भारत हेवी इलेक्ट्रिकल्स लिमिटेड
(भारत सरकार का उपक्रम)
BHARAT HEAVY ELECTRICALS LIMITED
(A Govt. of India Undertaking)

TCN - 01

Ref: PSER:SCT:KDM-M991:TCN-01 Date: 03-04-2009

Sub	Tender change notice (TCN) 01.	
Job	Erection, testing, commissioning etc of CW piping, ACW piping & DM water piping systems and various balance piping systems (instrument air, service air, drinking water, service water etc) of unit # 1 & 2 for 2x500 MW units at Koderma Thermal Power Station, Jharkhand.	
Ref	1.0	Tender no PSER:SCT:KDM-M991:09.
	2.0	BHEL's NIT, vide reference no PSER:SCT:KDM-M991:1700, dated 16-03-09.
	3.0	All other pertinent issues till date.

With reference to above, following points, relevant to tender, may please be noted and complied with while submitting offer.

1.0 Due date of submission of offer is extended from 06-04-09 to 15-04-2009 (15-00 hrs).
2.0 Amendment/ clarification to tender as per attached Annexure-A.
3.0 Drawings pertaining to (i) Cooling water piping layout, R-2; (ii) P&ID of ECW system; (iii) P&ID of CW/ ACW system and (iv) P&ID of PW & SW system for tender purpose only.
4.0 Revised `No deviation certificate' as per attached Annexure-2.
5.0 All other terms & conditions shall remain unchanged.

Thanking you,

Yours faithfully,
for BHARAT HEAVY ELECTRICALS LTD

DGM (SCT)

Encl
As above.

पावर सेक्टर पूर्वी क्षेत्र (मुख्यालय)
POWER SECTOR EASTERN REGION, DJ-9/1, SALT LAKE CITY, KOLKATA - 700 091
फैक्स/Fax : (033) 23211960 फोन/Phone : बोर्ड/EPABX : 23211691/ 23211798/ 23211796

SL NO	AMENDMENT/ CLARIFICATIONS	
1.0	**Volume-ID**	
	QUERY	**CLARIFICATION**
	Man-hour rates as provided for modification items are not tenable. As such, request to change the same.	Shall be as per tender provision.
2.0	**Volume-II**	
	QUERY	**CLARIFICATION**
2.1	Please furnish the detail of tentative bill of material against the individual piping system showing the sizes & tentative length thickness/ quantity involvement of various pipe line separately to ascertain the involvement of work.	Bidder may refer enclosed tender drawings of layout of CW/ ACW piping and P&IDs of ACW/ CW piping, ECW piping system for guidance purpose only.
2.2	Please confirm whether fabricated spools will be supplied or rolled straight lenghts of pipe and fabricated fittings will be supplied separately for all pipes including CW piping shall be supplied by BHEL in fabricated condition.	Straight lengths of pipe and fabricated fittings will be supplied separately.
2.3	Please specify tentative man-days to be considered for commissioning/ post commissioning assistance and valve servicing till trial run & handing over of the unit to customer.	Shall be as per tender provision.
2.4	Please confirm whether water, air, steam, including DM, if required for cleaning, hydrotest, pneumatic testing/ flushing/ blowing, etc will be provided by BHEL.	Water, air, steam, including DM if required for cleaning, hydro test, pneumatic testing/ flushing/ blowing, etc as applicable will be provided by BHEL.
2.5	All piping materials, pipe-fittings, flanges, etc for laying of temporary pipeline, for the testing/ flushing/ blowing of CW & LP piping system along with all valves, fasteners, gasket etc as may be required will be provided by BHEL	Shall be as per tender provision.
2.6	<u>CW/ ACW PIPING</u> Under-ground piping shall generally come without any external painting. BOQ-cum price schedule for supply & application of wrapping & coating of the under-ground piping shall be as per applicable item of Volume-IIIA. All pipes will be issued to contractor in fabricated condition in tentatively 6 mtr to 12 mtr length and pipe will be issued by BHEL with internal painting with primer and coal tar epoxy paint leaving a gap of approx 200 mm length at each end to provide for field welding. Internal coating of this gap section at site is in the scope of the contractor, Supply & application of Epoxy Resin based Red Oxide Primer followed by finish coats of Coal Tar Epoxy paint from BHEL approved vendor, is in the scope of the contractor.	
2.7	<u>CLEANING OF PIPES</u> For all sizes pipes, internal cleaning is to be done at site either manually or by air blowing, water flushing as per guidelines of BHEL engineer, as applicable.	
2.8	<u>EXTRNAL PAINTING OF ABOVE GROUND PIPES</u> All touch up & final painting is under the scope of contractor including surface preparation, supply of Red Oxide Primer and synthetic enamel paints from BHEL approved vendors.	
2.9	It is further clarified that no sandblasting is included.	
3.0	**Volume-IIIA**	
	QUERY	**CLARIFICATION**

3.1	Please confirm that against sl no 6.0, whether hangers & spring supports shall be supplied as a free issue by BHEL or it will be fabricated at site.	All materials shall be issued by BHEL free of cost to the contractor in fabricated condition. However, only structural members like Angle, Channels etc. may be supplied by BHEL as straight length and shall have to be cut by contractor as per execution drawing at site.
4.0	**General**	
4.1	Bidder shall submit offer strictly in compliance with technical specification and tender terms along with amendment/ clarifications issued subsequently till date.	
4.2	All other terms & conditions shall remain unchanged.	

ELECTRONIC FILE NAME :

REV	DATE	ALTD	CHD	APPD
03	25.03.2009	KKB	KKB	RM
02	03/11/08	KKB	RM	RM
01	04/10/08	KKB	RM	RM

Rev 03:
1) COOLING TOWERS' TERMINAL POINTS CHANGED.
REVISION MARKED AS △3

Rev 02:
1) ACW RETURN INTERCONNECTION LINE ADDED.
2) ACW DISCHARGE HDR. SIZE CHANGED TO 1000MM.
3) CW SIDE STREAM AND BLOWDOWN LINE ADDED
4) CHLORINATION LINE ADDED
REVISION MARKED AS △2

Rev 01:
CW PIPING ROUTING MODIFIED NEAR PUMP HOUSE. CW AND ACW PIPING EL. CHANGED. TERNINAL POINTS NEAR CT REVISED. ACW ROUTING NEAR SCS MODIFIED.
REVISION MARKED AS △1

JOB NO. : 280
STATUS : CONTRACT
DISTRIBUTION :
TO
No.OF

CUSTOMER
DAMODAR VALLEY CORPORATION
KOLKATA

PROJECT
KODERMA THERMAL POWR STATION
2x500 MW STAGE-I (UNIT 1 & 2)

BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NOIDA

DEPT CODE		NAME	SIGN	DATE
M	DRN	KKB		19.07.08
	DESN	KKB		19.07.08
	CHD	Richard		19.07.08
	APPD	Richard		19.07.08

