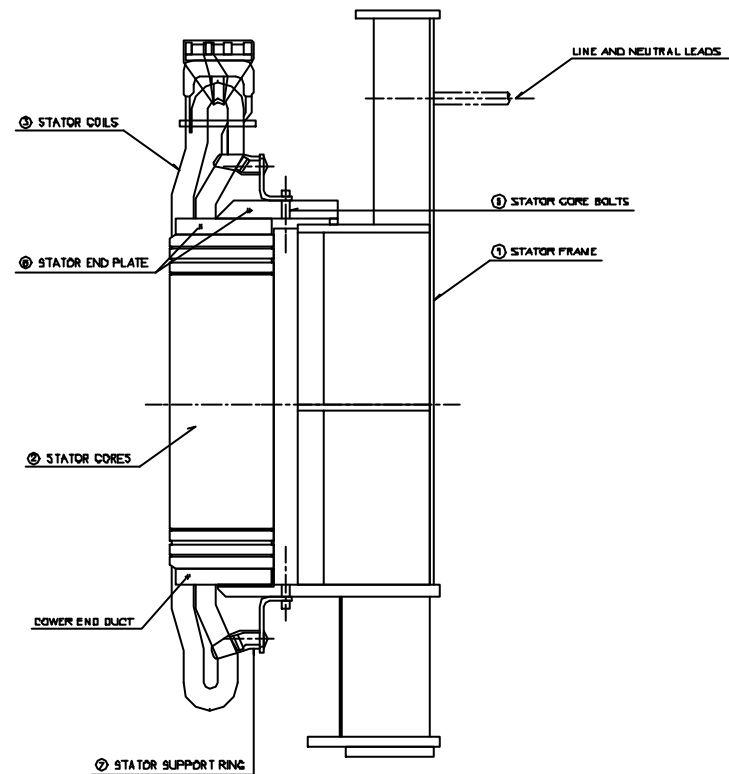
MARK	LETTER OF NAME PLATES
①	HOUSE-SERVICE
②	GENERATOR NO.1
③	GENERATOR NO.2
④	TRANSFORMER LINE NO.1
⑤	GENERATOR NO.1
⑥	GENERATOR NO.2
⑦	HOUSE-SERVICE
⑧	11KV BUSBAR
⑨	NEUTRAL GROUNDING TRANSFORMER
⑩	RESERVOIR WATER LEVEL
⑪	TAILRACE WATER LEVEL
⑫	22KV FEEDER NO.1
⑬	22KV FEEDER NO.2
⑭	22/0.38KV HOUSE TRANSFORMER
⑮	0.38KV DIESEL GENERATOR
⑯	11/0.38KV HOUSE TRANSFORMER
⑰	22/0.38KV HOUSE TRANSFORMER

Electricite du Laos
The Nam Ngum 1 Hydropower Station Rehabilitation Project

DWN	K.Yasuyuki	SCALE	TITLE
CHKD	N.Nakato		Existing Main Control Board
APPD	N.Nakato	DATE	DWG NO
NIPPON KOEI CO.,LTD. TOKYO, JAPAN		15 th March, 2001	JCOP106-14



