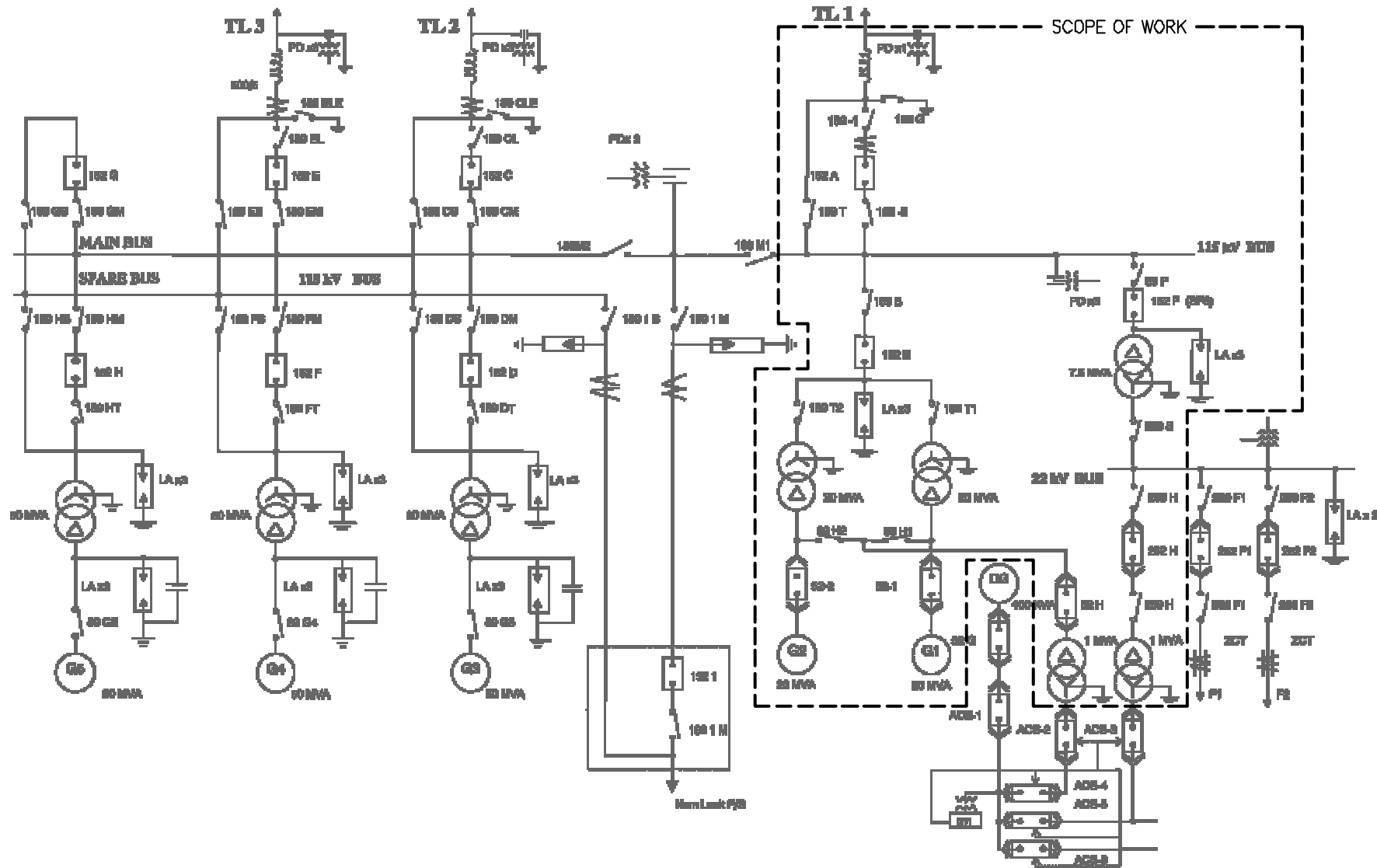


圖 面

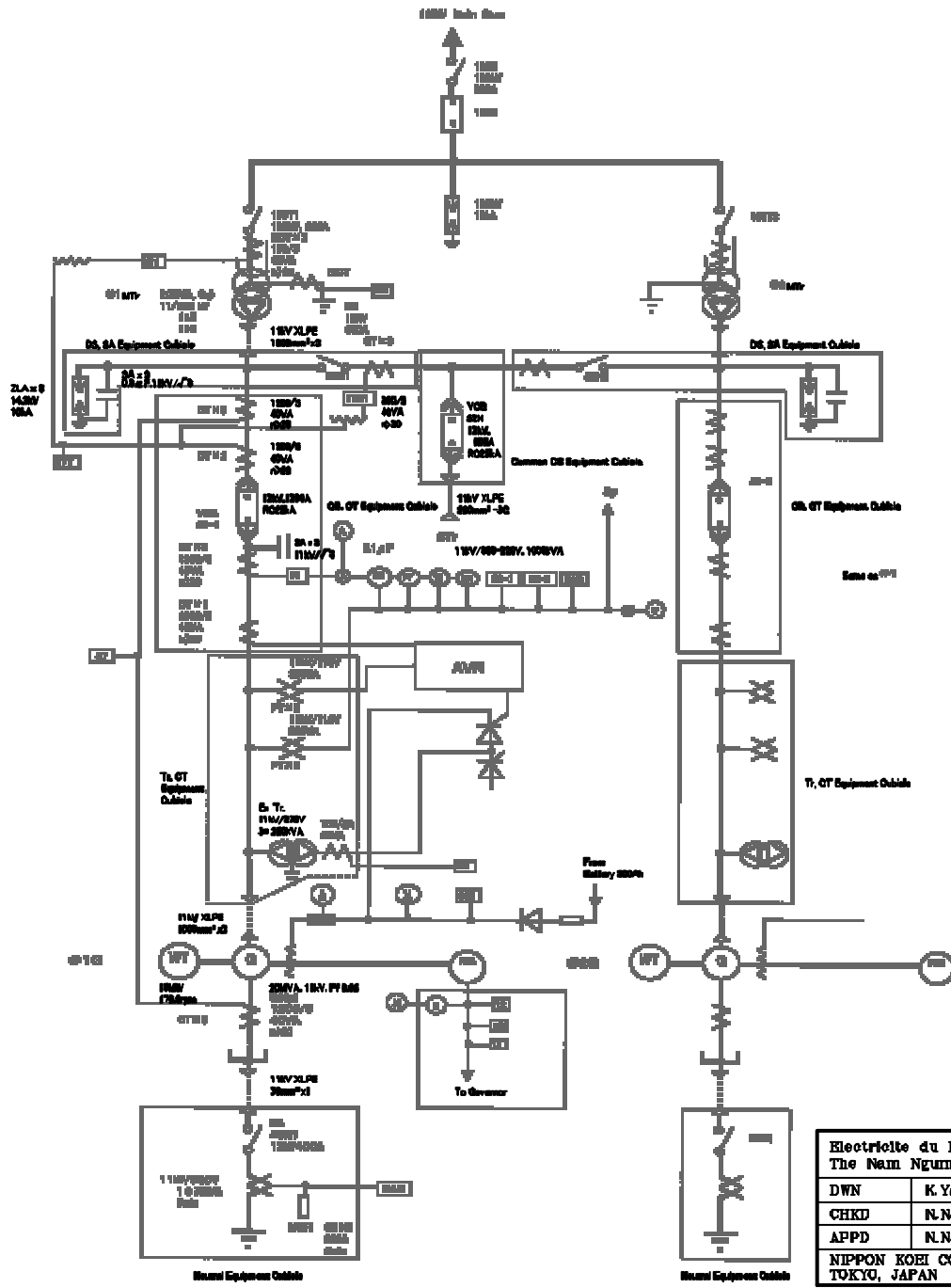
## 図面リスト

No.	図面番号	図面名称
1	JCOP106-1	発電所回路構成図
2	JCOP106-2	主回路単線接続図
3	JCOP106-3	直流電源回路単線接続図
4	JCOP106-4	交流制御電源回路単線接続図
5	JCOP106-5	発電所発電機フロア平面図
6	JCOP106-6	発電所横断図
7	JCOP106-7	発電所縦断図
8	JCOP106-8	115kV 屋外開閉所平面図 - 1・2号エリア
9	JCOP106-9	115kV 屋外開閉所横断図 - 1・2号エリア (A)
10	JCOP106-10	115kV 屋外開閉所横断図 - 1・2号エリア (B)
11	JCOP106-11	11 kV 閉鎖形配電盤構成図
12	JCOP106-12	11 kV 発電機回路ケーブル接続図
13	JCOP106-13	制御室機器配置図
14	JCOP106-14	制御監視盤機器取付詳細図 - 1・2号機、1号送電線、所内回路
15	JCOP106-15	発電機補修部品概念図
16	JCOP106-16	既設主要変圧器用基礎詳細図
17	JCOP106-17	発電機冷却配管ダイアグラム
18	JCOP106-18	115 kV 母線電線及び分岐金物配置図
19	JCOP106-21	1・2号水車断面図
20	JCOP106-22	1・2号水車平面図 (EL. 168.50)
21	JCOP106-23	1・2号水車平面図 (EL. 161.50)
22	JCOP106-24	1・2号機縦断面図
23	JCOP106-25	油圧配管・空気圧配管ダイアグラム
24	JCOP106-26	油圧タンク外形図
25	JCOP106-27	冷却水配管図 (1)
26	JCOP106-28	冷却水配管図 (2)
27	JCOP106-29	1・2号取水口ゲート組立図
28	JCOP106-30	1・2号取水口ゲートサイドローラー詳細図
29	JCOP106-31	1・2号取水口ゲートシールラバー詳細図
30	JCOP106-32	1・2号取水口ゲート現場操作盤
31	JCOP106-33	1・2号取水口ゲート遠隔操作盤
32	JCOP106-34	1・2号取水口ゲート操作盤シーケンス図 (1)
33	JCOP106-35	1・2号取水口ゲート操作盤シーケンス図 (2)
34	JCOP106-36	取水口ガントリークレーン操作盤シーケンス図 (1)
35	JCOP106-37	取水口ガントリークレーン操作盤シーケンス図 (2)
36	JCOP106-38	放水口ガントリークレーン操作盤シーケンス図 (1)
37	JCOP106-39	放水口ガントリークレーン操作盤シーケンス図 (2)