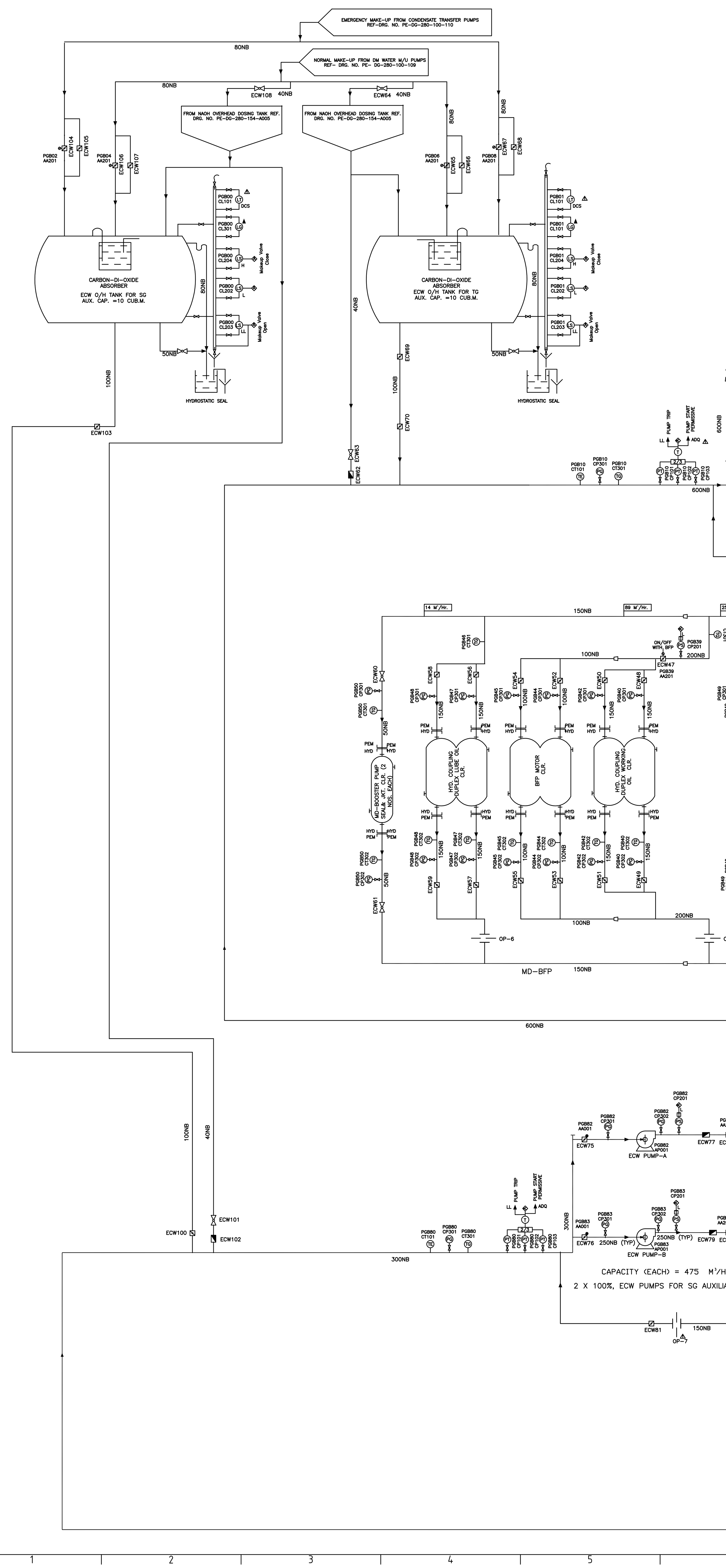
TITLE
COOLING WATER PIPING LAYOUT

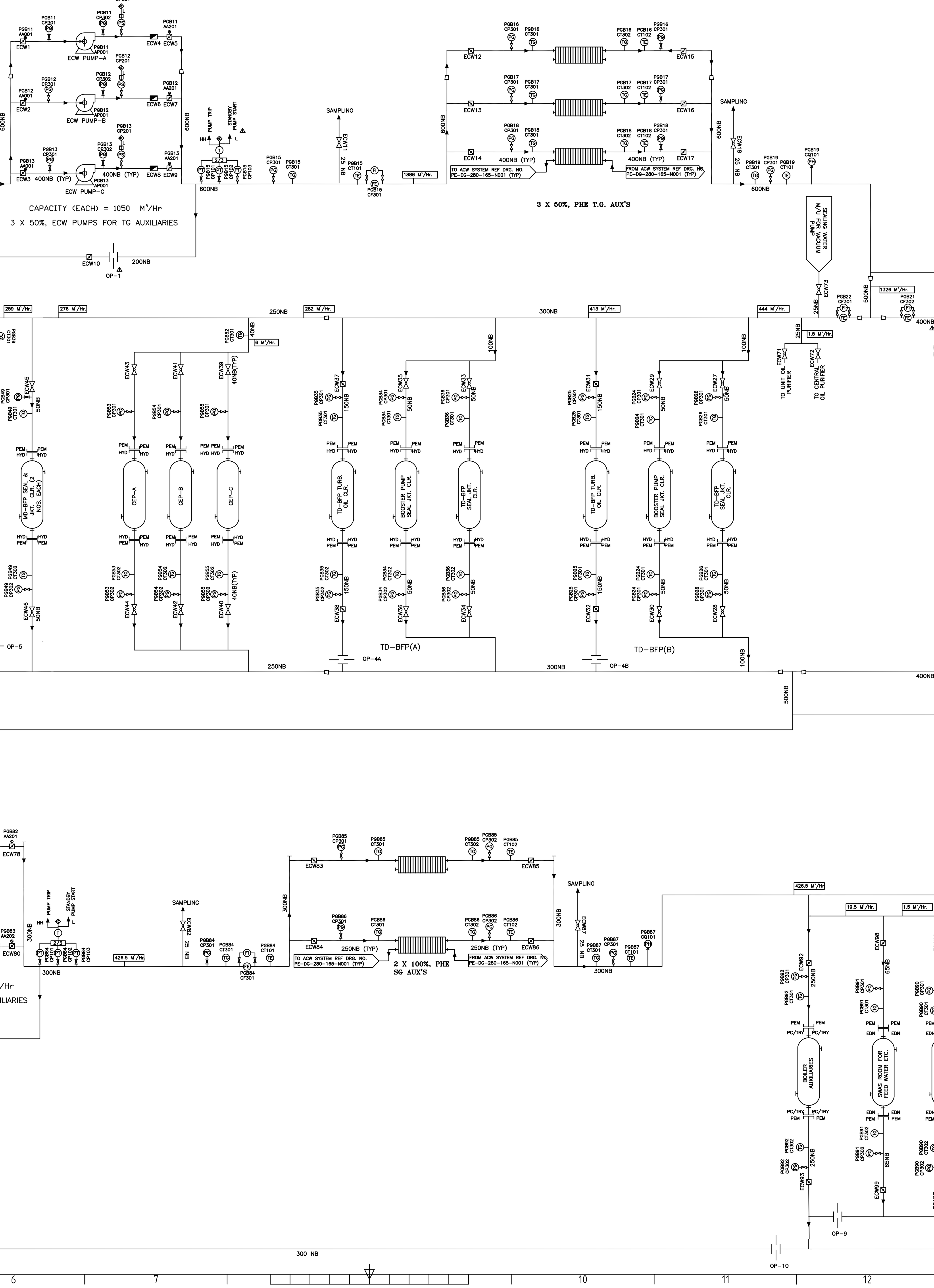
MAX	ELEC.	MSE	CIVIL	C&I	–	DEPT.
						SIGN
						DATE

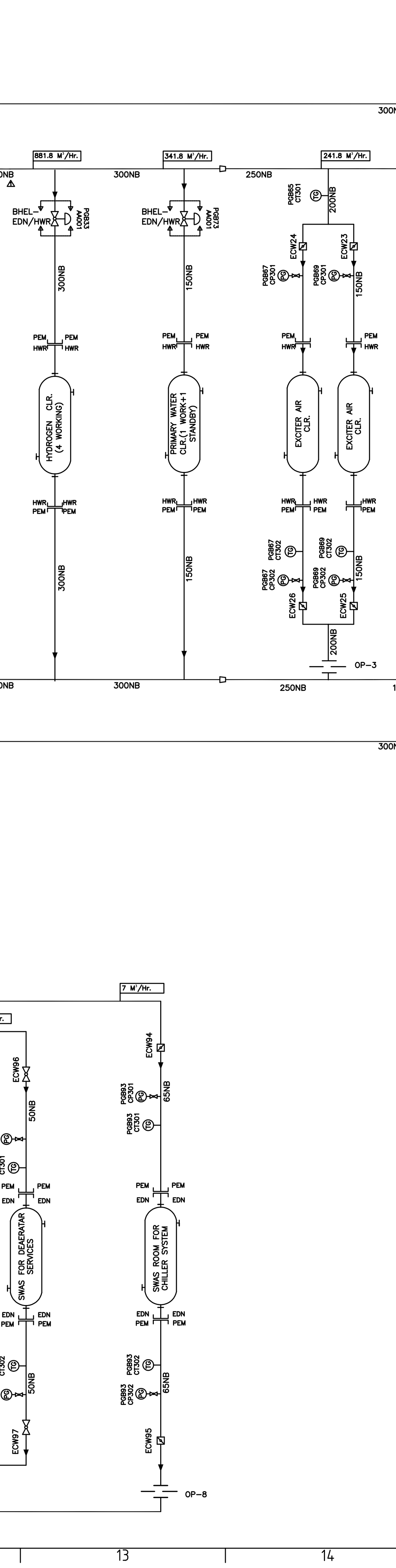
SCALE

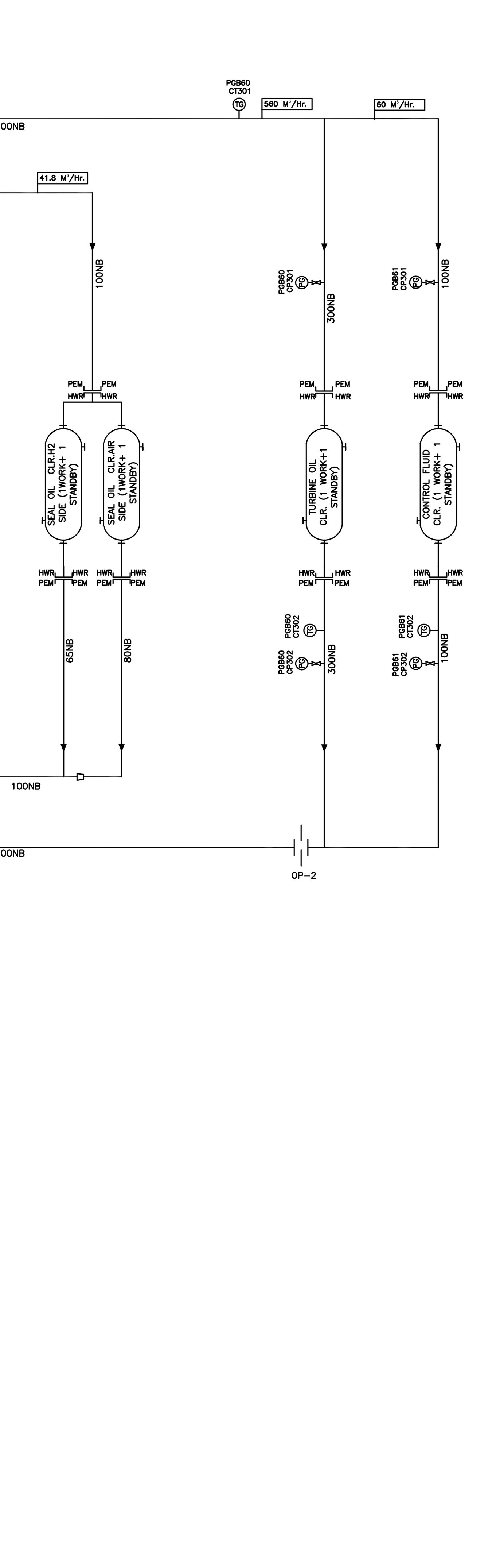
DRAWING NO.
PE-DG-280-165-M002
SHEET 01 OF 01 REV. 3

FORMAT SIZE A0









NOTES:

1.0 SCHEME SHOWN IS FOR UNIT #1, IT SHALL BE SIMILAR FOR UNITS # 2.

2.0 DESIGN PRESSURE : 10.0 Kg/sq.cm (g) FOR ECW SYSTEM FOR TG AUX.
DESIGN PRESSURE : 12.0 Kg/sq.cm (g) FOR ECW SYSTEM FOR SG AUX.
DESIGN INLET TEMPERATURE TO VARIOUS COOLERS = 38 °C
DESIGN MECHANICAL TEMPERATURE = 60 °C
QUALITY OF WATER : PASSIVATED DM WATER WITH pH MAINTAINED BETWEEN 8.5 TO 9.5 BY NaOH DOSING.

3.0 MATERIALS OF CONSTRUCTION :
3.1 EQUIPMENT COOLING WATER NETWORK:
A) PIPING UPTO & INCLUDING 150NB SHALL BE CARBON STEEL ERW AS PER IS:1239 (HEAVY GRADE)
B) PIPING 200 NB AND ABOVE SHALL BE CARBON STEEL AS PER IS:2062 GR.-B ROLLED AND WELDED CONFORMING TO IS:3589.
3.2 ECW O/H TANK FILLING LINE, FROM ECW O/H TANK TO PUMPS SUCTION HEADER LINE & NaOH DOSING PIPEWORK SHALL BE STAINLESS STEEL AS PER ASTM A312 Gr.304.THICKNESS FOR PIPES <= 50 NB SHALL BE AS PER SCHEME 40S & FOR PIPES >50 NB SHALL BE AS PER SCHEME 10S OF ASTM A312/ 312M

4.0 ALL PRESSURE TAPPINGS & ROOT VALVES TO BE OF 15 NB.