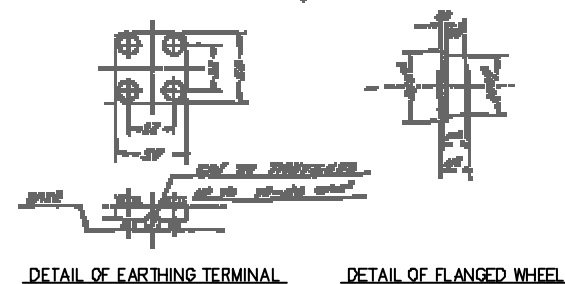
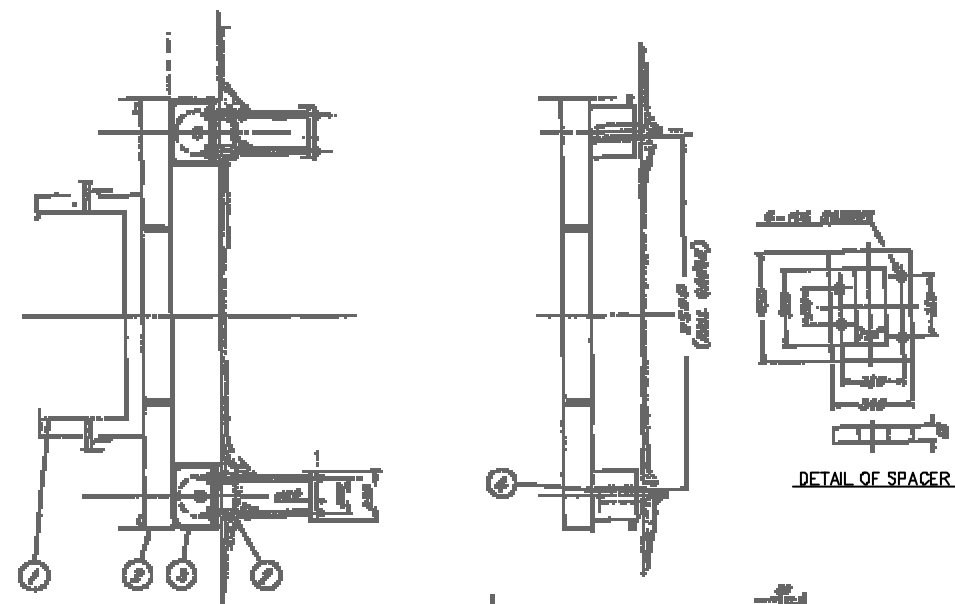
COILS OF AN OUTLINE



□ SCOPE OF WORK

NO	NAME	REPAIR	REMARKS
①	STATOR FRAME	NO	
②	STATOR CORES	NO	
③	STATOR COILS	YES	
④	TYING CORDS FOR COIL ENDS	YES	
⑤	STATOR CORE BOLTS	NO	
⑥	STATOR END PLATE	NO	
⑦	STATOR SUPPORT RING	YES	

Electricite du Laos The Nam Ngum I Hydropower Station Rehabilitation Project					
DWN	K. Yasuyuki	SCALE	TITLE Stator Assembly		
CHKD	N. Nakato	—			
APPD	N. Nakato	DATE			
NIPPON KOEI CO., LTD. TOKYO, JAPAN		15 th March, 2001	DWG NO	JCOP106-15	