NAM NGUM - I HYDRO POWER PLANT  
単線回路構成図

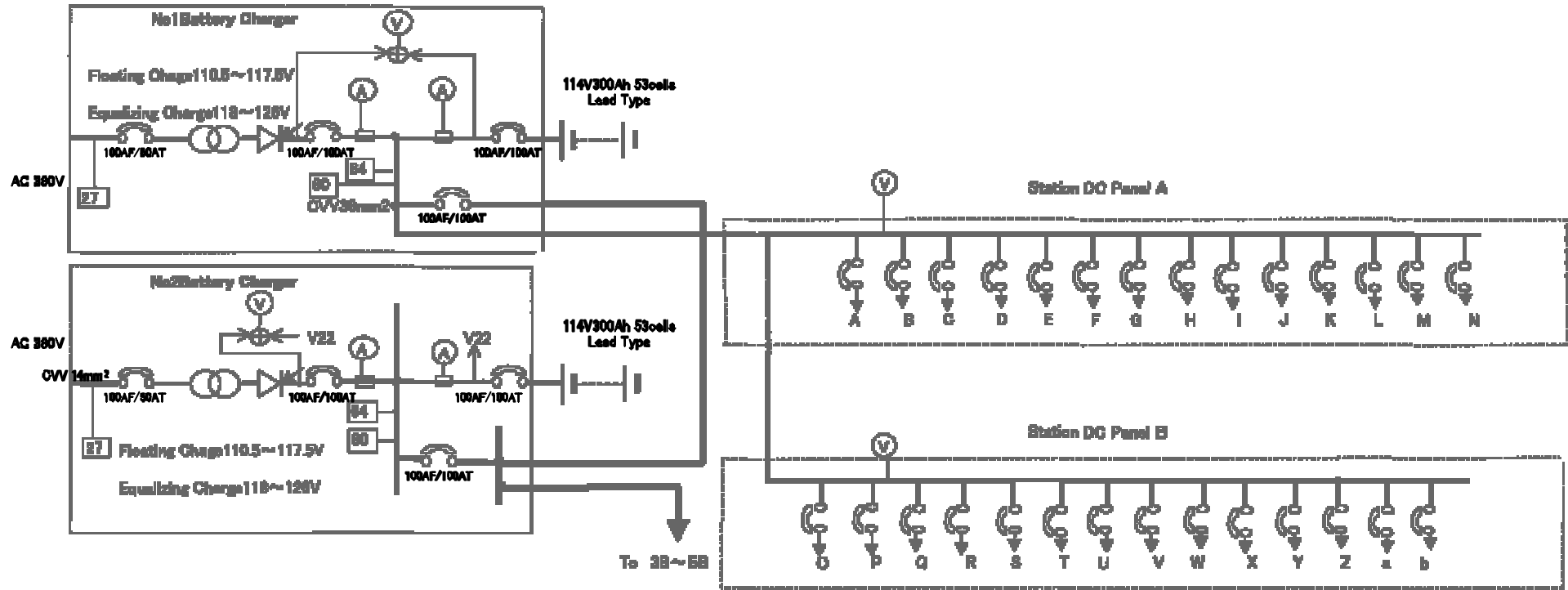
Electricite du Laos The Nam Ngum I Hydropower Station Rehabilitation Project			
DWN	K.Yasuyuki	SCALE	TITLE
CHKD	N.Nakato	—	発電所回路構成図
APPD	N.Nakato	DATE	
NIPPON KOEI CO.,LTD. TOKYO, JAPAN		15 <sup>th</sup> March, 2001	DWG NO JCOP106-1



Electricite du Laos The Nam Ngum I Hydropower Station Rehabilitation Project			
DWN	K. Yasuyuki	SCALE	TITLE
CHKD	N. Nakato		主回路単線接続図
APPD	N. Nakato	DATE	
NIPPON KOEI CO., LTD. TOKYO, JAPAN		15 <sup>th</sup> March, 2001	DWG NO JCOPI06-2

REVISED

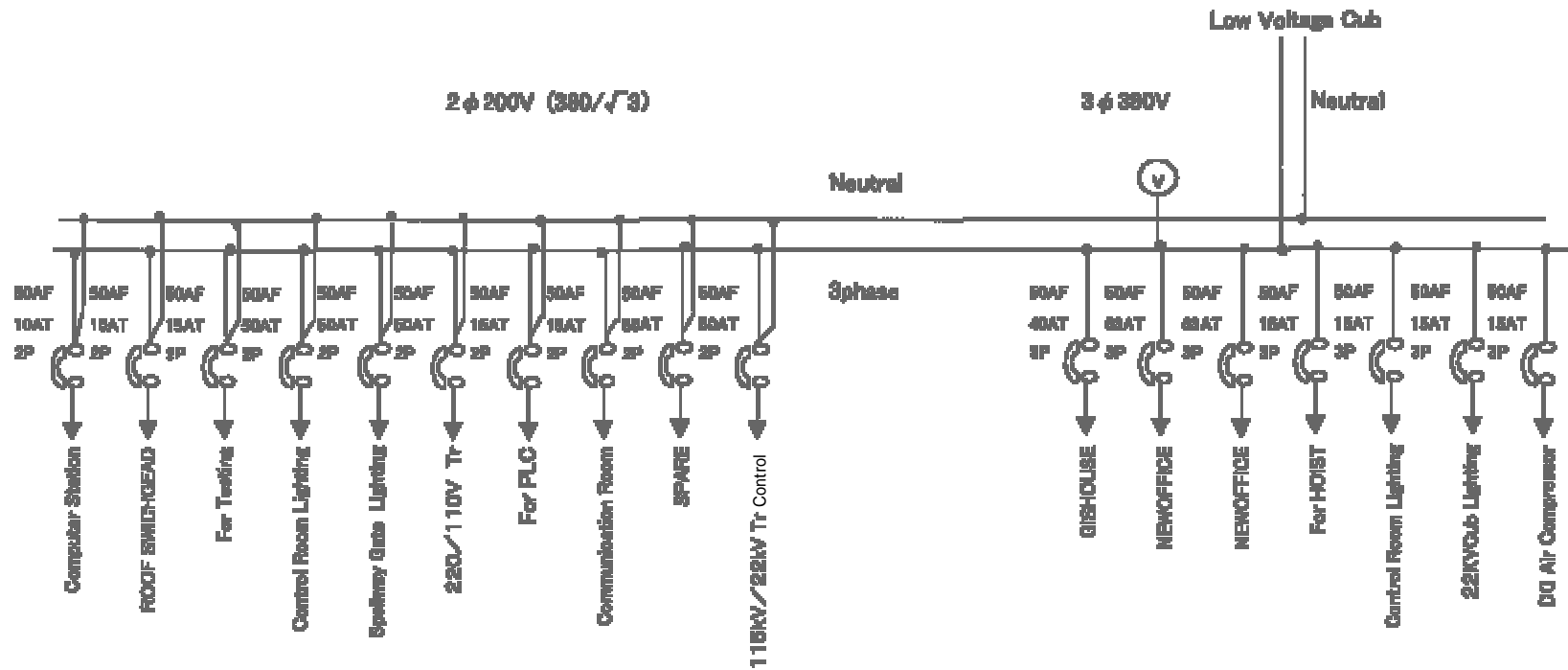
Station DC Power Single-line Diagram



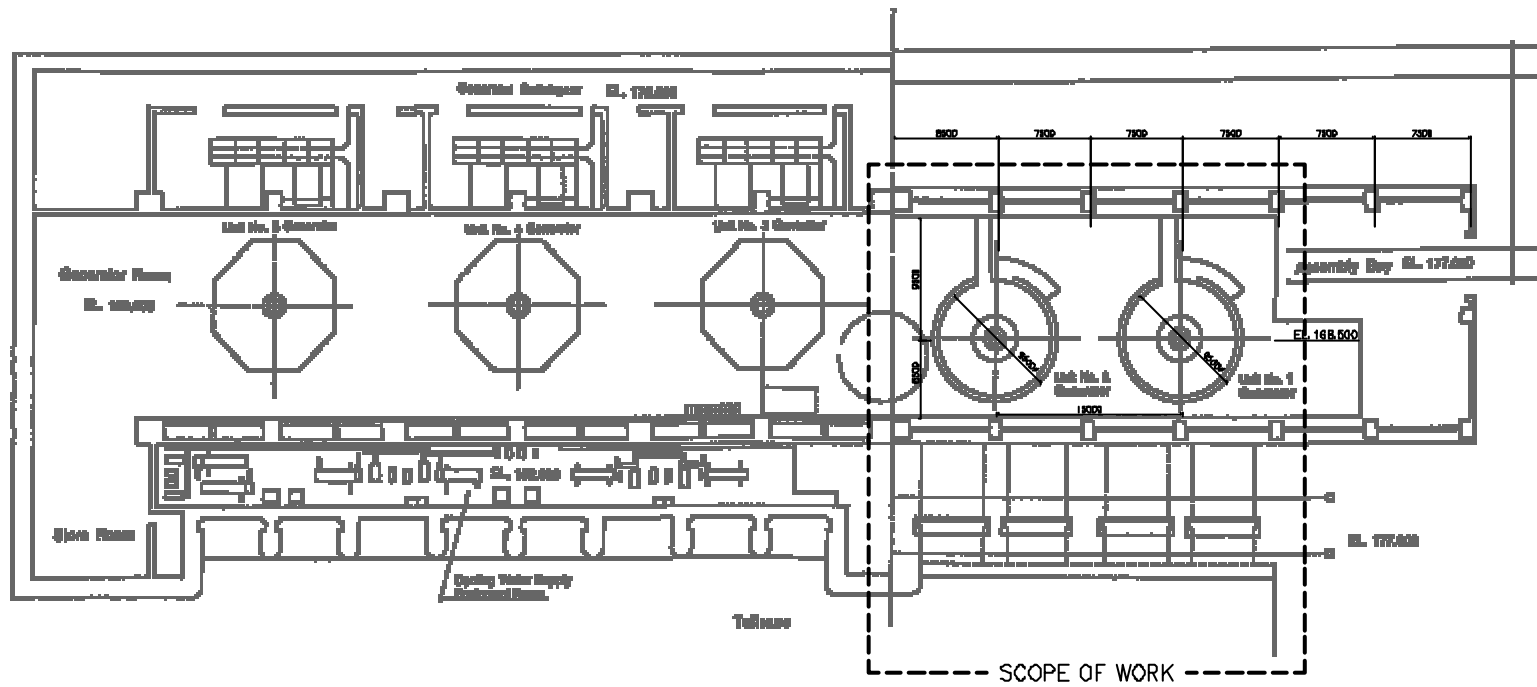
- |  |                                     |   |
|--|-------------------------------------|---|
| A: 100AF100AT No1G AVR                   | K: 100AF16AT TO MARSHALLING KIOSK   | U: 100AF30AT DIESEL                             |
| B: 100AF90AT No1G Equipment Control      | L: 100AF16AT TEST                   | V: 100AF30AT Emergency Lighting                 |
| C: 100AF15AT No1G Control Board          | M: 100AF90AT Spare                  | W: 100AF30AT TO GIS1                            |
| D: 100AF15AT TL1 Control & Relay         | N: 100AF100AT Spare                 | X: 100AF30AT TO Spare                           |
| E: 100AF50AT Station Power Control Board | O: 100AF160AT NO2G AVR              | Y: 100AF30AT INTAKE GATE NO6                    |
| F: 100AF15AT Fault Target                | P: 100AF58AT No2G Equipment Control | Z: 100AF16AT TO MARSHALLING KIOSK GIS INTERFACE |
| G: 100AF50AT SFB G1-2 TL1                | Q: 100AF15AT No2G Control Board     | a: 100AF100AT Spare                             |
| H: 100AF50AT SFB G3-4-5 TL2-3            | R: 100AF15AT 280V0UB                | b: 100AF16AT Spare                              |
| I: 100AF50AT TO GIS2                     | S: 100AF58AT INTAKE GATE NO1~NO4    |   |
| J: 100AF50AT No1G AVR                    | T: 100AF58AT 22kV0Ub                |   |

