

ESP-001-2A Rev.00		PROJECT ENGINEERING & SYSTEMS DIVISION HYDERABAD		Doc. No: PY51529	
				Rev. No.	00
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COPYRIGHT AND CONFIDENTIAL The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED , It must not be used directly or indirectly in any way detrimental to the interest of the company.	TECHNICAL SPECIFICATION FOR SUPERVISION SERVICES FOR E&C OF DM PLANT IN AUTO MODE				
	PROJECT:		1 X 100MW NAMRUP COMBINED CYCLE REPLACEMENT POWER PROJECT (PHASE -1) –NAMRUP , ASSAM		
	CUSTOMER:		ASSAM POWER GENERATION CORPOTATION LTD, GUWAHATI, ASSAM		
	CONSULTANT:		M/S DEVELOPMENT CONSULTANTS (P) LTD CONSULTING ENGINEERS		

Revisions:	Prepared by :	Checked by :	Approved by :	Date :
Refer to record of revisions	Santosh	AKS	MSSN	10.03.19



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1.0 INTENT OF SPECIFICATION:

- 1.1 This specification along with its annexures is intended to provide supervision services to complete the DM plant erection and commissioning in auto mode as per the following:
- a) Study of DM plant and ensuring complete erection of electromechanical components. Bidders shall visit at site and satisfy themselves before giving their techno commercial offer to ascertain the present condition of DM plant.
 - b) Supervision services for any repair of the equipment to ensure successful operation of DM Plant.
 - c) Supervision services of Commissioning of the DM Plant in auto mode.

2.0 BRIEF SUMMARY OF PRESENT STATUS:

- 2.1 The 2 x 8.5 m³/hr. capacity DM plant is supplied and erected at the project site, at Namrup Assam. The mechanical erection of the DM plant is completed and the both the streams of the DM plant are commissioned and tested manually. The output quality is found acceptable.
- 2.2 Erection agency for DM Plant is M/s Arun Constructions. Supervision agency need to provide technical supervision services to complete the system as per scope of supply.
- 2.3 The DM Plant is to be commissioned in automatic mode as per the BHEL approved control philosophy and as per technical job specification PEMC-2220 and its annexures.

3.0 SCOPE OF WORK:

- 3.1 The following Supervision services are required for commissioning of the DM Plant in auto mode.
- a) Commissioning of PLC.
 - PLC OEM will perform commissioning. However, bidders is responsible for any interface issues between PLC, field instruments and work station (in control room)
 - b) Commissioning of work station in DM plant control room
 - All the required soft wares are Pre- installed in the workstation. However, any modifications required in the configuration shall be carried out by bidder for operating DM plant in auto mode from control room.
 - c) Commissioning of Instruments like flow transmitter, analyzers, etc.
 - d) Trouble shooting of all equipment pertaining to DM plant, as required.
 - e) Any other services not mentioned above but required for the commissioning of DM Plant in auto mode is also included in scope of services.

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4.0 LIST OF ANNEXURES:

Sl.No.	Description	Drg/Doc.No.
1.	Design basis	A4-JWL-2194-DB-DM-R01
2.	Control philosophy	A4-JWL-2194-CP-DM
3.	P&ID Of DM PLANT	A0-JWL-2194-201-01 A1-JWL-2194-201-02
4.	P&ID of Regeneration System	A1-JWL-2194-201-03
5.	Equipment Layout	A0-JWL-2194-02A-01
6.	PLC Documents	



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5.0 PRICE-BID FORMAT

Sl. No:	Description	Unit	QTY	Unit Rate (Rs)	Total Price (Rs)
1	Supervision services for E&C of DM Plant in Auto mode as per BHEL job specification and its annexures	Lot	1		
1a	Per Diem rates for Process Engineer including Boarding, Lodging & Local Travel	Mandays	10		
1a	Per Diem rates for Electrical Engineer including Boarding, Lodging & Local Travel	Mandays	10		
1b	Per Diem rates for C&I Engineer including Boarding, Lodging & Local Travel	Mandays	10		
1c	Travel expenses from vendor works to project site and back per Service Engineer/Technician	No. of visits	3		
	Total (Sl. no.1)				
	<u>Notes:</u> 1. All the prices quoted in this price bid format shall be without taxes and duties. 2. Bidder to fill the above prices manually put his seal & signature and submit the same for price bid opening. 3. For purpose of evaluation, the total price quoted by the bidder (i.e. Sl. no. 1) will be considered for evaluation. However, both the number of mandays and number of trips may vary as per actual site requirement and payment shall be made accordingly.				