5.0 50 NB DRAINS & VENTS SHALL BE PROVIDED FOR PIPE SIZES 400NB & ABOVE AND 25 NB DRAINS & VENTS SHALL BE PROVIDED FOR PIPE SIZES UPTO 350NB AS PER LAYOUT REQUIREMENTS.

6.0 INSTRUMENTS MARKED (▲) THIS SHALL BE SUPPLIED ALONG WITH EQUIPMENTS.

7.0 PAINTING/ PROTECTION -PIPES:
EXTERNAL SURFACE -OVERGROUND PIPING
A) SURFACE CLEANING BY WIRE BRUSH.
B) APPLICATION OF ONE COAT OF RED LEAD PRIMER FOLLOWED BY ADEQUATE NO. OF FINISH COATS OF SYNYHETIC ENAMLE PAINT TO ACHIEVE TOTAL DFT OF 125 TO 150 MICRONS.

7.0 ECW SYSTEM DESIGN PHILOSOPHY AND SYSTEM WRITEUP - DOC NO. PE-DC-280-179-N002.

PIPE SIZES OF SS PIPING

NB	OD	THICK.
25	33.4	3.38
40	48.3	3.68
50	60.3	3.91
80	88.9	3.05
100	114.3	3.05

PIPE SIZES OF CS PIPING

NB	OD	THICK.	NB	OD	THICK.
15	21.8	3.2	200	219.1	6.0
25	34.2	4.0	250	273.0	6.0
40	48.8	4.0	300	323.9	6.0
50	60.8	4.5	350	355.6	6.0
65	76.6	4.5	400	406.4	6.0
80	89.5	4.8	450	457.0	6.0
100	115.0	5.4	500	508.0	6.0
150	166.5	5.4	600	610.0	6.0

LEGEND

- HORIZONTAL PUMP
- MOTOR OPERATED BUTTERFLY VALVE
- MANUAL BUTTERFLY VALVE
- NON RETURN VALVE
- GLOBE VALVE
- (PG) PRESSURE GAUGE
- (PS) PRESSURE SWITCH
- (PT) PRESSURE TRANSMITTER
- (LG) LEVEL GAUGE
- (LT) LEVEL TRANSMITTER
- (FI)/(FE) BY PASS ROTAMETER
- (TE) TEMPERATURE ELEMENT
- (TG) TEMPERATURE GAUGE
- (pHT) pH TRANSMITTER
- ORIFICE PLATE