Electricite du Laos The Nam Ngum I Hydropower Station Rehabilitation Project			
DWN	K Yasuyuki	SCALE	TITLE
CHKD	N.Nakato	—	直流電源回路単線接続図
APPD	N.Nakato	DATE	
NIPPON KOEI CO.,LTD. TOKYO, JAPAN		16 <sup>th</sup> March, 2001	DWG NO JCOP106-S

### Station AC power Single-line Diagram

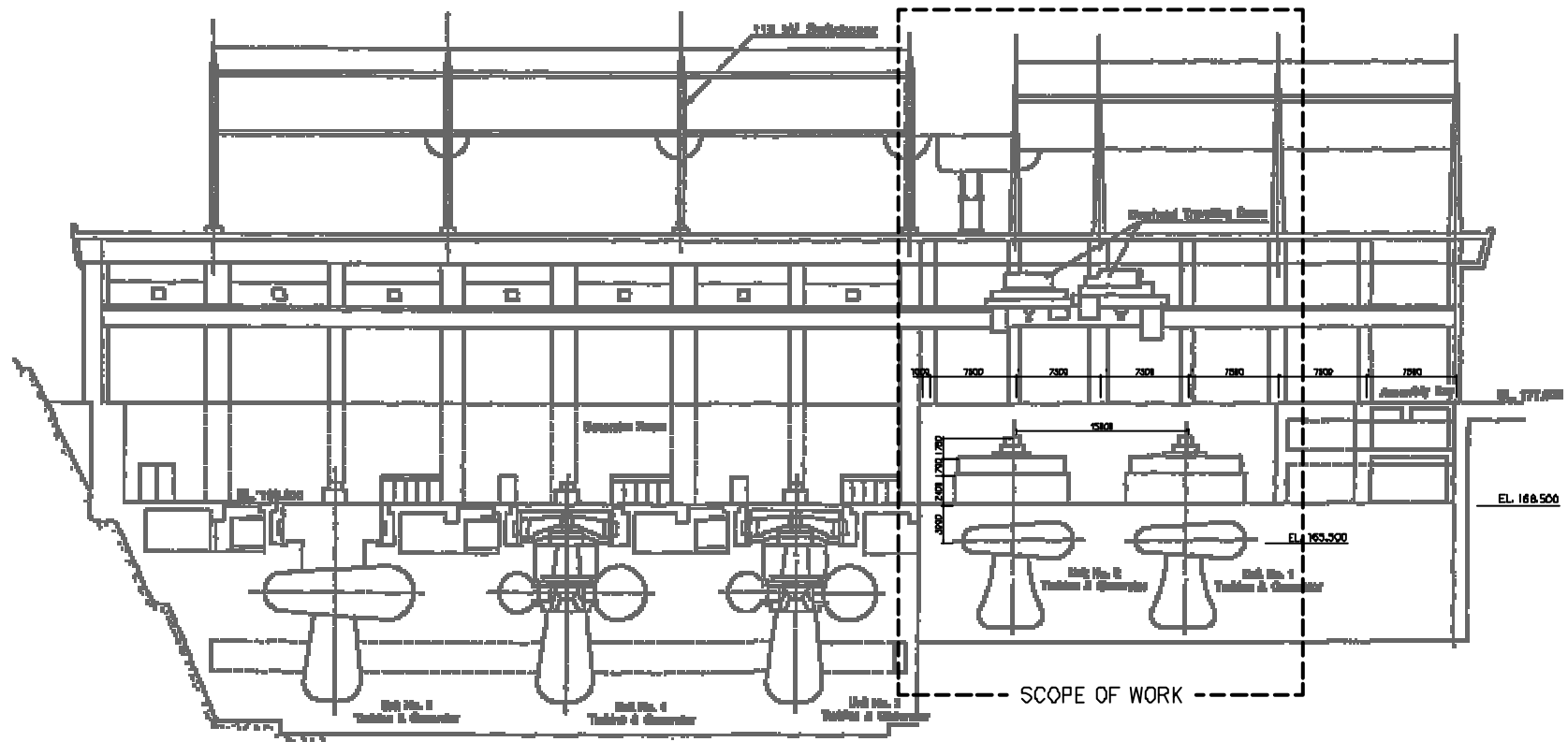


Electricite du Laos			
The Nam Ngum I Hydropower Station Rehabilitation Project			
DWN	K. Yasuyuki	SCALE	TITLE
CHKD	N. Nakato	—	交流制御電源回路単線接続図
APPD	N. Nakato	DATE	
NIPPON KOEI CO. LTD. TOKYO, JAPAN		15 <sup>th</sup> March, 2001	DWG NO JCOP106-4



Electricite du Laos			
The Nam Ngum I Hydropower Station Rehabilitation Project			
DWN	K. Yasuyuki	SCALE	TITLE
CHKD	N. Nakato	—	発電所発電機フロア平面図
APPD	N. Nakato	DATE	
NIPPON KOEI CO., LTD. TOKYO, JAPAN		16 <sup>th</sup> March, 2001	DWG NO JCOP106-5

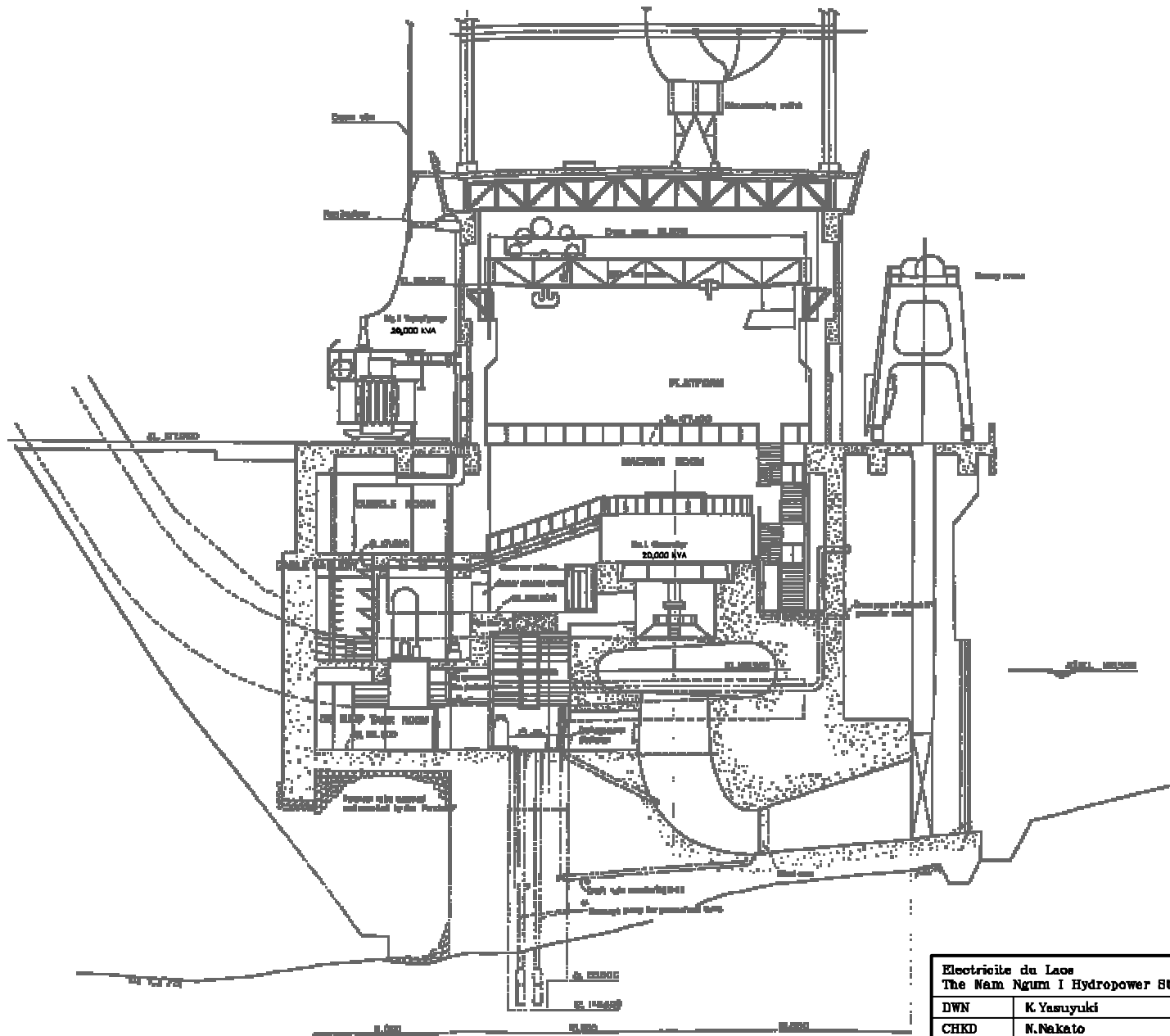
JCOP106-5



Electricite du Laos			
The Nam Ngum I Hydropower Station Rehabilitation Project			
DWN	K. Yasuyuki	SCALE	TITLE
CHKD	N. Nakato	—	発電所横断面図
APPD	N. Nakato	DATE	
NIPPON KOEI CO., LTD. TOKYO, JAPAN		16 <sup>th</sup> March, 2001	DWG NO JCOP106-6