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Variant Table:

Var no.	Item Type	Material Code	Remarks
01	Supervision of DM Plant Commissioning activity	PY9751529018	



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ANNEXURE – I

Bidder to fill and furnish the following information in the indicated format:

KEY INFORMATION

1. Name of the Bidding Company :
2. Registered in (mention the name of the Country) :
3. Name, designation, telex & telephone number and postal address of responsible officer of Bidder to whom all reference shall be made for expeditious coordination. :
4. Name, designation, telex & telephone number and postal address of responsible officer of Indian Agent. :
5. Bidder's proposal number :
6. Bidder's proposal date :
7. Validity of offer, counted from the date of opening of bid :
8. Guaranteed completion period, counted from date of issuance of LOI/TOI :
9. Confirm that Scope of supply and services are exactly as per specification requirement. : Yes/No
10. Confirm technical compliance with specification : Yes/No
11. Confirm that List of Recommended Spares has been furnished as per Annexure-II : Yes/No
12. Confirm that Special Tools & Tackles are as per Annexure-III : Yes/No
13. Confirm that deviations ,if applicable, have been furnished as per Annexure-IV : Yes/No

Signature of Bidder's
Authorized representative with date.....
Date

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ANNEXURE – II**DEVIATION FROM SPECIFICATION**

If the proposal submitted has got any deviation from the technical stipulations in the bidding document, the Bidder shall tabulate below the full particulars of such deviations and shall sign below. Additional sheets may be enclosed, if necessary. Deviation is to be furnished with mention of specific clause numbers. Technical and commercial deviations to scope of supply and services, shall be indicated separately.

Sl.No.	CLAUSE NO.	DESCRIPTION AS PER SPECIFICATION	DEVIATION BY BIDDER

We confirm that all the deviations/exceptions to the Job specification and enclosures including reference documents attached are listed in this format only. No other deviations or exceptions even if mentioned elsewhere shall be considered for any technical/ commercial evaluation or for ordering.

Signature of Bidder's

Authorized representative with date.....

Date.....

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RECORD OF REVISIONS

Rev. No.	Date	Revision Details	Prepared/ Reviewed By	Approved By
00	10.02.19	First Issue	DSK	MSSN

DM,CW & ETP PLANT FOR 1X100 MW NAMRUP COMBINED CYCLE REPLACEMENT POWER PROJECT (PHASE – 1) AT NAMRUP, AASAM.

DOCUMENT CONTROL SHEET

CLIENT : NTPC BHEL POWER PROJECT PVT. LTD.
DOCUMENT TITLE : DESIGN BASIS FOR DM PLANT & POTABLE WATER TREATMENT PLANT.
WIPRO DOC NO : A4-JWL-2194-DB-DM
REV. NO. : 01

Bharat Heavy Electricals Limited <i>Ramachandrapuram, Hyderabad</i>	
PROJECT ENGINEERING DEPARTMENT	
DESCRIPTION OF CODE:	
✓ APPROVED SUBMIT AS BUILT DRAWINGS / DOCUMENTS.	
02. APPROVED WITH MINOR COMMENTS. ACTIVITY MAY PROCEED PLEASE RESUBMIT FOR FINAL APPROVAL.	
03. REVISE AS PER BHEL COMMENTS AND RESUBMIT FOR APPROVAL.	
04. RETAINED FOR INFORMATION.	
<i>This approval does not absolve the vendor from the responsibility to comply with BHEL's specification and all applicable codes and standards. Vendor has to ensure safe and smooth operation and meet the intended performance of the equipment.</i>	
Comments as marked on drawing ✓	Comments as in enclosed document. 
Date : 03.11.2011	

ENDORSEMENTS :

Rev no	Date	Description	Initials	Sign	Initials	Sign	Initials	Sign	Initials	Sign
1	31.10.2011	Incorporating comments	AG		AG		MB			
0	10.10.2011	For Approval	AG		AG		MB		SR	
			Prepared by		Reviewed by		Approved by		Issue	Authorisation