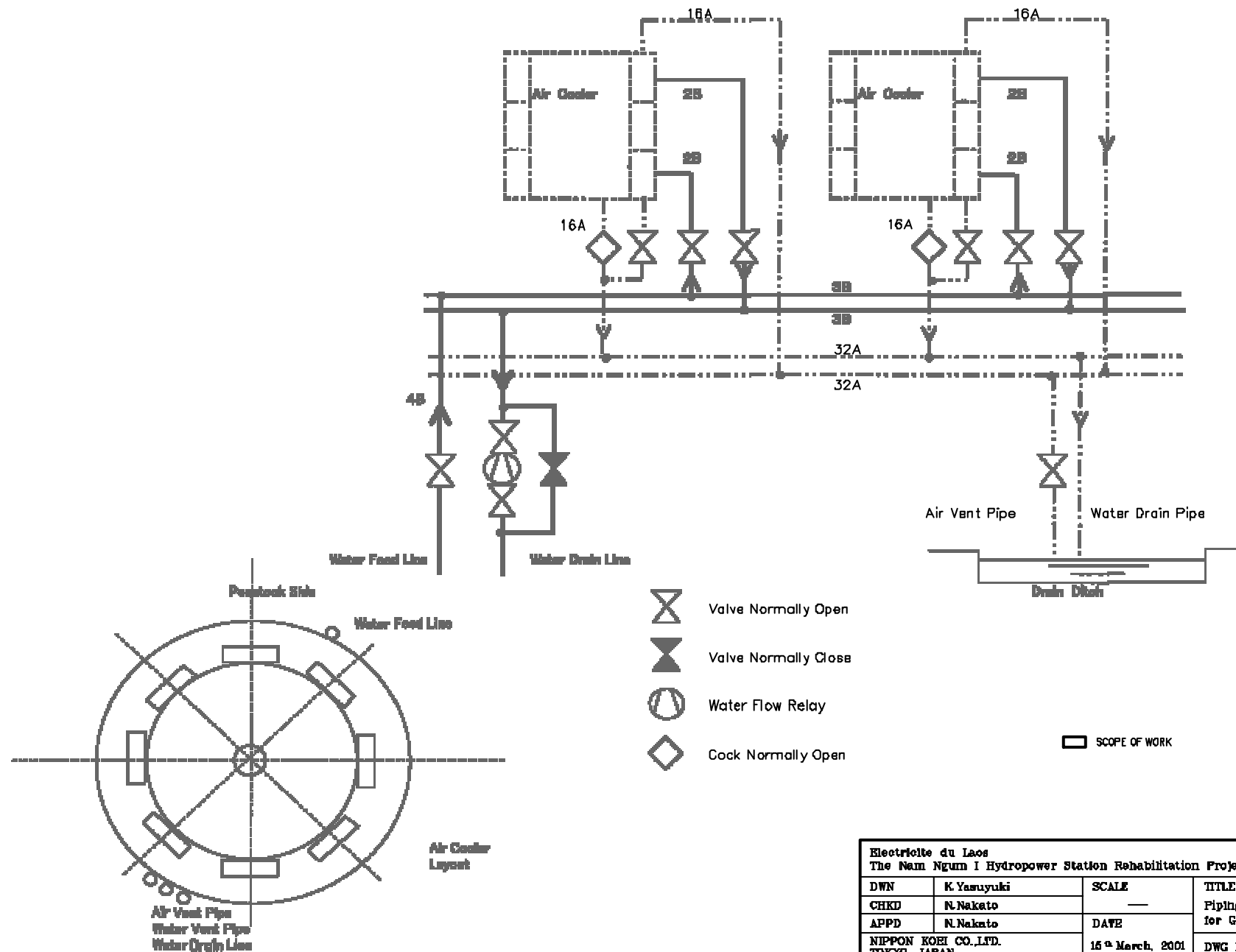


NO	NAME
1	TRANSFORMER TANK
2	BASE
3	WHEELS BASE
4	FLANGED WHEELS
5	PULLING LUG
6	SPACER (4 PIECES)
7	JACKING BOSS
8	EARTHING TERMINAL
9	BLOCK
10	FOUNDATION BOLT
11	TERMINAL BOX
12	CODDING FAN CONTROL DUEBULE