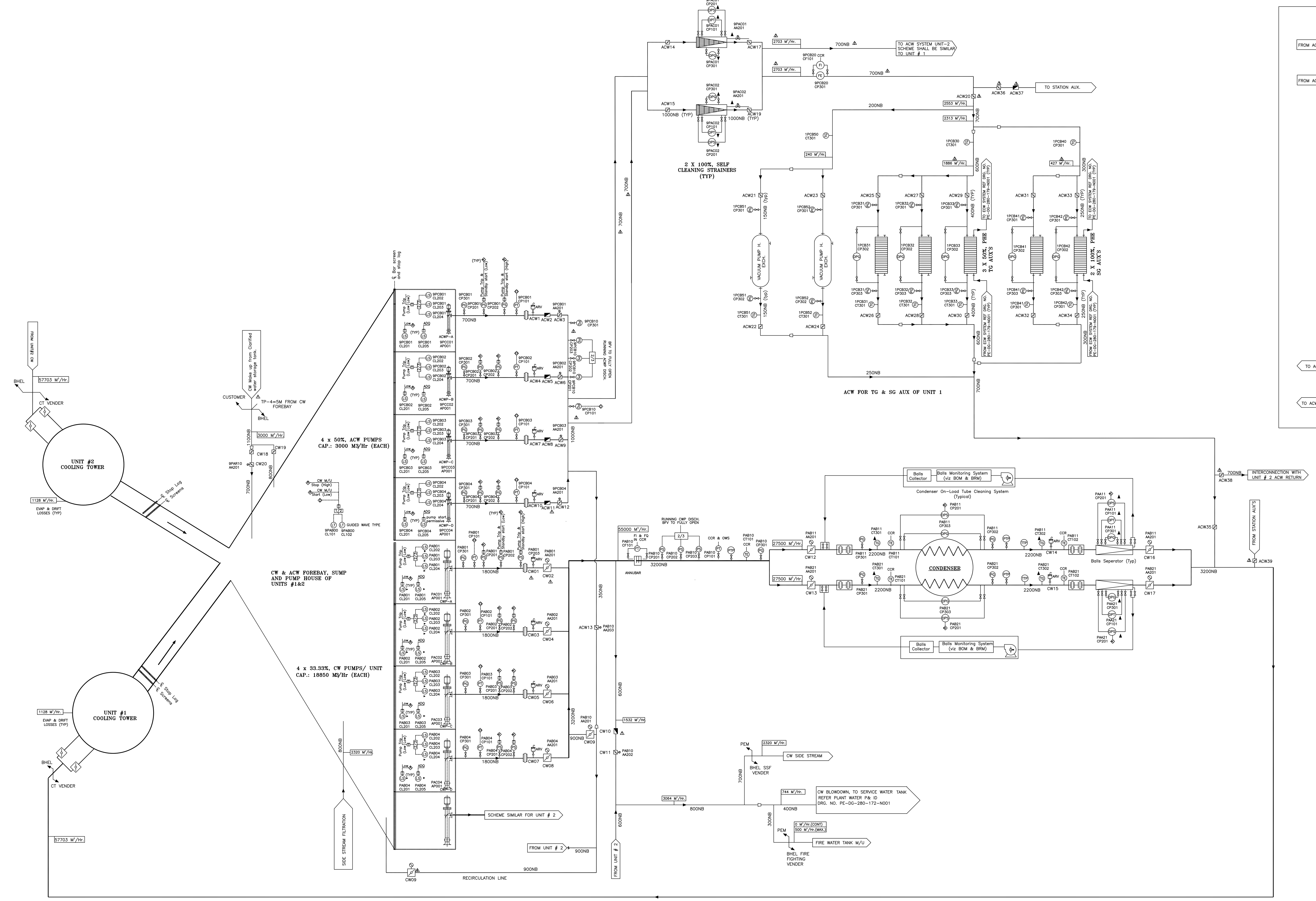
COOLING WATER REQUIREMENT

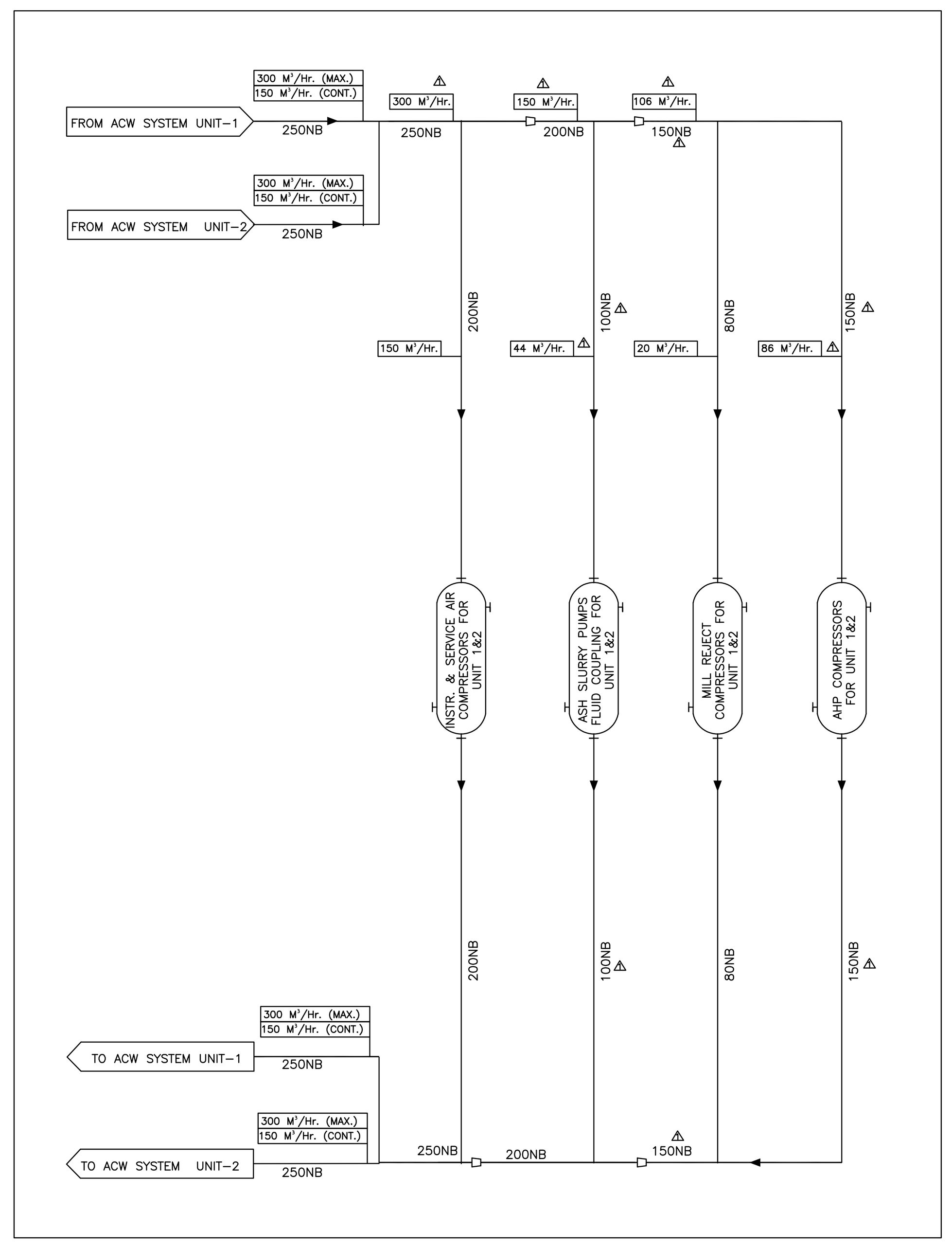
SL. NO.	EQUIPMENT	NOS. (WORKING +STANDBY)	FLOW RATE PER EQUIP. (M^3/HR)	FLOW RATE PER UNIT. (M^3/HR)	PRESSURE DROP WITHIN UNIT TERM. (MWC)	TEMP. RISE(°C)	REMARKS
1.	BOILER FEED PUMPS	2W + 1S					
1A).	MOTOR DRIVEN BFP	1W + 0S					
	a) BOOSTER PUMP JACKET	2 PER BFP	1.0	2.0	0.5	3.0	ECW SUPPLIED TO STANDBY ALSO
	b) BOOSTER PUMP MECH. SEAL CLR	2 PER BFP	6.0	12.0	2.0	4.0	
	c) MOTOR COOLER	1 PER BFP	50.0	50.0	5.0	5.0	–
	d) HYD. COUPLING WORKING OIL CLR.	1 PER BFP	120.0	120.0	5.0	5.0	–
	e) HYD. COUPLING LUBE OIL CLR.	1 PER BFP	75.0	75.0	4.0	4.0	–
	f) BFP MECH. SEAL CLR.	2 PER BFP	6.0	12.0	2.0	4.0	ECW SUPPLIED TO STANDBY ALSO
	g) BFP JACKET	2 PER BFP	2.5	5.0	2.0	3.0	
	TOTAL FOR BFP's =			276.0			
1B).	TURBINE DRIVEN BFP	1W + 1S					
	a) BOOSTER PUMP JACKET	2 PER BFP	1.0	4.0	0.5	3.0	ECW SUPPLIED TO STANDBY ALSO
	b) BOOSTER PUMP MECH. SEAL CLR	2 PER BFP	6.0	24.0	2.0	4.0	
	c) BFP TURBINE OIL CLR.	1 PER BFP	100.0	200.0	6.2	3.0	*WHEN BOTH TDBFP'S IN OPERATION
	d) BFP MECH. SEAL CLR.	2 PER BFP	6.0	24.0	2.0	4.0	ECW SUPPLIED TO STANDBY ALSO
	e) BFP JACKET	2 PER BFP	2.5	10.0	2.0	3.0	
	TOTAL FOR BFP's =			262.0			
	TOTAL MAX. REQUIREMENT (WHEN 1 MD-BFP + 1 TD-BFP ARE IN SERVICE)			438.0			
2.	CEP THRUST BEARING	2+1	2.0	6.0	2.0	4.0	
3.	STEAM TURBINE & GENERATOR AUX.						
	a) TURBINE OIL COOLER	1+1	500	500	3.5	3.3	
	b) CONTROL FLUID COOLER	1+1	60.0	60.0	2.4	2.1	
	c) HYDROGEN COOLERS	4+0	135	540	6.5 ▲	8.0	
	d) EXCITER AIR COOLER	2+0	100	200	3.0	2.2	
	e) PRIMARY WATER COOLERS	1+1	100	100	11.7	16.0	
	f) SEAL OIL COOLERS(HYD. SIDE)	1+1	17.4	17.4	3.8	5	
	g) SEAL OIL COOLERS(AIR SIDE)	1+1	24.4	24.4	5.3	5	
4.	SWAS FOR CHILLER SYSTEM	–	–	7.0	10	10	
5.	SWAS RACK FOR D/A SERVICES	–	–	1.5	10	10	
6.	SWAS RACK FOR FEEDWATER	–	–	18.0	10	10	
7.	BOILER AUX.	–	–	400 ▲	28	5	
8.	SEALING WATER M/U FOR VACUUM PUMP	–	–	NEGLIGIBLE	10	10	
9.	LUBE OIL PURIFIER (UNIT)	–	–	0.75	–	–	
10.	LUBE OIL PURIFIER (UNIT)	–	–	0.75	–	–	