	CUSTOMER : ASSAM POWER GENERATION CORPORATION LTD. GUWAHATI, ASSAM.
	CONSULTANT: DEVELOPMENT CONSULTANTS PRIVATE LIMITED. 24 – B, PARK STREET, KOLKATA – 700016.
	EPC CONTRACTOR: BHARAT HEAVY ELECTRICALS LTD. RAMACHANDRAPURAM, HYDERABAD, T.N – 502 032
	EPC SUB CONTRACTOR: NTPC BHEL POWER PROJECT PVT. LTD., 6 TH FLOOR, LOBE-4, TOWER-B, THE CORENTUM, PLOT A/41, SEC-62, NOIDA – 201309.
	CONTRACTOR WIPRO WATER, Serene Properties, S.E.Z., 3rd Floor, Building No. 7, Plot No.3, TTC Industrial Area, Thane Belapur Road, Airoli, Navi Mumbai- 400708.

DOCUMENT NO: A4-JWL-2194-DB-DM

REV : 01

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PROJECT	1 X 100 MW NAMPUR COMBINED CYCLE REPLACEMENT POWER PROJECT	Ref. Doc. No. PEMC 2220	Job No. JWJ 2194
		REV 01	DATE 31.10.2011
Title	DESIGN BASIS FOR DM PLANT		

Bharat Heavy Electricals Limited Ramachandrapuram, Hyderabad PROJECT ENGINEERING DEPARTMENT DESCRIPTION OF CODE:	
01. APPROVED SUBMIT AS BUILT DRAWINGS / DOCUMENTS. 02. APPROVED WITH MINOR COMMENTS ACTIVITY MAY PROCEED PLEASE RESUBMIT FOR FINAL APPROVAL. 03. REVISE AS PER BHEL COMMENTS AND RESUBMIT FOR APPROVAL. 04. RETAINED FOR INFORMATION.	This approval does not absolve the vendor from the responsibility to comply with BHEL's specification and all applicable codes and standards. Vendor has to ensure safe and smooth operation and meet the intended performance of the equipment.
Comments as marked on drawing 	Comments as in enclosed document.
Date: 03.11.2011	

I: ANALYSIS OF CLARIFIED WATER TO DM PLANT

SR. NO.	DESCRIPTION	UNIT	VALUE
1	Calcium Hardness	ppm as CaCO3	18
2	Magnesium Hardness	ppm as CaCO3	18
3	Sodium	ppm as CaCO3	11
4	Potassium	ppm as CaCO3	-
	TOTAL CATION	ppm as CaCO3	47
5	Bi-carbonate	ppm as CaCO3	20
6	Suphate	ppm as CaCO3	19
7	chloride	ppm as CaCO3	8
8	Nitrate	ppm as CaCO3	-
	TOTAL ANION	ppm as CaCO3	47
9	Total Silica	ppm as SiO2	7
10	Iron	ppm as Fe	0.5
11	pH value at 25 deg.C	-	7.1
12	Turbidity	NTU	10
13	TSS	ppm	25
14	Conductivity	Micro Seimens/cm @ 25 deg.C	60
15	TDS	ppm	40
16	CO2	As CO2	4

II: OUTLET QUALITY

SR. NO.	DESCRIPTION	UNIT	VALUE
A.	PRESSURE SAND FILTER (DM)		
1	Net Capacity	m3/hr	8.5
2	Quantity of treated water between two (2) successive regeneration		
a	Net	Cum	170
b	Gross	Cum	186.4
3	Quality of treated water		

Prepared by		Checked by		Approved By	
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					Page 1 of 6

PROJECT	1 X 100 MW NAMPUR COMBINED CYCLE REPLACEMENT POWER PROJECT	Ref. Doc. No. PEMC 2220	Job No. JWL 2194
		REV 01	DATE 31.10.2011
Title	DESIGN BASIS FOR DM PLANT		

j.	Turbidity	NTU	NIL
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III: OUTLET QUALITY (POTABLE WATER)