NKKP-1/D

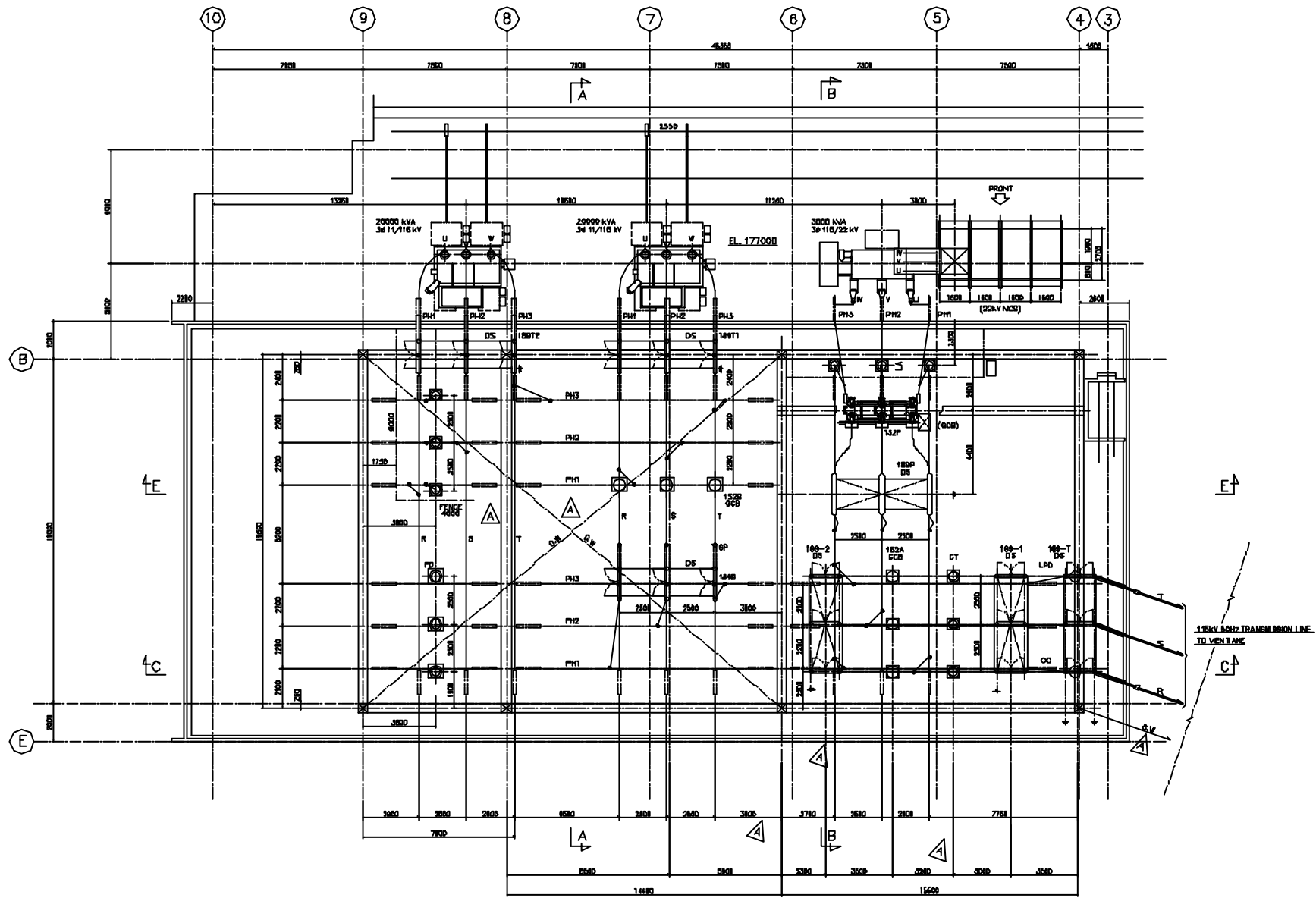




TRANSVERSE SECTION - G. UNIT NO. 1

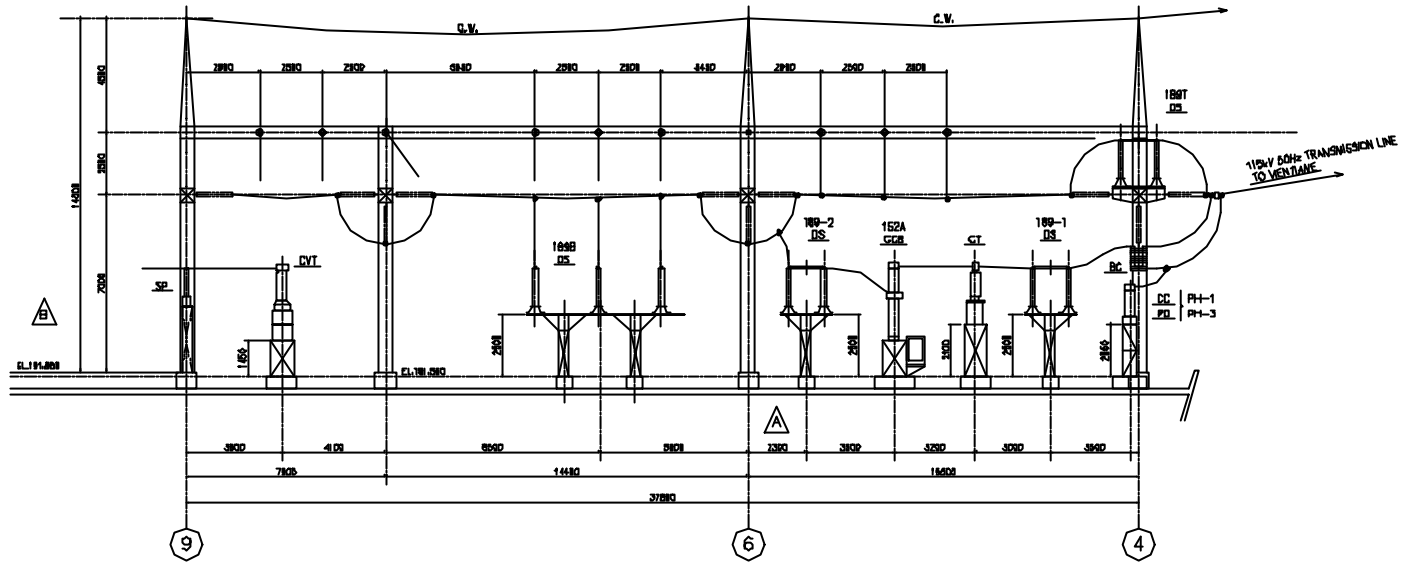


Electricite du Laos			
The Nam Ngum I Hydropower Station Rehabilitation Project			
DWN	K. Yasuyuki	SCALE	TITLE
CHKD	N. Nakato	—	発電所縦断面図
APPD	N. Nakato	DATE	
NIPPON KOEI CO., LTD. TOKYO, JAPAN		16 <sup>th</sup> March, 2001	DWG NO JCOP106-7

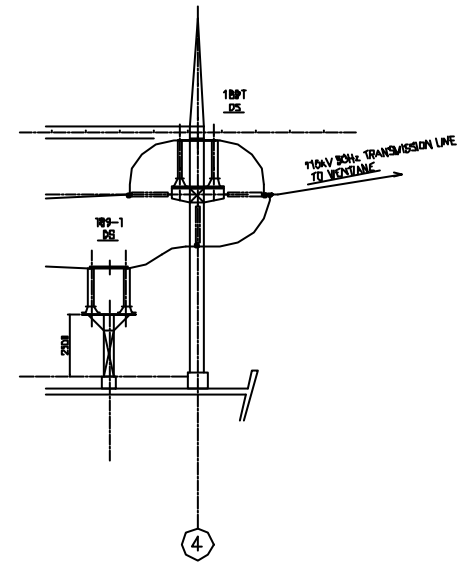


Electricite du Laos The Nam Ngum I Hydropower Station Rehabilitation Project			
DWN	K. Yasuyuki	SCALE	TITLE
CHKD	N. Nakato	—	115kV 屋外開閉所
APPD	N. Nakato	DATE	平面図 - 1・2号エリア
NIPPON KOEI CO., LTD. TOKYO, JAPAN		16 <sup>th</sup> March, 2001	DWG NO JCOP106-B

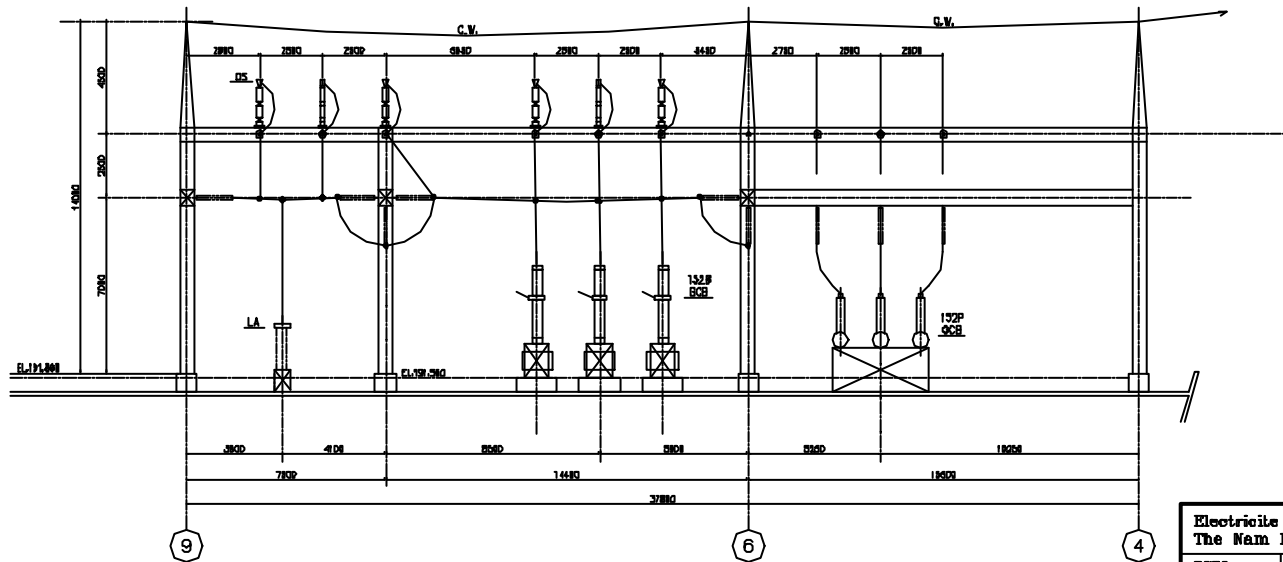
NKKP-1-1



SECTION C-C



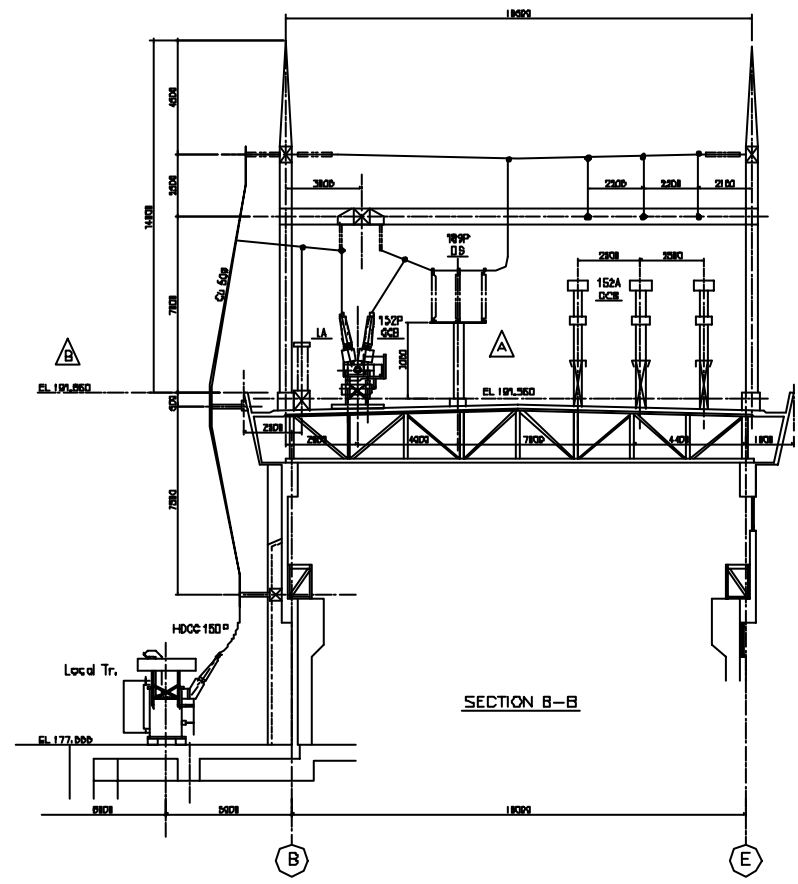
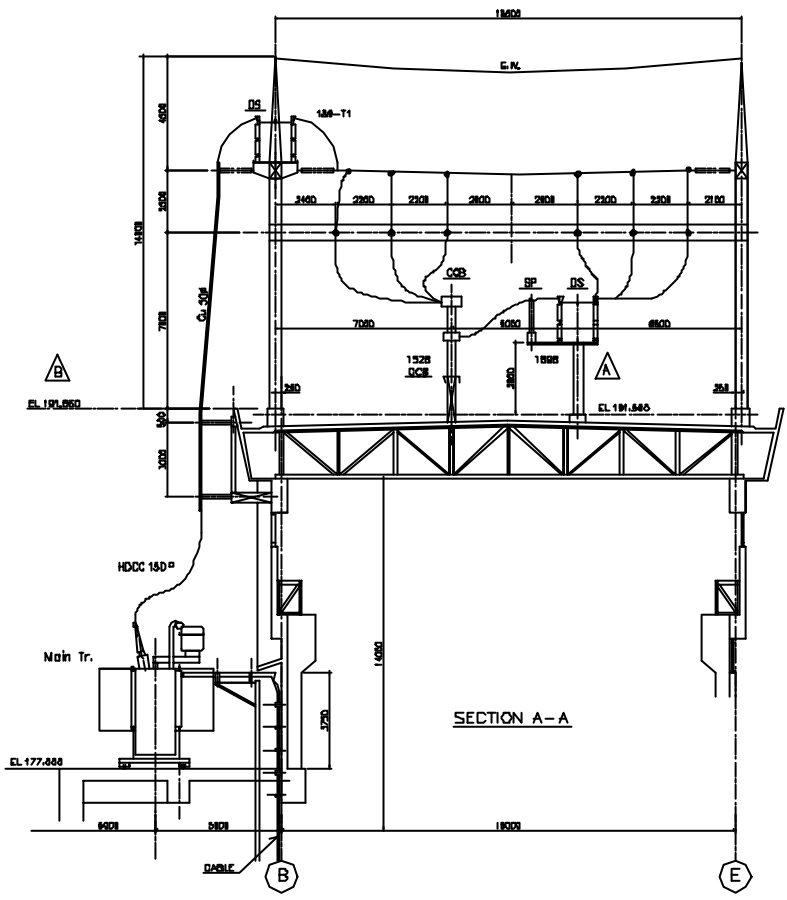
PH-2