CUSTOMER	DAMODAR VALLEY CORPORATION, KOLKATA
JOB NO. 280	KODERMA THERMAL POWER PLANT (2X500 MW)
STATUS / DISTRIBUTION / TO / NO.	BHARAT HEAVY ELECTRICALS LTD. POWER SECTOR PROJECTS ENGINEERING MANAGEMENT NEW DELHI
REV 01, DATE 14.05.08, ALTD ND, CHD M.S., APPD VKY — REVISED AS PER CUSTOMER COMMENT DTD 04.02.08	TITLE: P&ID OF ECW SYSTEM

DEPT CODE	NAME	SIGN	DATE
PRPD	MS	sd/-	17.12.07
CHD	VKY	sd/-	17.12.07
APPD	VKY	sd/-	17.12.07

DRAWING NO. PE-DG-280-179-N001 SHEET 01 OF 01 REV. 01





ACW SYSTEM FOR COMMON STATION AUX'S

LEGEND

- MOTOR OPERATED BUTTERFLY VALVE
- MANUAL BUTTERFLY VALVE
- NON RETURN VALVE
- GLOBE VALVE
- AIR RELEASE VALVE
- (PG) PRESSURE GAUGE
- (PS) PRESSURE SWITCH
- (PT) PRESSURE TRANSMITTER
- (DPG) DIFFERENTIAL PRESS. GAUGE
- (DPS) DIFFERENTIAL PRESS. SWITCH
- (DPT) DIFFERENTIAL PRESS. TRANSMITTER
- (LT) LEVEL TRANSMITTER
- (FI)(FE) BYPASS/ ONLINE ROTAMETER
- (TE) TEMPERATURE ELEMENT
- (TG) TEMPERATURE GAUGE
- DCS
- ALARM
- ORIFICE PLATE
- R.E. JOINT (STD.)
- R.E. JOINT (PRESS BAL. TYPE)
- VERTICAL PUMP
- (VMS) VIBRATION MONITORING SYSTEM

	INSTRUMENT DESCRIPTION	NOS/ EQUIPMENT	KKS NO/ PUMP			
			ACW PUMP A	ACW PUMP B	ACW PUMP C	ACW PUMP D
	MOTOR					
	(TE) NDE BEARING	1 NO.	PCC01CT101	PCC02CT101	PCC03CT101	PCC04CT101
	(TE) DE BEARING	1 NO.	PCC01CT102	PCC02CT102	PCC03CT102	PCC04CT102
	(TG) NDE	1 NO.	PCC01CT301	PCC02CT301	PCC03CT301	PCC04CT301
	(TG) DE	1 NO.	PCC01CT302	PCC02CT302	PCC03CT302	PCC04CT302
	(TE) WINDING	6 NOS.	PCC01CT103–108	PCC02CT103–108	PCC03CT103–108	PCC04CT103–108
	(VMS) DE & NDE	4 NOS.	PCC01CY101–104	PCC02CY101–104	PCC03CY101–104	PCC04CY101–104
	PUMP					
	(VMS) THRUST BEARING	2 NOS.	PCC01CY105–106	PCC02CY105–106	PCC03CY105–106	PCC04CY105–106

TYPICAL INSTRUMENTATION FOR ACW PUMPS
THESE INSTRUMENTS SHALL BE SUPPLIED BY PUMP/MOTOR SUPPLIER
TE AND VMS SIGNALS SHALL BE TAKEN TO DCS FOR MONITORING.

PIPE SIZES OF CS MATL.

NB	OD	THICK.	NB	OD	THICK.	NB	OD	THICK.
15	21.8	3.2	300	323.9	6.0	1100	1118	10.0
25	34.2	4.0	350	355.6	6.0	1800	1829	14.2
40	48.8	4.0	400	406.4	6.0	2200	2235	18.0
50	60.8	4.5	450	457.0	6.0	3200	3240	20.0
65	76.6	4.5	500	508.0	6.0			
80	89.5	4.8	600	610.0	6.0			
100	115.0	5.4	700	711.0	10.0			
150	166.5	5.4	800	813.0	8.0			
200	219.1	6.0	900	914.0	8.0			
250	273.0	6.0	1000	1016	12.0			

S.NO.	EQUIPMENT	NOS. WORK. + STANDBY	CW REQD. PER COOLER CUB.M/Hr.	CW REQD. PER UNIT CUB.M/Hr	PRESS. DROP MWC	TEMP. RISE °C	REMARKS
1	CONDENSER	1 + 0	55000	55000	4.5	10.0	
2	VACUUM PUMPS OF ONE UNIT	1 + 1	120	120 *240	3.5	2.0	*DURING START UP BOTH PUMPS WORK.
3	PHE'S (TG AUX) OF ONE UNIT	2 + 1	943	1886	5.0	5.3	
3	PHE'S (SG AUX) OF ONE UNIT	1 + 1	427	427	5.0	5.3	

NOTES:

1. DESIGN PRESSURE : 5.0 Kg/sq.cm (g) FOR C.W.SYSTEM,
   DESIGN PRESSURE : 7.5 Kg/sq.cm (g) FOR A.C.W.SYSTEM,
   DESIGN CW INLET TEMP. TO CONDENSER & TO VACUUM PUMP H.E. = 33 °C
   DESIGN CW INLET TEMP. TO PHE'S = 36 °C
   DESIGN MECHANICAL TEMPERATURE : 50 °C
2. MATERIALS OF CONSTRUCTION :
   A). PIPING UPTO & INCLUDING 150Nb SHALL BE CARBON STEEL ERW, IS:1239 (HEAVY GRADE)
   B). PIPING 200 Nb AND ABOVE SHALL BE CARBON STEEL (IS:2062), ROLLED AND WELDED CONFORMING TO IS:3589.
   C). MATERIALS OF CONSTRUCTION FOR BUTTERFLY VALVES AND GATE/ GLOBE/ CHECK VALVES/ ARV's SHALL BE AS PER CW/ ACW DESIGN PHILOSOPHY (REFER DOC. NO. PE-DC-280-165-N002).
3. ALL PRESSURE TAPPINGS & ROOT VALVES TO BE OF 15 Nb.
4. CW SYSTEM : 150 NB SIZE DRAIN & VENT VALVES SHALL BE PROVIDED AS REQD. AS PER LAYOUT. 600 NB MANHOLE WITH 150 NB VENT VALVE SHALL ALSO BE PROVIDED @ 125M – 150M INTERVAL.
   ACW SYSTEM : 50 NB SIZE DRAIN & VENT VALVES SHALL BE PROVIDED FOR PIPE SIZES 400 NB & ABOVE. 25 NB DRAIN & VENT VALVES SHALL BE PROVIDED FOR PIPE SIZES UPTO 350 NB AS PER LAYOUT REQUIREMENTS.
5. INSTRUMENTS MARKED ▲ THUS SHALL BE SUPPLIED ALONGWITH THE EQUIPMENTS.
6. R.E.JOINT AT CONDENSER INLET & OUTLET SHALL BE PRESSURE BALANCING TYPE.
7. ADDITIONAL AIR RELEASE VALVES (150 Nb) SHALL BE PROVIDED. THE TOTAL NOS OF VALVES SHALL NOT BE LESS THAN 30. ⚠
8. PAINTING/PROTECTION – PIPES:
   8.1 INTERNAL SURFACE (FOR PIPE DIA ABOVE 1000 mm)
   A). SURFACE CLEANING BY WIRE BRUSH.
   B). APPLICATION OF ONE COAT OF RED LEAD PRIMER FOLLOWED BY ADEQUATE NO. OF FINISH COATS OF SYNTHETIC ENAMAL PAINT TO ACHIEVE TOTAL DFT OF 125 TO 150 MICRONS.
   8.2 EXTERNAL SURFACE – OVERGROUND PIPING
   A) SURFACE CLEANING BY WIRE BRUSH.
   B). APPLICATION OF ONE COAT OF RED LEAD PRIMER FOLLOWED BY ADEQUATE NO. OF FINISH COATS OF SYNTHETIC ENAMEL PAINT TO ACHIEVE TOTAL DFT OF 125 TO 150 MICRONS.
   8.3 CW, ACW & CW M/U PIPE BURIED PORTION COMING UNDER RAIL OR ROAD SHALL BE CONCRETE ENCASED.
   8.4 CW ACW & CW M/U BURRIED PIPING SHALL BE PROTECTED AS UNDER.
   8.4.1 CW PIPEWORK (3200NB AND 2200NB) IN THE TRANSFORMER YARD AREA OF LENGTH AS PER LAYOUT. SHALL BE CONCREATE ENCASED.
   8.4.2 CW PIPEWORK OTHER THAN ABOVE, ACW & CW M/U.
   – SURFACE CLEANING BY WIRE BRUSH
   – APPLY ONE COAT OF COALTAR/ PRIMER/ ENAMEL CONFORMING TO AWWA C-203/ IS 15337.
   – APPLY ONE/ TWO LAYER OF TAPE COMPRISING OF COALTAR. APPLICATION OF TAPE SHALL CONFORM TO AWWA C-203/ IS 10221 (APPENDIX-B) WITH THICKNESS OF TAPE AS 4.0 MM.(MIN.)
9. THE PULLING FORCE REQUIRED TO OPERATE THE MANUAL VALVES UNDER FLOW & OPERATING PRESSURE SHALL NOT EXCEED 25 KFG. AND GEAR OPERATOR ARRANGENT SHALL BE PROVIDED FOR VALVES OF SIZE 350 NB AND ABOVE
10. REFERENCE DRAWINGS :
    CW/ ACW SYSTEM DESIGN PHILOSOPHY AND SYSTEM WRITEUP – DOC. NO. PE-DC-280-165-N002.
    BHEL HYD'S INSTRUMENTATION SCHEME OF CWP – 2 182 ....