SR. NO.	DESCRIPTION	UNIT	VALUE
A.	PRESSURE SAND FILTER (POTABLE)		
1	Net Capacity	m3/hr	8
2	Quantity of treated water between two (2) successive regeneration		
a	Net	Cum	160
b	Gross	Cum	164
3	Quality of treated water		
a.	Turbidity	NTU	< 2

IV: PROCESS DESCRIPTION

Pressure Sand Filter (PSF)

Water will be fed to Pressure Sand Filter (PSF). PSF shall comprise of Sand and Gravels, which removes suspended solids

The unit is backwashed when the unit has delivered its specified output or when the treated water quality is not satisfactory whichever is earlier. Backwash will be done with Filtered water

Activated Carbon Filter (ACF)

Filtered water will pass through Activated carbon filter (ACF). ACF contains activated carbon as filter media, which removes the organisms, chlorine from filtered water.

The unit is backwashed when the unit has delivered its specified output or when the treated water quality is not satisfactory whichever is earlier.

Strong Acid Cation Exchanger (SAC)

Bharat Heavy Electricals Limited Power and Heavy Engineering Division, Hyderabad	
PROJECT ENGINEERING DEPARTMENT	
DESCRIPTION OF CODE:	
☒ APPROVED SUBMIT AS BUILT DRAWINGS / DOCUMENTS. ☐ APPROVED WITH MINOR COMMENTS ACTIVITY MAY PROCEED PLEASE RESUBMIT FOR FINAL APPROVAL. ☐ REVISE AS PER BHEL COMMENTS AND RESUBMIT FOR APPROVAL. ☐ RETAINED FOR INFORMATION.	
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Comments as marked on drawing ☒	Comments as in enclosed document ☐
Date: 03.11.2011	

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AG		AG		MB	
					Page 3 of 6

PROJECT	1 X 100 MW NAMPUR COMBINED CYCLE REPLACEMENT POWER PROJECT	Ref. Doc. No. PEMC 2220	Job No. JWL 2194
		REV 01	DATE 31.10.2011
Title	DESIGN BASIS FOR DM PLANT		

The filtered water is fed to the Strong Acid Cation unit. The unit is designed on counter-current regeneration mode to have the better efficiency and uniform treated water quality with economical chemical consumption.

The countercurrent mode of regeneration also ensures the best utilization of Regenerate i.e. it provides higher regeneration efficiency and lower chemical consumption (operating cost). The decationised water is then passed to the Degasser Tower.

Degasser System (DGT)

Air blowers installed at the side of degassed tower to provide low-pressure air for degassing water rich in carbon dioxide. One blower is normally in service, other being a standby for each stream of DM plant

STRONG BASE ANION EXCHANGER (SBA)

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AG		AG		MB	
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PROJECT	1 X 100 MW NAMPUR COMBINED CYCLE REPLACEMENT POWER PROJECT	Ref. Doc. No. PEMC 2220	Job No. JWL 2194
		REV 01	DATE 31.10.2011
Title	DESIGN BASIS FOR DM PLANT		

When the resin is saturated with anions and cannot further exchange hydroxyl ions and when the quality of the outlet water deteriorates the unit requires regeneration with Caustic. The unit is regenerated with NaOH. The strength of alkali is 5%. During regeneration of SBA the reverse action takes place, hydroxyl ions from the caustic replaces unwanted anions absorbed by the resin during service cycle. The unit after regeneration is ready for next treatment run.

Mixed Bed Exchanger (MB)

The water from SBA will feed to the MB containing mixture of strong acid cation exchange resin and strong base anion exchange resin.

Mixed Bed Exchanger contains mixture of Cation Exchange Resin and Anion Exchange Resin. Cations and anions will be exchanged in mixed bed unit to insure the desired treated water quality at the outlet.

The regeneration of the exchanger will be performed with Hydrochloric acid & Caustic soda solution. Regeneration will be sequential type i.e. first with alkali followed by acid. Chemical dilution will be performed with de-mineralized water. Regeneration sequence will be completed automatically the water coming from the Demineralization package will be sent to DM Water Storage Tank.



The effluents from the Mixed Bed will be conveyed by gravity through channel to Neutralization pit.

DM Water Storage Tank

DM water shall be stored in two Nos. of DM water storage tanks.