SECTION E-E

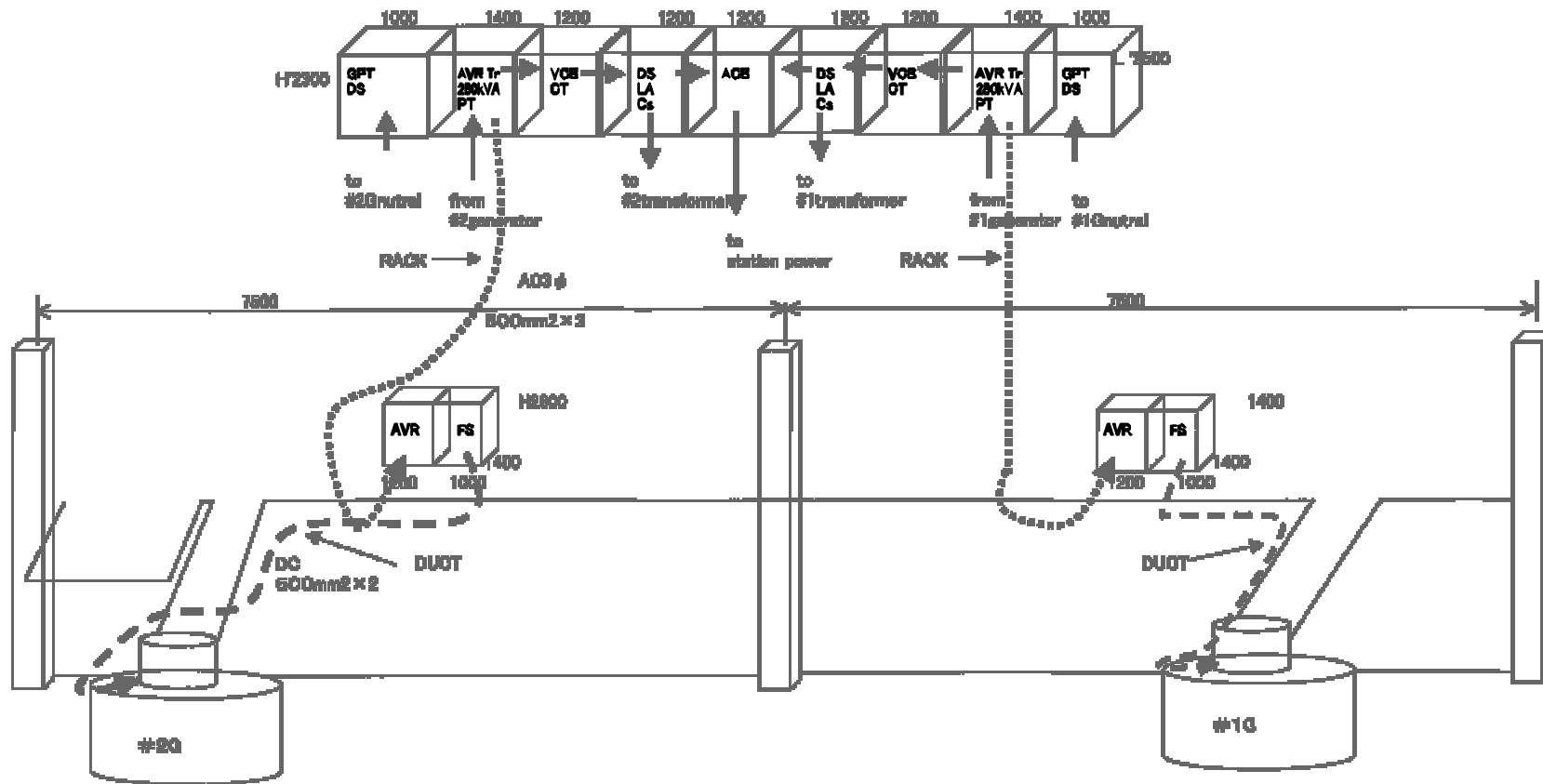
Electricite du Laos The Nam Ngum I Hydropower Station Rehabilitation Project			
DWN	K. Yasuyuki	SCALE	TITLE
CHKD	N. Nakato	—	115kV 屋外開閉所
APPD	N. Nakato	DATE	横断図 - 1, 2号エリア (A)
NIPPON KOEI CO., LTD. TOKYO, JAPAN		16 <sup>th</sup> March, 2001	DWG NO JCOP106-9

100000000



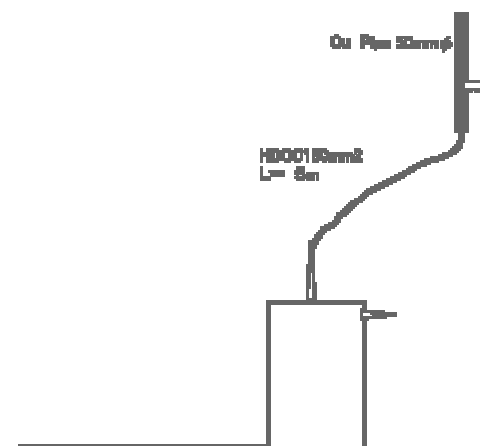
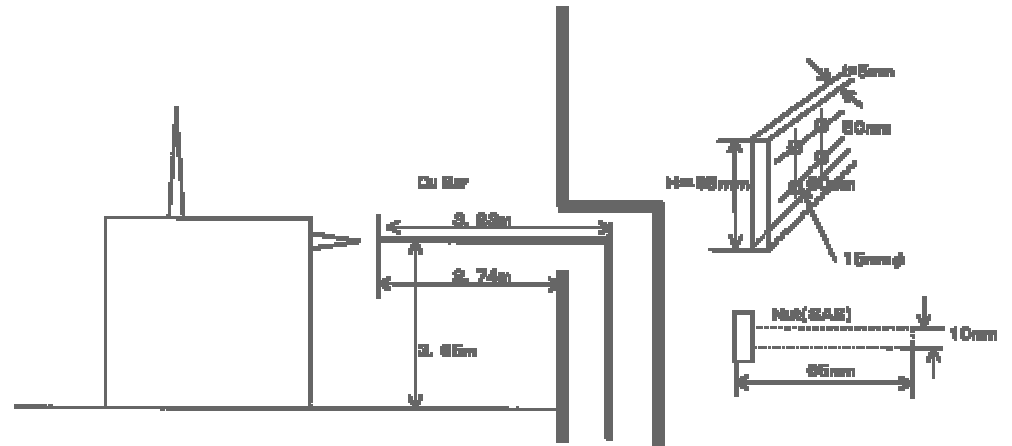
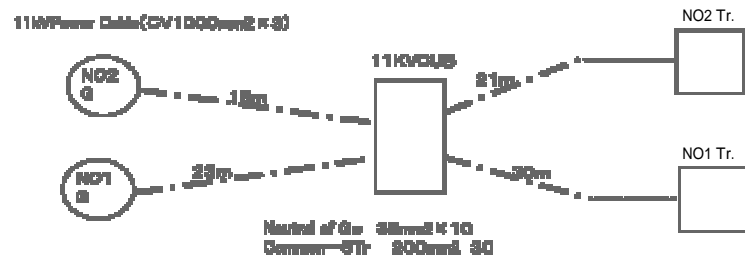
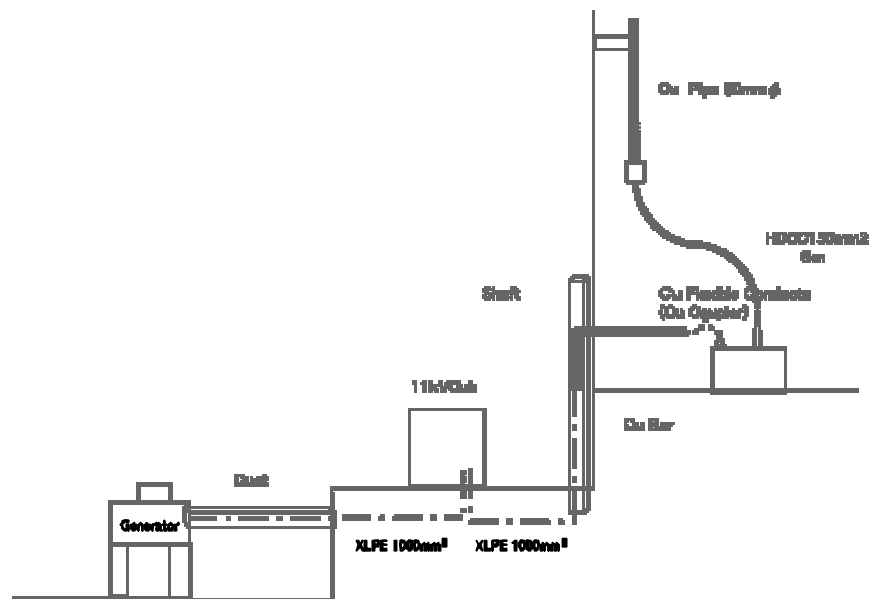
Electricite du Laos The Nam Ngum I Hydropower Station Rehabilitation Project			
DWN	K. Yasuyuki	SCALE	TITLE
CHKD	N. Nakato	—	115kV 屋外開閉所
APPD	N. Nakato	DATE	横断面図 - 1・2号エリア (B)
NIPPON KOEI CO., LTD. TOKYO, JAPAN		15 <sup>th</sup> March, 2001	DWG NO JCOPI06-10