REV	DATE	DRG.	CHD	APPD	DESCRIPTION
04	07.05.08	M.S.	V.K.Y.	V.K.Y.	UPDATED IN LINE WITH CUSTOMER MAIL DTD. 06.05.08
03	28.04.08	AMIT	M.S.	V.K.Y.	UPDATED IN LINE WITH CUSTOMER COMMENTS DTD. 29.03.08
02	18.03.08	M.S	V.K.Y.	V.K.Y.	UPDATED IN LINE WITH M.O.M. DTD. 27/28.02.08.
01	21.02.08	M.S	V.K.Y.	V.K.Y.	UPDATED IN LINE WITH CUSTOMER COMMENTS DTD. 28.01.08.

CUSTOMER: DAMODAR VALLEY CORPORATION, KOLKATA
JOB NO. 280
STATUS CONTRACT
DISTRIBUTION TO NO.

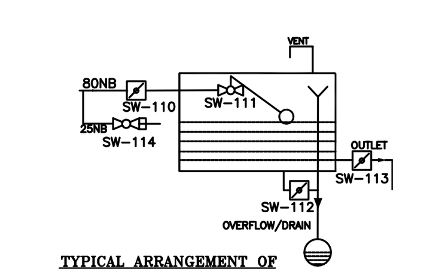
KODERMA THERMAL POWER PLANT (2X500 MW)

BHARAT HEAVY ELECTRICALS LTD.
POWER SECTOR
PROJECTS ENGINEERING MANAGEMENT
NEW DELHI

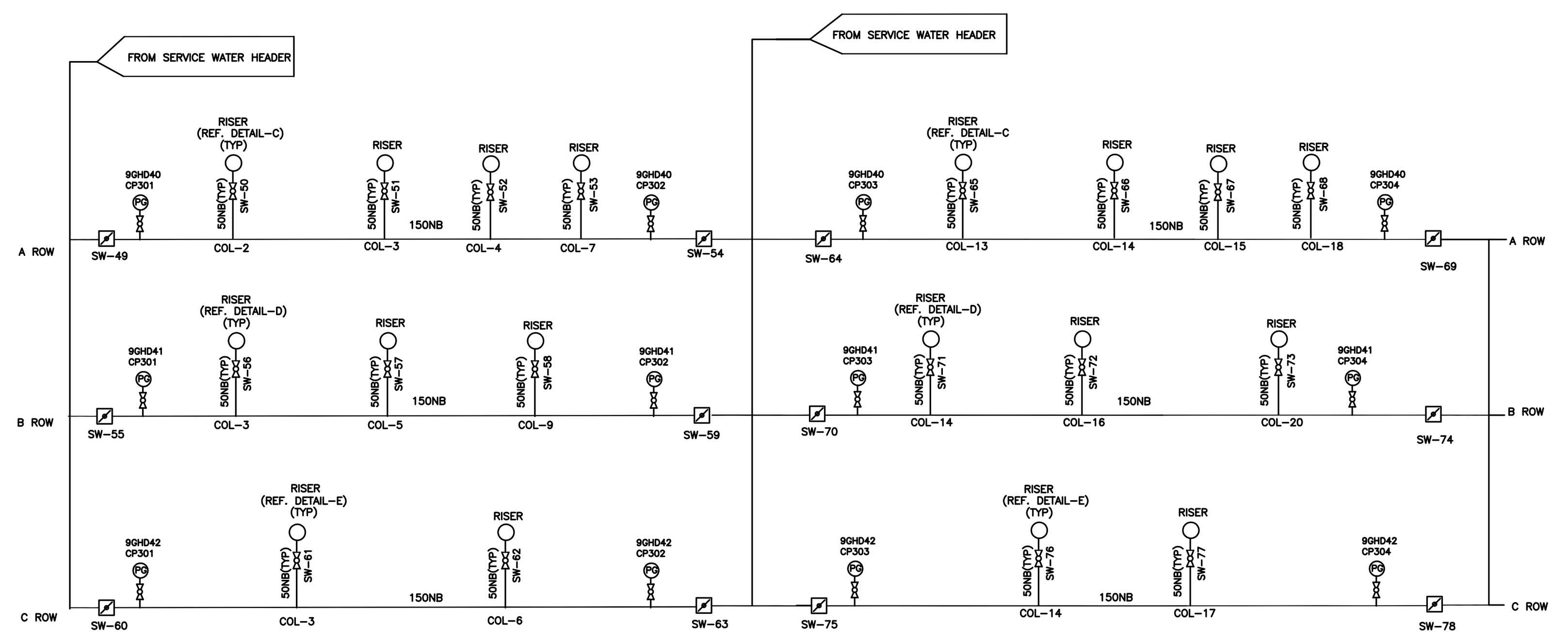
DEPT CODE		NAME	SIGN	DATE
	PRPD	M.S.	sd/–	25.10.07
	CHD	VKY	sd/–	25.10.07
	APPD	VKY	sd/–	25.10.07