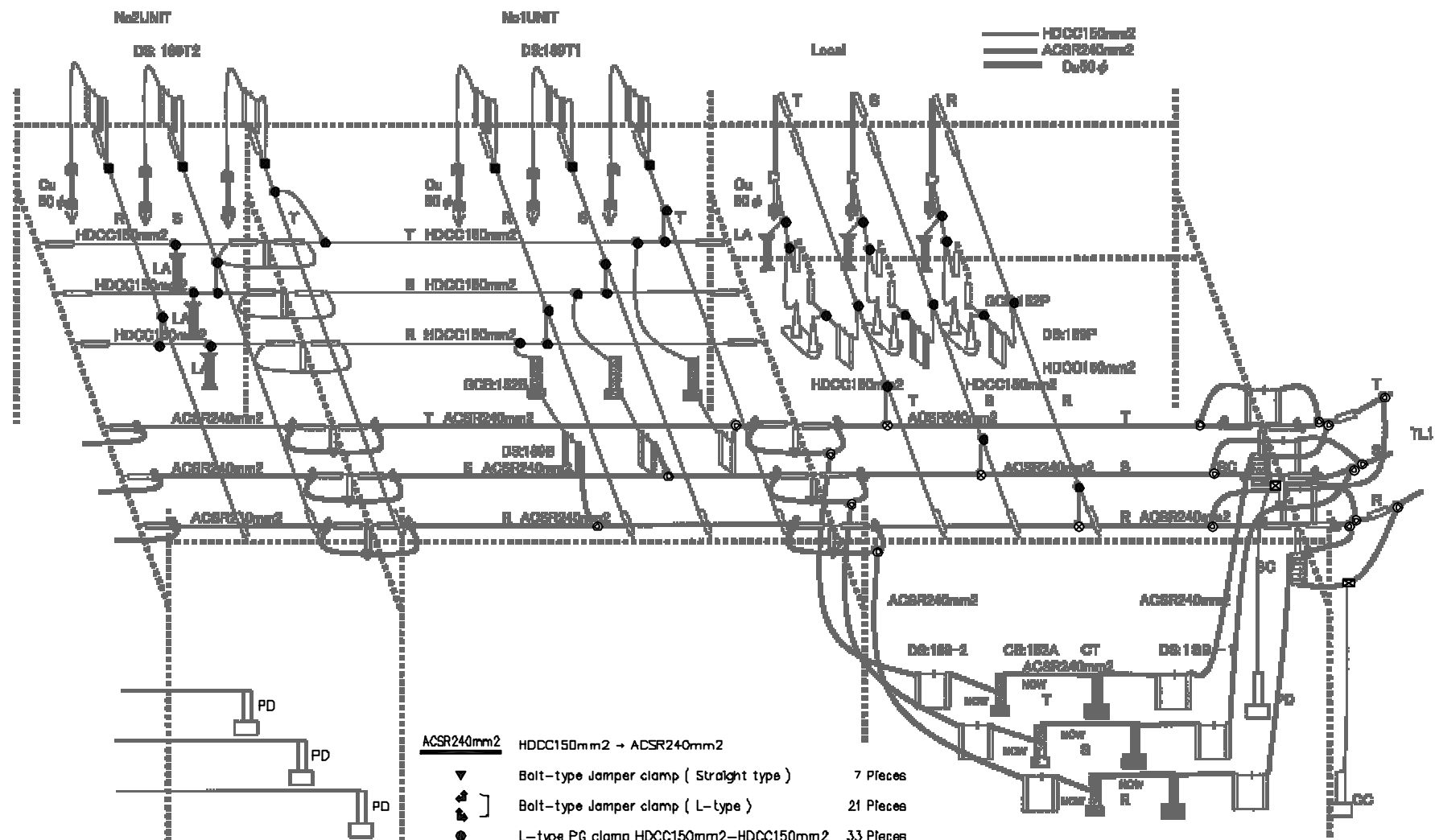
DIMENSIONS ARE ALL mm

Electrielle du Laos The Nam Ngum I Hydropower Station Rehabilitation Project				
DWN	K. Yamayuki	SCALE	TITLE Foundation for Existing Main Transformer	
CHKD	N. Nakato	—		
APPD	N. Nakato	DATE		
NIPPON KOEI CO.,LTD. TOKYO, JAPAN		15 th March, 2001	DWG NO	JCOP106-16

Air Cooler K 8



Electricite du Laos The Nam Ngum I Hydropower Station Rehabilitation Project				
DWN	K.Yasuyuki	SCALE	TITLE Piping Diagram for Generator Air Coolers	
CHKD	N.Nakato	DATE		
APPD	N.Nakato	DATE		
NIPPON KOEI CO.,LTD. TOKYO, JAPAN		15 th March, 2001	DWG NO	JCOP106-17



Electricite du Laos The Nam Ngum I Hydropower Station Rehabilitation Project			
DWN	K.Yasuyuki	SCALE	TITLE
CHKD	N.Nakato	—	Arrangement of 115kV Busbars and Fittings
APPD	N.Nakato	DATE	DWG NO
NIPPON KOEI CO.,LTD. TOKYO, JAPAN		15 th March, 2001	JCOP106-18