CHEMICAL HANDLING SYSTEM

Acid Unloading Pumps

Two acid unloading pumps each sized for filling the storage tank in one hour shall be provided. The pumps shall be designed for handling 30-33% hydrochloric acid.

Bulk Acid Storage Tank (BAST)

One No. of acid storage tank common for both streams shall be supplied.

Acid Measuring Tank

Bharat Heavy Electricals Limited Ramachandrapuram, Hyderabad	
PROJECT ENGINEERING DEPARTMENT	
DESCRIPTION OF CODE:	
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<i>This approval does not absolve the vendor from the responsibility to comply with BHEL's specification and all applicable codes and standards. Vendor has to ensure safe and smooth operation and meet the intended performance of the equipment.</i>	
Comments as marked on drawing ☒	Comments as in enclosed document.
Date : 03.11.2011	

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AG		AG		MB	
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PROJECT	1 X 100 MW NAMPUR COMBINED CYCLE REPLACEMENT POWER PROJECT	Ref. Doc. No. PEMC 2220	Job No. JWJ 2194
		REV 01	DATE 31.10.2011
Title	DESIGN BASIS FOR DM PLANT		

Five (5) nos. of Acid measuring tank; regeneration two for each of SAC & MB cation resins and one to meet the requirements for the neutralization of excess alkali present in regeneration waste from the DM plant in the N. pit

From the measuring tanks, acid shall be injected to the SAC & Cation MB units by means of water ejectors. Pressurized water for ejector for MB shall be taken from the DM water storage tank. Pressurized water for ejector for SAC shall be taken from the Degassed water storage tank. The ejectors including the nozzles shall be specially designed for acid service and for the specified dilution ratio of acid to water.

Caustic Unloading Pumps

Two caustic unloading pumps each sized for filling the storage tank in one hour shall be provided. The pumps shall be designed for handling 40-48% Caustic Lye.

Bulk Caustic Storage Tank (BCST)

One No. of caustic storage tank common for both the streams shall be supplied.

Bharat Heavy Electricals Limited Banshodrapuram, Hyderabad	
PROJECT ENGINEERING DEPARTMENT	
DESCRIPTION OF WORK:	
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<i>This approval does not absolve the vendor from the responsibility to comply with the specification and all applicable codes and standards. Vendor has to ensure safe and smooth operation and meet the intended performance of the equipment.</i>	
Comments as marked on drawing ☒	Comments as in enclosed document. ☐
Date: 30.11.2011	

Caustic Measuring Tank

Five (5) nos. of Caustic measuring tank; two for regeneration of each of SBA & MB and one to meet the requirements for the neutralization of excess acid present in regeneration waste from the DM plant in the N. pit

From the measuring tank, alkali shall be injected to anion exchanger by means of water jet ejectors. Pressurized water for ejectors shall be taken from DM Water Storage Tank. The ejectors including nozzles shall be suitably designed for alkali service and for the specified dilution ratio of alkali to water.

Effluent Disposal System

The drain of Acid & Alkali regeneration tank, SAC, SBA & MB effluent will be collected in the Neutralization Pit. The neutralizing system shall be suitable to neutralize the alkaline/Acidic effluent of DM plant. The effluent neutralizing system consists of one number acid & one number alkali measuring tank. The acid will be of commercial grade of 30-33% & alkali will be of commercial grade of 40-48% strength. The capacity of the tanks shall be suitable to hold chemicals for neutralization of effluent generated from regeneration of one complete cycle. Two nos. (1W+1S) of Horizontal Centrifugal pumps shall be supplied for re-circulation and disposal of effluents.

Prepared by		Checked by		Approved By	
AG		AG		MB	
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DM,CW & ETP PLANT FOR 1X100 MW NAMRUP COMBINED CYCLE REPLACEMENT POWER PROJECT (PHASE – 1) AT NAMRUP, AASAM.