REVISED

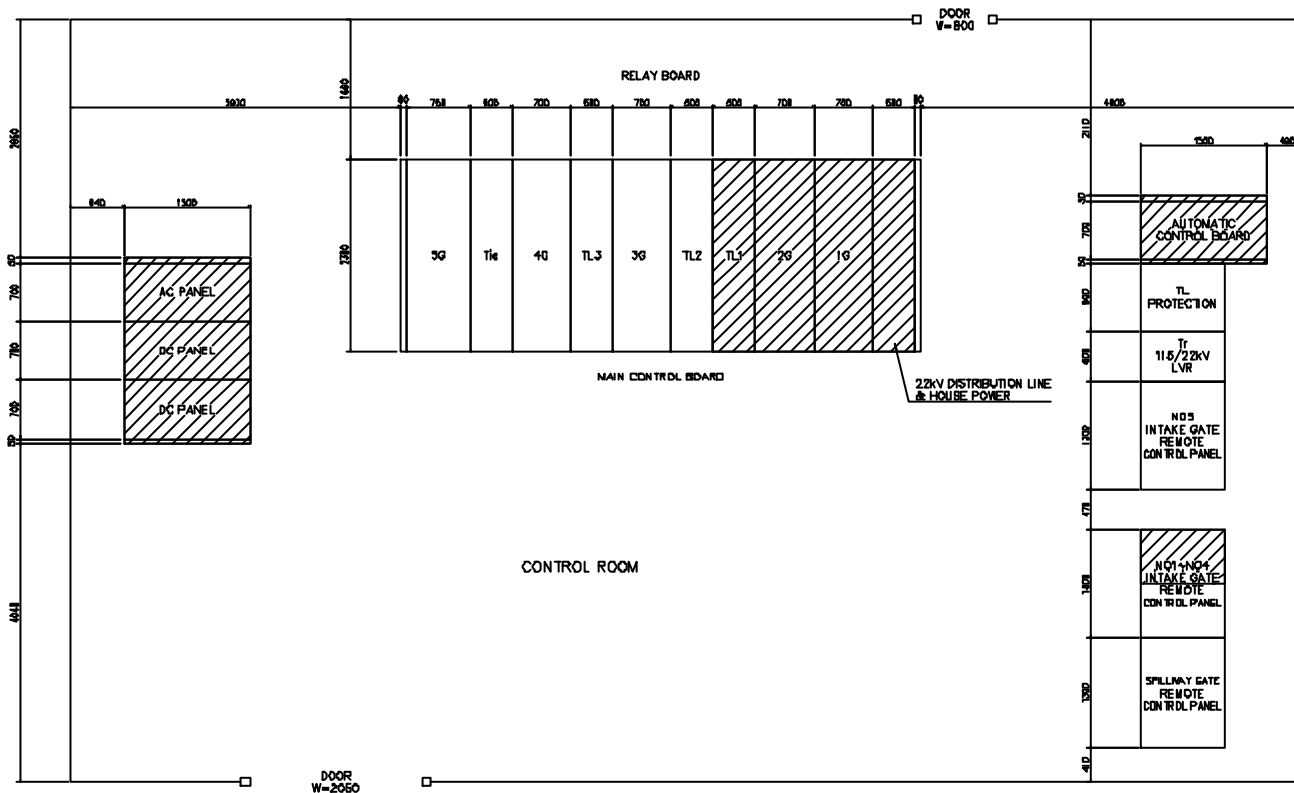


Electricite du Laos			
The Nam Ngum I Hydropower Station Rehabilitation Project			
DWN	K. Yasuyuki	SCALE	TITLE
CHKD	N. Nakato	—	11kV 閉鎖形配電盤構成図
APPD	N. Nakato	DATE	
NIPPON KOEI CO.,LTD. TOKYO, JAPAN		15 <sup>th</sup> March, 2001	DWG NO JCOP106-11

REVISED



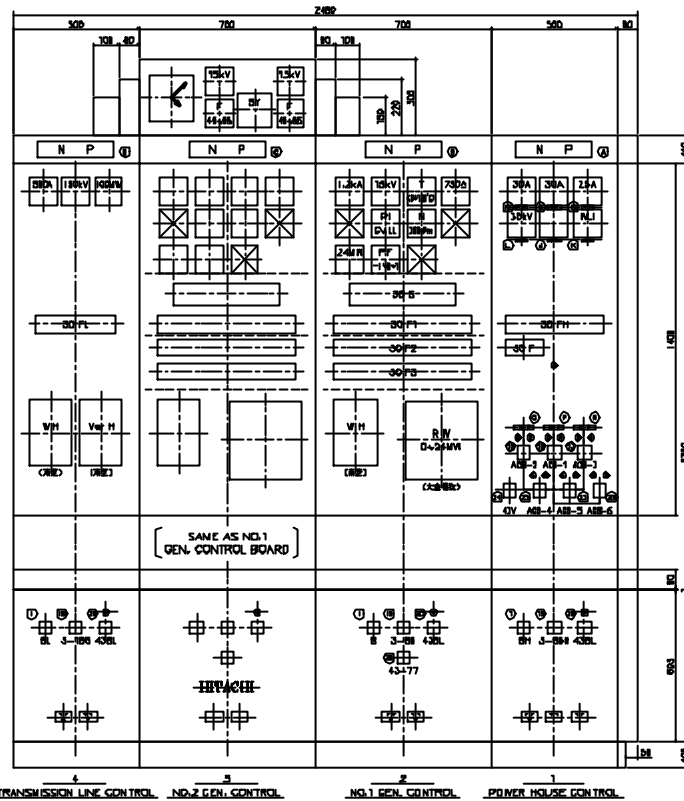
Electricite du Laos The Nam Ngum I Hydropower Station Rehabilitation Project			
DWN	K. Yasuyuki	SCALE	TITLE
CHKD	N. Nakato	—	11kV 発電機口ケーブル接続図
APPD	N. Nakato	DATE	
NIPPON KOEI CO., LTD. TOKYO, JAPAN		15 <sup>th</sup> March, 2001	DWG NO JCOPI06-12



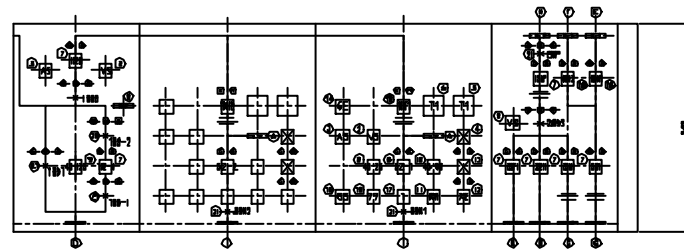
▨ SIDE OF WORK

Electricite du Laos The Nam Ngum I Hydropower Station Rehabilitation Project			
DWN	K. Yasuyuki	SCALE	TITLE
CHKD	N. Nakato	—	制御室機器配置図
APPD	N. Nakato	DATE	
NIPPON KOEI CO., LTD. TOKYO, JAPAN		15 <sup>th</sup> March, 2001	DWG NO JCOPI06-13

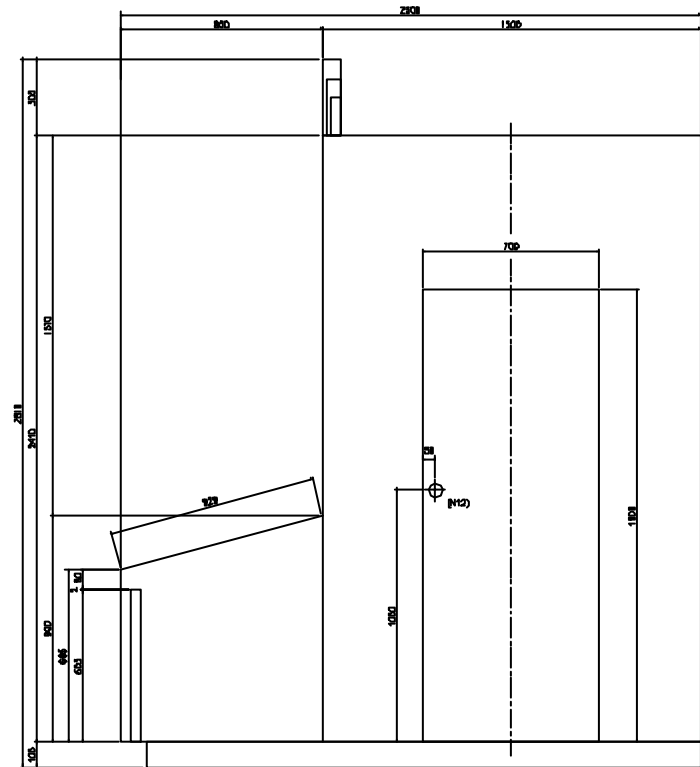
□ SCOPE OF WORK  
 □ BLIND PANEL



FRONT VIEW



SLANT PANEL



RIGHT SIDE VIEW

TEMPERATURE INDICATOR

LETTER OF MARK PLATE	LETTER OF MARK PLATE
Q ON/OFF	8 ON/OFF
1 MAIN THRUST BEARING METAL	1 MAIN TRANSFORMER OIL
2 GEN. BEARING OIL	2
3 GEN. GUIDE BEARING METAL	3
4 TEN. BEARING OIL	4
5 GEN. GUIDE BEARING METAL	5
6 GEN. WINDING-PHASE A	6
7 GEN. WINDING-PHASE B	7
9 GEN. WINDING-PHASE C	8
11 AIR COOLER INLET	8
13 AIR COOLER OUTLET	10
10 NONE	11
12 NONE	12
12 NONE	13

31E1 (TARGET TYPE INDICATOR)

478	191	161G	191GZ	64AL					
C-1	C-1	C-1	C-1	C-1	CR-1	CR-1	DR-1	DR-1	

30F1

56	57	58N	51	57	51T	57T	58-2	58-2	38	63G3	45
D-1	D-1	D-1	D-1	D-1	G-1	G-1	G-1	D-1	D-1	D-1	D-1

31F2

5 PIP		10-1	10-2	30D	49V1	48A8	63N	48AD	63A5	63A2	64V1
C-1	C-1	C-1	C-1	C-1	C-1	C-1	G-1	C-1	C-1	C-1	CR-1

31E3

4302	4449	330D	330P	330G	59C	56-1	26T	591P	26T	59A0P	59C
CR-1	CR-1	CR-1	CR-1	CR-1	CR-1	CR-1	CR-1	CR-1	CR-1	CR-1	CR-1

31S (LAMP INDICATOR)

STOP	INTAKE GATE	REFILLING WATER	ANNING-PROGRAM	SYNGH.	AVR	LOAD	BRAKE
59C	59C	59C	59C	59C	59C	59C	59C
CR-1	CR-1	CR-1	CR-1	CR-1	CR-1	CR-1	CR-1