TITLE: P&ID OF CW & ACW SYSTEM

DRAWING NO. PE-DG-280-165-N001
SHEET 01 OF 01 REV. 04

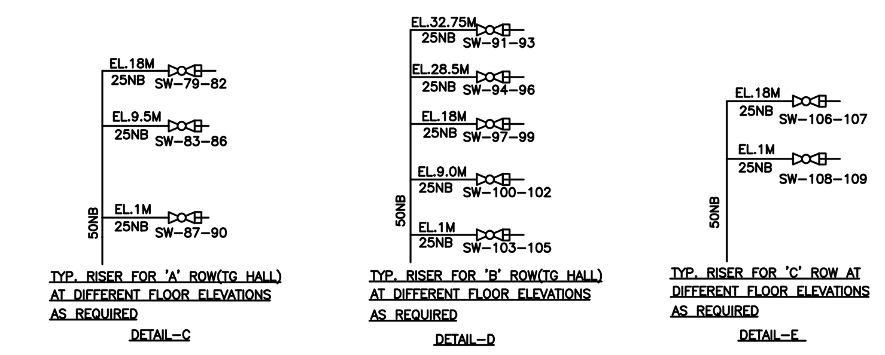


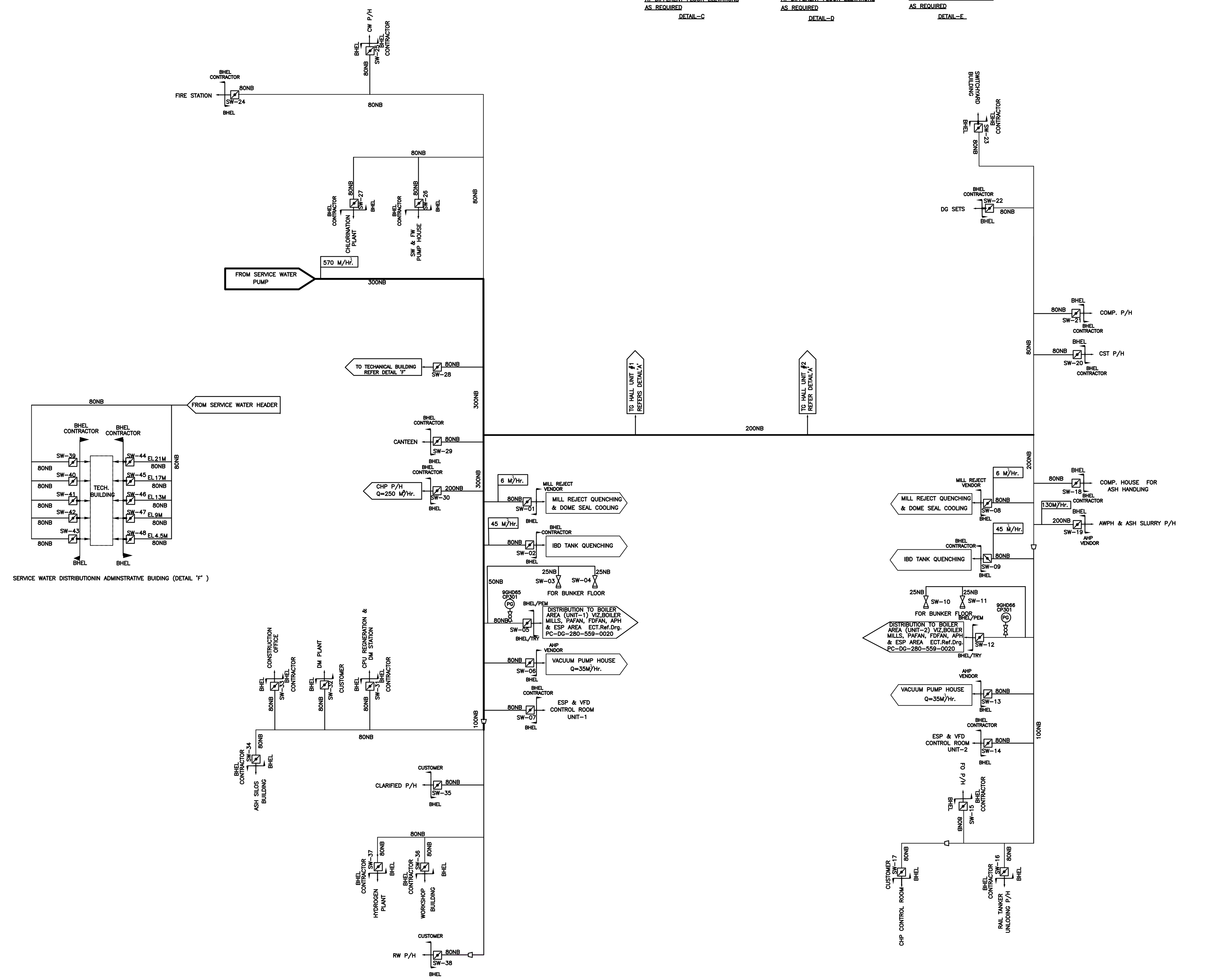
TYPICAL ARRANGEMENT OF SERVICE WATER TANK PLACED AT THE TOP OF EACH BUILDING EXCEPT CHP CONTROL ROOM, RW P/H, CLARIFIED P/H, DM PLANT (CAP-1000 LTR.)



UNIT#1 UNIT#2

SERVICE WATER DISTRIBUTION WITHIN TG HALL (DETAIL-A)





SERVICE WATER SYSTEMS

PIPE SIZES

Nb	O.D.(mm) MAX.	THK.(mm)
15	21.8	3.2
25	34.2	4.0
40	48.8	4.0
50	60.8	4.5
65	76.6	4.5
80	89.5	4.8
100	115.0	5.4
150	166.5	5.4
200	219.1	6.0
250	273.0	6.0
300	323.9	6.0

LEGEND

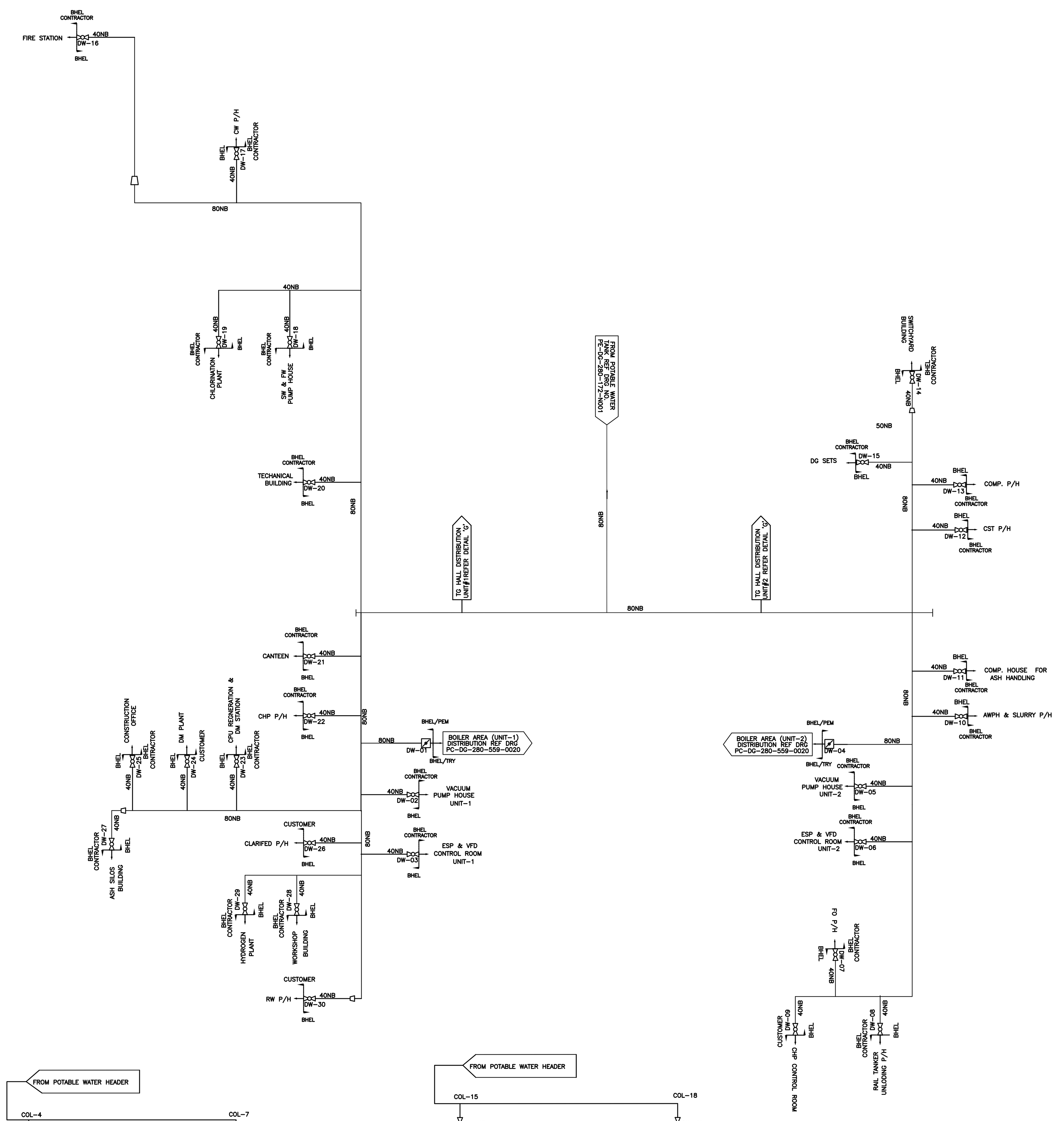
- BUTTERFLY VALVE
- GLOBE VALVE
- PRESSURE GAUGE
- HOSE VALVE
- REDUCER/EXPANDER