DOCUMENT CONTROL SHEET

CLIENT : NTPC BHEL POWER PROJECT PVT. LTD.
DOCUMENT TITLE : CONTROL PHILOSOPHY FOR DM & POTABLE WATER TREATMENT PLANT.
WIPRO DOC NO : A4-JWL-2194-CP-DM
REV. NO. : 0

ENDORSEMENTS :

0	26.06.2013	For Approval	AL		SK		MB			
Rev no	Date	Description	Initials	Sign	Initials	Sign	Initials	Sign	Initials	Sign
			Prepared by		Reviewed by		Approved by		Issue Authorisation	

	CUSTOMER : ASSAM POWER GENERATION CORPORATION LTD. GUWAHATI, ASSAM.
	CONSULTANT: DEVELOPMENT CONSULTANTS PRIVATE LIMITED. 24 – B, PARK STREET, KOLKATA – 700016.
	EPC CONTRACTOR: BHARAT HEAVY ELECTRICALS LTD. RAMACHANDRAPURAM, HYDERABAD, T.N – 502 032
	EPC SUB CONTRACTOR: NTPC BHEL POWER PROJECT PVT. LTD., 6 TH FLOOR, LOBE-4, TOWER-B, THE CORENTHUM, PLOT A/41, SEC-62, NOIDA – 201309.
	CONTRACTOR WIPRO WATER, Serene Properties, S.E.Z., 3rd Floor, Building No. 7, Plot No.3, TTC Industrial Area, Thane Belapur Road, Airoli, Navi Mumbai- 400708.

Bharat Heavy Electricals Limited	
PROJECT ENGINEERING DEPARTMENT	
REVISIONS	
ALL APPROVED DOCUMENTS TO BE SUBMITTED TO THE PROJECT ENGINEERING DEPARTMENT FOR APPROVAL. PLEASE REQUEST FOR FINAL APPROVAL. APPROVAL OF THE DESIGN AND REVISIONS FOR APPROVAL. APPROVAL FOR SUBMISSION.	
This approval does not absolve the reader from the responsibility to comply with EPCET specifications and all applicable codes and standards. Reader has to ensure that all equipment operation and maintenance procedures are followed.	
Checked	Reviewed
Signature	Signature
Date: 26/06/13	

DOCUMENT NO: A4-JWL-2194-CP-DM

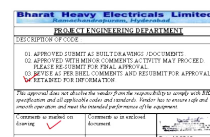
REV : 0

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WIPRO WATER			
CLIENT	NTPC BHEL POWER PROJECT PVT. LTD.	Job No.	JWL 2194
CONSULTANT	DEVELOPMENT CONSULTANTS PRIVATE LIMITED	DATE	26.06.2013
PROJECT	DM PLANT FOR 1X100 MW NAMRUP COMBINED CYCLE REPLACEMENT POWER PROJECT (PHASE – 1) AT NAMRUP, ASSAM.		
Title	CONTROL PHILOSOPHY FOR DM PLANT, POTABLE WATER SYSTEM & REGENERATION SYSTEM.		
Doc. Ref. No.	A4-JWL-2194-CP-DM	REV	00

Note: Read this document in conjunction with the following documents:

P & ID for DM System – A0-JWL-2194-201-01
P & ID for Potable water System – A0-JWL-2194-201-02
P & ID for Regeneration System – A0-JWL-2194-201-03



GENERAL DESCRIPTION:

The De-mineralization plant is a two-stream plant having a net output capacity of 8.5 m3/hr of DM quality water. Each de-mineralizing chain comprises of following units.

PSF - ACF- SAC - DGT& DGWST – SBA – MB - DMWST

Each filter & exchanger is mounted with various instruments for local and/or PC based SCADA indication, interlocking thro' the PLC & alarm annunciation on PC based SCADA screens to monitor the various parameters for smooth running of plant. Pressure gauges are provided at each ion exchanger inlet & outlet.

Each filter (PSF-A/B) is provided with Flow transmitter FT 5404A /5404B at service inlet. Pressure gauge is provided at inlet & outlet of filter (PSF-A/B & ACF-A/B). Pressure Differential switch PDS 5404A/5404B/5405A/5405B is provided across the filter to monitor & annunciate for high differential pressure. ACF service discharge is provided with flow indicator FI 5407A/5407B.

Over and above other instruments are also provided to individual ion exchanger as mentioned vessel wise.

Cation exchanger (SAC – A/B) is provided with conductivity analyzer (AE 5404A/5404B) at drain line to monitor the conductivity during regeneration & FT-5405A/5405B to monitor the flow in each exchanger for high alarm & interlock for isolation purpose from service. Single channel sodium analyzer (AE-5404A/ AE-5404B) is provided for monitoring, high alarm & interlock for isolation purpose from service.