31E1

33NH	26HT	54D	50	51AG	26H	51H1	67H2	NEB
CR-1	CR-1	CR-1	CR-1	CR-1	CR-1	C-1	C-1	CR-1

31E5G1

31P	40T	502	58-1
TR-1	TR-1	TR-1	TR-1

LIST OF CONTROL & SELECTOR SWITCHES

MARK	LETTER OF MARK PLATED	MARK OF HANDLE
①	POWER SUPPLY SWITCH, OFF-ON	5H BL
②	PHASE SELECTOR SWITCH FOR AD VOLTMETER	V5
③	PHASE SELECTOR SWITCH FOR AC AMMETER	AS
④	PHASE SELECTOR SWITCH FOR AG VOLTMETER	V5
⑤	SELECTOR SWITCH FOR TEMPERATURE INDICATION	T1
⑥	CONTROL SW TO-1 FOR 11kV SYNCHRONIZING CIRCUIT BREAKER, OPEN-CLOSE	62-1,52-2
⑦	CONTROL SW TO-1 FOR CIRCUIT BREAKER OPEN-CLOSE	50P,50R,50L,50R,50L,50M,50N
⑧	SELECTOR SWITCH FOR GENERATOR SYNCHRONIZING CONTROL, MAN. OFF-AUTO	43-25
⑨	SELECTOR SWITCH FOR SYNCHRONIZING CONTROL, MAN. OFF-AUTO	43-12A
⑩	SELECTOR SWITCH FOR AVR, OFF-ON	43-90
⑪	CONTROL SW TO-1 FOR AVR, LOWER-RAISE	90R
⑫	CONTROL SW TO-1 FOR MANUAL VOLTAGE REGULATOR	70C
⑬	CONTROL SWITCH FOR FIELD RHIOSTAT FOR FLUOT EXCITER, LOWER-RAISE	70S
⑭	MANUAL EMERGENCY STOP SWITCH	6E
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	T
⑱	CONTROL SW TO-1 FOR DISCONNECTOR, OFF-ON	50H1,50H2,50H1,50H2
⑲	RESET SWITCH FOR LOCKOUT RELAY	55,150,50H1
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	ACB1-4,5
㉔	SELECTOR SWITCH FOR POWER SUPPLY FROM DG	43V
㉕	CONTROL SW TO-1 FOR CIRCUIT BREAKER, OPEN-CLOSE	62

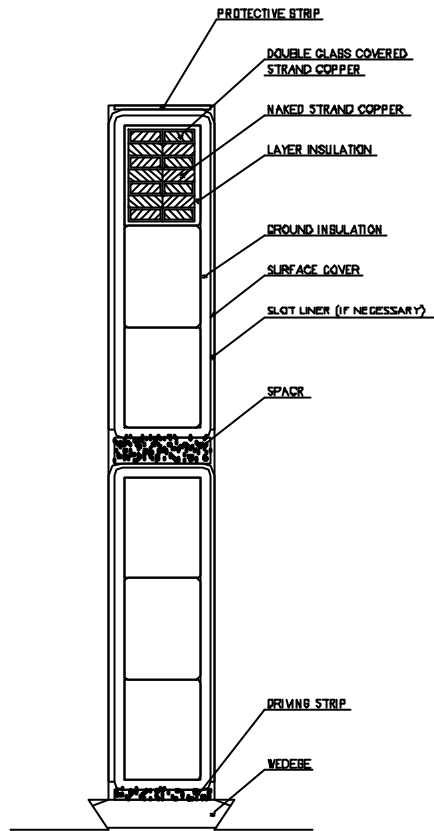
LIST OF NAME PLATES

MARK	LETTER OF NAME PLATED
Ⓐ	HOUSE-SERVICE
Ⓑ	GENERATOR NO.1
Ⓒ	GENERATOR NO.2
Ⓓ	TRANSFORMER ON LINE NO.1
Ⓔ	GENERATOR NO.1
Ⓕ	GENERATOR NO.2
Ⓖ	HOUSE-SERVICE
Ⓗ	11kV BUSBAR
Ⓙ	NEUTRAL GROUNDING TRANSFORMER
Ⓚ	RESERVOIR WATER LEVEL
Ⓛ	TAILRAVE WATER LEVEL
Ⓜ	22kV BUSBAR
Ⓝ	22kV FEEDER NO.1
Ⓟ	22kV FEEDER NO.2
Ⓠ	22/0.38kV HOUSE TRANSFORMER
Ⓡ	22/0.38kV HOUSE TRANSFORMER
Ⓢ	22/0.38kV HOUSE TRANSFORMER

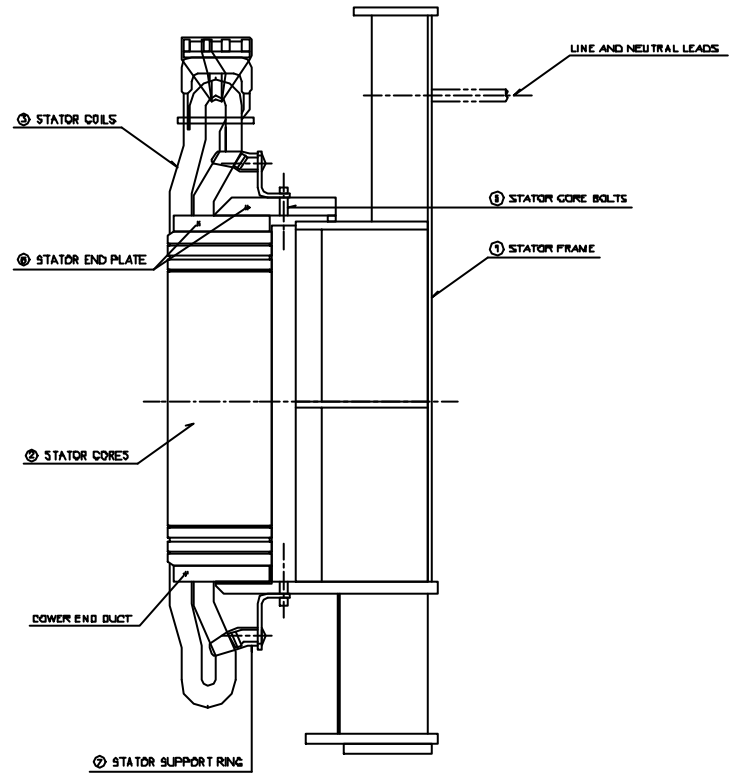
Electricite du Laos  
 The Nam Ngum I Hydropower Station Rehabilitation Project

DWN	K.Yasuyuki	SCALE	TITLE
CHKD	N.Nakato	—	制御盤機器取付詳細図
APPD	N.Nakato	DATE	- 1・2号機, 1号送電線, 所内回路
NIPPON KOEI CO.,LTD. TOKYO, JAPAN		15 <sup>th</sup> March, 2001	DWG NO JCOP106-14





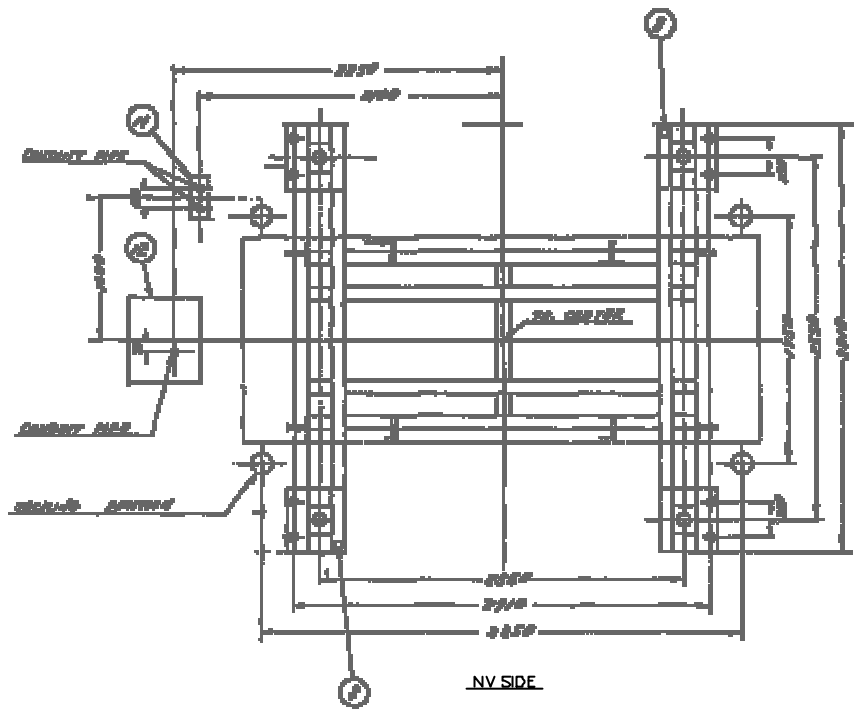
COILS OF AN OUTLINE



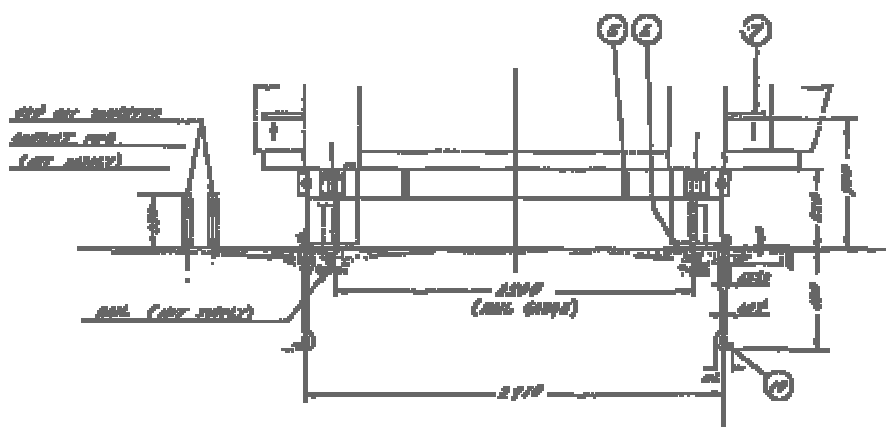
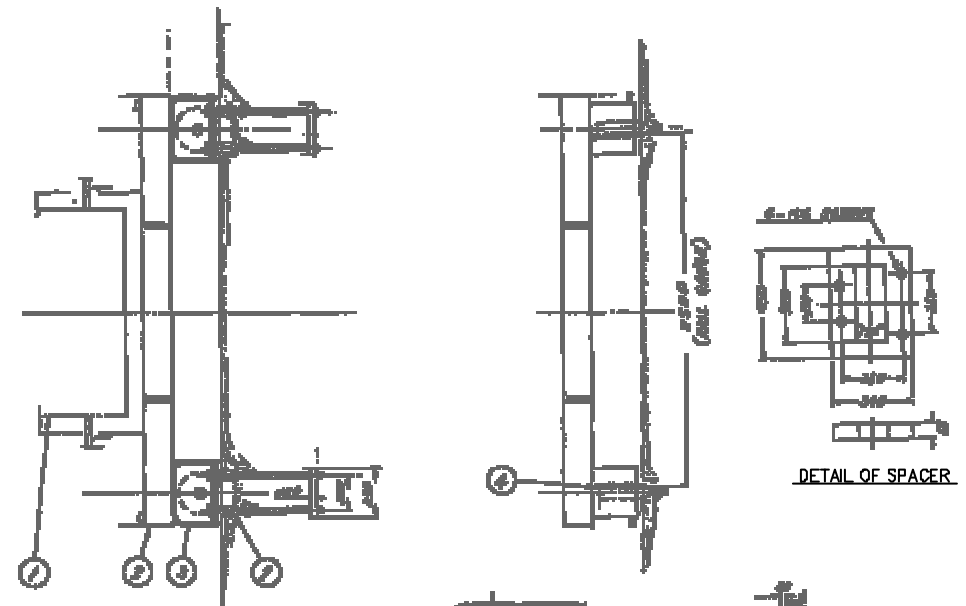
□ SCOPE OF WORK