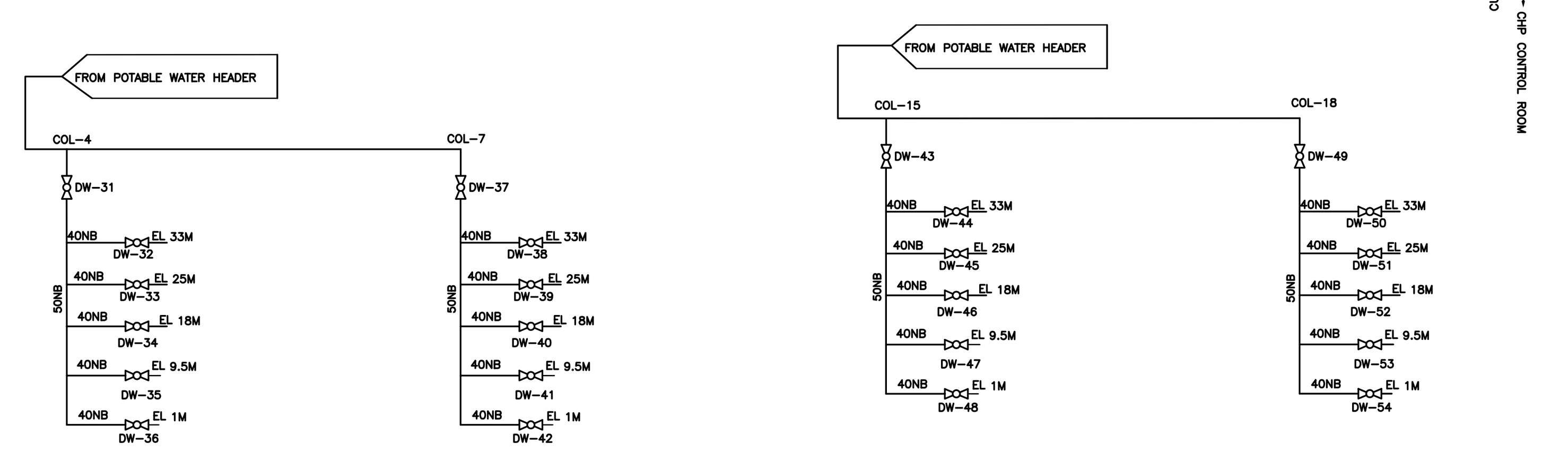
NOTES:-

1. DESIGN PRESSURE: a) SERVICE WATER SYSTEM=10KG/SQ.CM(G)
   b) POTABLE WATER SYSTEM=10KG/SQ.CM(G)
   MECH. DESIGN TEMPERATURE: 60°C
2. MINIMUM PRESSURE OF SERVICE WATER AT ANY SW CONNECTION SHALL BE 1.5KG/SQ.CM EXCEPT WHERE MENTIONED OTHERWISE SPECIFICALLY.
3. MATERIALS OF CONSTRUCTION(PIPEWORK):
   3.1 SERVICE WATER SYSTEM:
   a) PIPING LESS THAN EQUAL TO 150NB SHALL BE CARBON STEEL,ERW CONFORMING TO IS:1239(HEAVY GRADE).
   b) PIPING>150NB SHALL BE CARBON STEEL,IS:2062 GR.BPLATES ROLLED AND WELDED AS PER IS:3589
   3.2 POTABLE WATER SYSTEM:
   a) PIPING LESS THAN EQUAL TO 150NB SHALL BE CARBON STEEL,ERW CONFORMING TO IS:1239(HEAVY GRADE) & SHALL BE GALVANISED AS PER IS 4736 OR EQ. PIPE END CONNECTIONS SHALL BE SCREWED.
4. WATER HOSES FOR SERVICE SYSTEM:
   4.1 WATER HOSES SHALL BE AS PER IS:444 WITH 25NB SIZE.
   4.2 TOTAL 210 NOS. HOSE PIPES FOR TG HALL AREA OF BOTH UNITS SHALL BE SUPPLIED BY BHEL FOR INSTALLATION AT:
   a) TG HALL-'A' ROW: 2 NO. AT EACH FLOOR PER UNIT (TOTAL 12 NOS.- FOR 2 UNITS)
   b) TG HALL-'B' ROW: 2 NO. AT EACH FLOOR PER UNIT (TOTAL 20 NOS.- FOR 2 UNITS)
   c) TG HALL-'C' ROW: 2 NO. AT EACH FLOOR PER UNIT (TOTAL 8 NOS.- FOR 2 UNITS)
   d) BUNKER FLOOR 2 NOS. PER UNIT (ie. 4 FOR 2 UNITS)
   e) TG BUILDINGS 50 NOS FOR BOTH UNITS.
   f) 18 NOS. HOSE PIPES ARE SPARE.
   4.3 LENGTH OF EACH HOSE PIPE SHALL BE 15M.
   4.4 HOSE POINTS SHALL BE LOCATED STRATEGICALLY AS NEAR TO COLUMN CENTER LINE AS POSSIBLE WITHOUT OBSTRUCTING PASSAGES/CLEAR SPACES.
   4.5 FOR EACH HOSE,ONE END SHALL BE FITTED WITH MS FEMALE COUPLING WITH SWIVELLING NUTS & SOFT SEATED RING SUITABLE FOR CONNECTION TO SCREWED ENDS OF HOSE VALVE & OTHER END SHALL BE MALE THREADED(AS PER IS 554) TO JOIN WITH THE SWIVELLING NUT OF SECOND HOSE WHEREBY TWO HOSE LENGTHS CAN BE JOINED IF REQUIRED.
5. ALL HOSE VALVES SHALL BE APPROX. 1 M ABOVE FLOOR LEVEL.

6.0 EXTERNAL SURFACE - OVERGROUND PIPING (SERVICE WATER SYSTEM ONLY)
   A) SURFACE CLEANING BY WIRE BRUSH.
   B). APPLICATION OF ONE COAT OF RED LEAD PRIMER FOLLOWED BY ADEQUATE NO. OF FINISH COATS OF SYNTHETIC ENAMEL PAINT TO ACHIEVE TOTAL DFT OF 125 TO 150 MICRONS.

7. TERMINAL POINTS
   a) SERVICE WATER CONNECTIONS WITH ISOLATING VALVES SHALL BE TERMINATED 5M AWAY FROM VARIOUS BUILDINGS. FURTHER DISTRIBUTION OF PIPEWORK INCLUDING SERVICE WATER OVERHEAD TANKS ETC. WITHIN RESPECTIVE BUILDINGS SHALL BE BY RESPECTIVE BUILDINGS CONTRACTOR.
   b) DRINKING WATER CONNECTIONS WITH ISOLATING VALVES SHALL BE TERMINATED 5M AWAY FROM VARIOUS BUILDINGS. FURTHER DISTRIBUTION OF PIPEWORK INCLUDING DRINKING WATER TANK ETC. WITHIN RESPECTIVE BUILDINGS SHALL BE BY RESPECTIVE BUILDINGS CONTRACTOR
8. REFERENCE DRG./DOC. NOS.:
   PEM DRAWINGS AND DOCUMENTS:-
   A) PLANT WATER SYSTEM DESIGN PHILOSOPHY & SYSTEM WRITEUP-DOC.NO.PE-DC-280-172-N002
   B) PLANT WATER SYSTEM EQUIPMENT SIZING CALCULATIONS - DOC.NO.PE-DC-280-172-N102
   C) PLANT WATER SYSTEM VALVE SCHEDULE - DOC.NO.PE-DC-280-172-N104
   D) PLANT WATER SYSTEM P&ID - DRG. NO.PE-DG-280-172-N001.





UNIT#1 UNIT#2

POTABLE WATER SYSTEM DISTRIBUTION WITHIN TG HALL (DETAIL 'G')

POTABLE WATER SYSTEM

CUSTOMER	DAMODAR VALLEY CORPORATION, KOLKATA
JOB NO. 280	KODERMA THERMAL POWER PLANT (2X500 MW)
STATUS CONTRACT	
DISTRIBUTION TO NO.	BHARAT HEAVY ELECTRICALS LTD. POWER SECTOR PROJECTS ENGINEERING MANAGEMENT NEW DELHI
REV / DATE / ALTD / CHD / APPD	

DEPT CODE		NAME	SIGN	DATE
	PRPD	M.S.	sd/-	25.12.08
	CHD	VKY	sd/-	25.12.08
	APPD	VKY	sd/-	25.12.08

TITLE: P&ID OF PW & SW SYSTEM

DEPT. SCALE SIGN DATE

DRAWING NO. PE-DG-280-172-N003

SHEET 01 OF 01 REV. 0

ANNEXURE - 2

FORMAT FOR NO DEVIATION CERTIFICATE
(To be submitted in the bidder's letter head)

BHARAT HEAVY ELECTRICALS LIMITED,
Power Sector - Eastern Region,
Plot no 9/1, DJ Block, Sector – II, Salt Lake City,
Kolkata – 700 091

Sub	No Deviation Certificate.	
Job	Erection, testing, commissioning etc of CW piping, ACW piping & DM water piping systems and various balance piping systems (instrument air, service air, drinking water, service water etc) of unit # 1 & 2 for 2x500 MW units at Koderma Thermal Power Station, Jharkhand.	
Ref	01	Tender no PSER:SCT:KDM-M991:09.
	02	BHEL's NIT, vide reference no PSER:SCT:KDM-M991:1700, dated 16-03-09.
	03	BHEL's TCN-01, vide reference no PSER:SCT:KDM-M991:TCN-01, dated 03-04-09.
	04	All other pertinent issues till date.

Dear Sirs,

With reference to above, this is to confirm that as per tender conditions, we have visited site before submission of our offer and noted the job content & site conditions etc. We also confirm that we have not changed/ modified the tender documents as appeared in the website and in case of such observance at any stage, it shall be treated as null and void.

We hereby confirm that we have not taken any deviation from tender clauses together with other references as enumerated in the above referred NIT and convey our unqualified acceptance to all terms & conditions, unqualified compliance to technical specification and acceptance to reverse auctioning process.

In the event of observance of any deviation in any part of our offer at a later date whether implicit or explicit, the deviations shall stand null & void.

We confirm to have submitted offer strictly in accordance with tender instructions.

Thanking you,

Yours faithfully,

(Signature, date & seal of authorized representative of the bidder)