NO	NAME	REPAIR	REMARK
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
CHKD	N. Nakato	—	発電機補修部品概念図
APPD	N. Nakato	DATE	
NIPPON KOEI CO., LTD. TOKYO, JAPAN		15 <sup>th</sup> March, 2001	DWG NO JCOPI06-15



NV SIDE

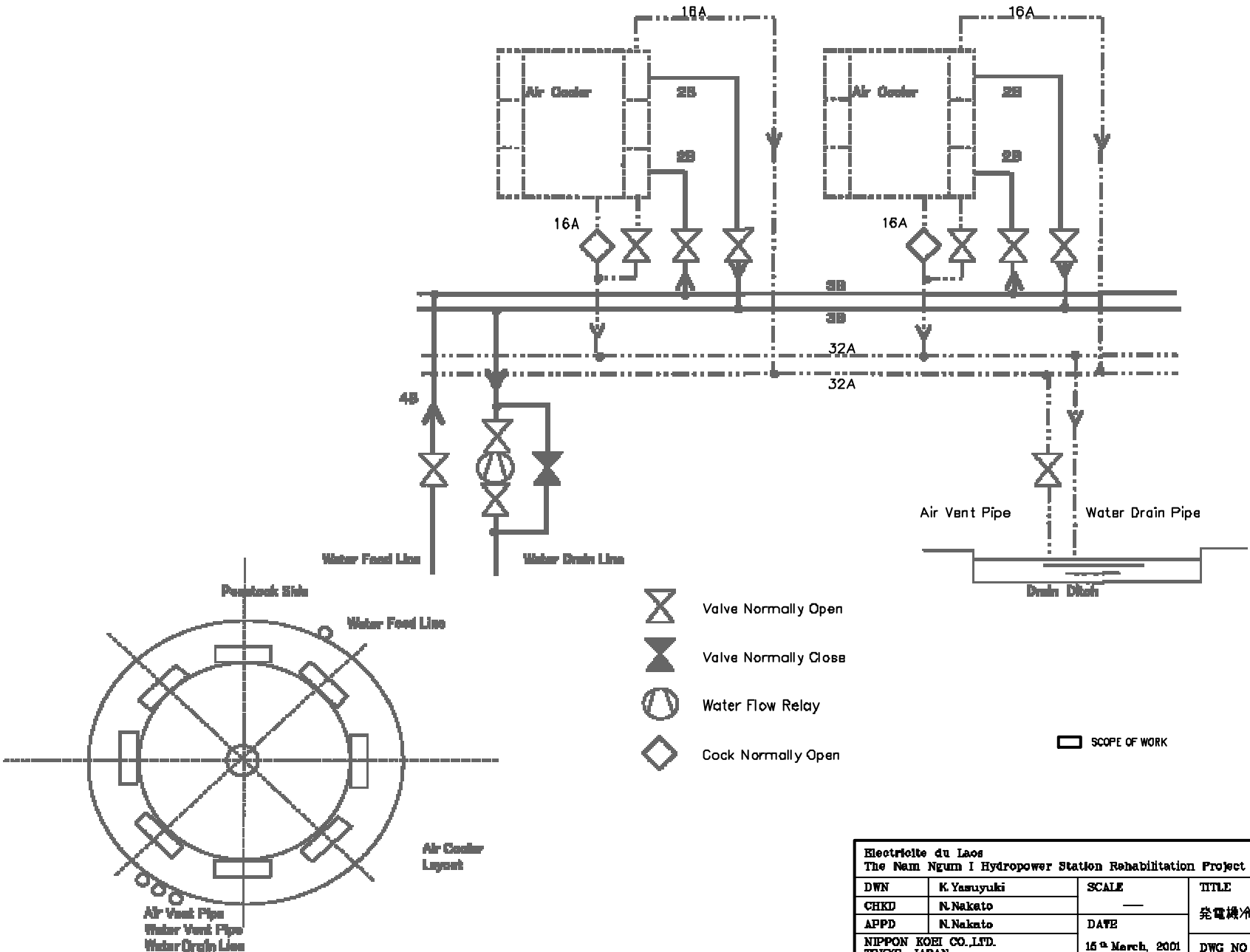


NO	NAME
1	TRANSFORMER TANK
2	BASE
3	WHEELS BASE
4	FLANGED WHEELS
5	PULLING LUG
6	SPACER (4 PIECES)
7	JACKING BOSS
8	EARTHING TERMINAL
9	BLOCK
10	FOUNDATION BOLT
11	TERMINAL BOX
12	CODLING FAN CONTROL CUBICULE

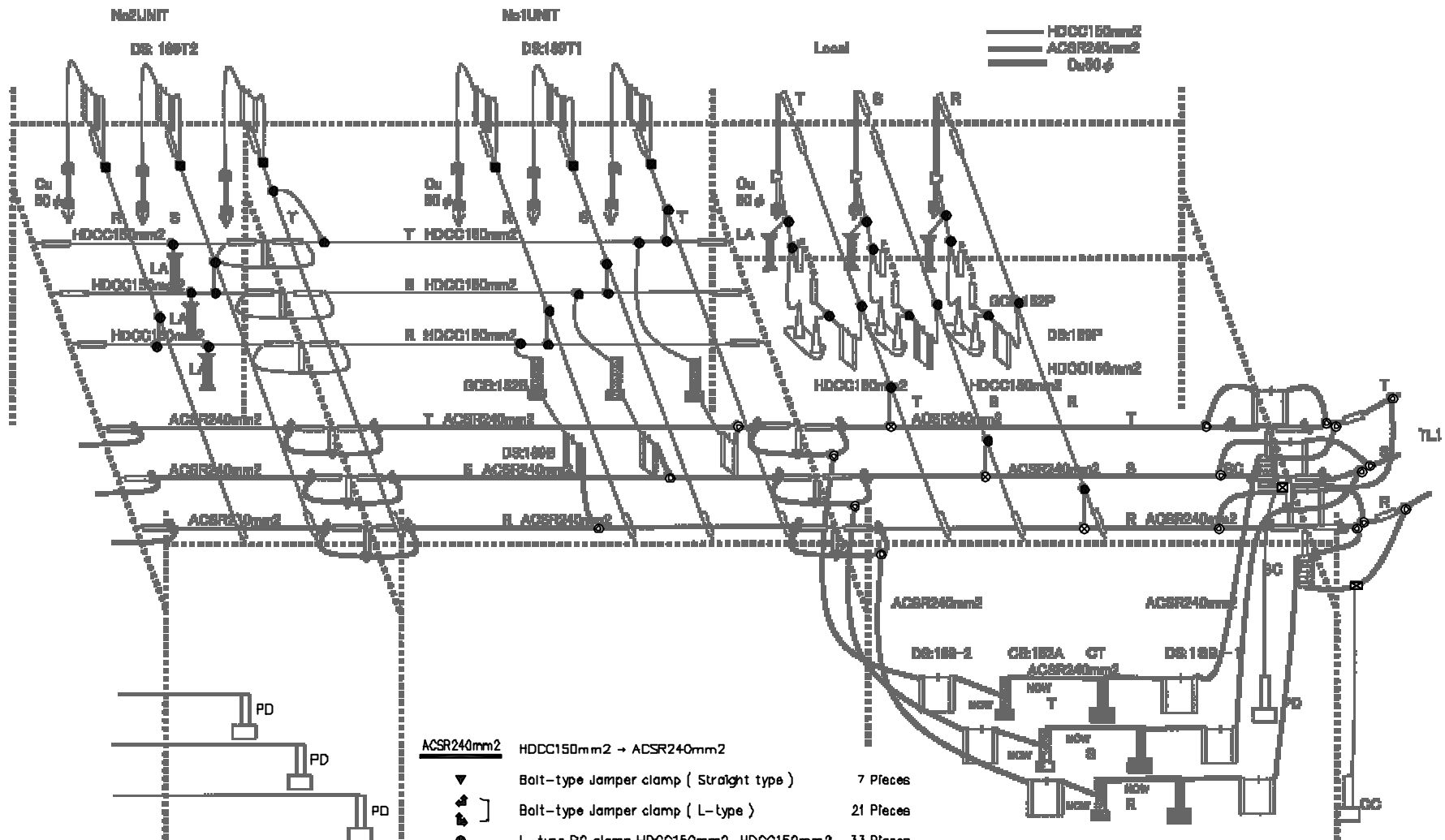
DIMENSIONS ARE ALL mm.

Electricite du Laos The Nam Ngum I Hydropower Station Rehabilitation Project			
DWN	K. Yasuyuki	SCALE	TITLE
CHKD	N. Nakato	—	既設 主要変圧器用基礎詳細図
APPD	N. Nakato	DATE	
NIPPON KOEI CO., LTD. TOKYO, JAPAN		15 <sup>th</sup> March, 2001	DWG NO JCOPI06-16

Air Cooler K 8



Electricite du Laos			
The Nam Ngum I Hydropower Station Rehabilitation Project			
DWN	K.Yasuyuki	SCALE	TITLE
CHKD	N.Nakato	—	発電機冷却配管ダイアグラム
APPD	N.Nakato	DATE	
NIPPON KOEI CO.,LTD. TOKYO, JAPAN		15 <sup>th</sup> March, 2001	DWG NO JCOPI06-17



— HDCC150mm<sup>2</sup>  
 — ACSR240mm<sup>2</sup>  
 — Cu50φ

- ACSR240mm<sup>2</sup>** HDCC150mm<sup>2</sup> → ACSR240mm<sup>2</sup>
- ▼ Bolt-type Jumper clamp ( Straight type ) 7 Pieces
  - ▲ Bolt-type Jumper clamp ( L-type ) 21 Pieces
  - L-type PG clamp HDCC150mm<sup>2</sup>—HDCC150mm<sup>2</sup> 33 Pieces
  - ⊙ L-type PG clamp ACSR240mm<sup>2</sup>—ACSR240mm<sup>2</sup> 17 Pieces
  - ⊗ L-type PG clamp ACSR240mm<sup>2</sup>—HDCC150mm<sup>2</sup> 3 Pieces
  - T-type PG clamp HDCC150mm<sup>2</sup>—HDCC150mm<sup>2</sup> 6 Pieces
  - ⊠ T-type PG clamp ACSR240mm<sup>2</sup>—HDCC150mm<sup>2</sup> 2 Pieces
  - Straight type clamp Cu50φ—HDCC150mm<sup>2</sup> 15 Pieces
  - ▷ T-type clamp Cu50φ—HDCC150mm<sup>2</sup> 3 Pieces

Electricite du Laos			
The Nam Ngum I Hydropower Station Rehabilitation Project			
DWN	K.Yasuyuki	SCALE	TITLE
CHKD	N.Nakato	—	115kV 母線電線及び分岐金物配置図
APPD	N.Nakato	DATE	
NIPPON KOEI CO.,LTD. TOKYO, JAPAN		15 <sup>th</sup> March, 2001	DWG NO JCOPI06-18

REVISED