Strong base anion exchanger (SBA-A/B) is provided with conductivity analyzer (AE -5405A/ 5405B) & FT-5406A/5406B to monitor the conductivity and flow in each exchanger for high alarm & interlock for isolation purpose from service. Single channel Silica analyzer (AE- 5404A/ 5404B) is provided to measure reactive silica at outlet of SBA unit.

Mixed bed unit is provided with conductivity analyzer AE 5406A/ 5406B and FT-5406A/5406B to monitor the conductivity and flow in each exchanger for high alarm & interlock for isolation purpose from service. Single channel Silica analyzer AE 5405A/ 5405B is provided for measurement of reactive silica at outlet of each MB unit.

Pneumatic diaphragm type control valves GLXV5429A/ GLXV5429B provided at inlet of DG tower A /B to control the level in the degassed water tank, by level transmitter LT-5404A/5404B

WIPRO WATER			
CLIENT	NTPC BHEL POWER PROJECT PVT. LTD.	Job No.	JWL 2194
CONSULTANT	DEVELOPMENT CONSULTANTS PRIVATE LIMITED	DATE	26.06.2013
PROJECT	DM PLANT FOR 1X100 MW NAMRUP COMBINED CYCLE REPLACEMENT POWER PROJECT (PHASE – 1) AT NAMRUP, ASSAM.		
Title	CONTROL PHILOSOPHY FOR DM PLANT, POTABLE WATER SYSTEM & REGENERATION SYSTEM.		
Doc. Ref. No.	A4-JWL-2194-CP-DM	REV	00

& opening position of control valve is provided in PLC by means of position transmitter. Control valve operation & monitoring shall be in auto mode however manual override is provided for manual operation.

Each Degassed water storage tank (DGWST-A/B) mounted with Level switches LS-5404A/5404B for alarm & Interlock with DMFP-A/B (High level) & DGWTP A/B/C/D (Low level). Level transmitter LT-5404A/5404B is provided for local & remote indication as well as to control the level by control valve through PLC. Level gauges LG-5405A/5406A/5405B/5406B are provided for local indication.

Low pressure switches (PS 5404 A/B) are provided at common discharge header of pumps for each service for alarm & interlock.

Ball valves are used for flow transmitter isolation, analyzer isolation, pressure indicator isolation drain & sampling etc.

BRIEF DESCRIPTION OF PLANT / VARIOUS UNITS IS AS BELOW:

The plant is consisting of two parallel de-mineralizing streams. Only one stream is normally in operation to produce net rated flow rate of each is 8.5 m³/hr of DM water, with the other stream is in stand-by mode. At any particular point of time, the operator shall take up only one stream for the regeneration. Any unit shall be brought into service by operator only after the unit is regenerated (the same shall not be put automatically,). Service operation shall be initiated by the operator from the SCADA control scheme for that particular unit.

Filter / Ion exchange unit shall be isolated from the system as follows –

Pressure Sand Filter: On reaching high pressure differential across bed or on passing of pre-determine volume of water through the unit.

Activated carbon filter - On reaching high-pressure differential across bed or on passing of pre-determine volume of water i.e. high throughput.

Strong Acid Cation – If sodium value exceeds the preset value or on passing of pre-determine volume of water i.e. high throughput.

Strong base Anion– If silica value exceeds the preset value or on reaching higher conductivity at outlet or on passing of pre-determines volume of water i.e. high throughput.

Mixed Bed Unit– On reaching higher conductivity at outlet or on passing of pre-determines volume of water i.e. high throughput or high silica contains at the outlet.

The plant is designed for semi-automatic operation. This is achieved through a PLC based control system which is manually initiated automatic sequential control.

Following functions as a minimum shall be available.

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1. Display of plant graphics.
2. Display of analog values & status.
3. Display of annunciation and acknowledgement.
4. Control faceplate for plant/ equipment operation.
5. Adjustment of timer / counter.
6. Display of history & current trends.
7. Selected history data & Cumulative running hour.
8. Logging of data.
9. Printing of alarms, reports, logs and screen.



Status of drives and valves shall be indicated on SCADA as follows:

Drive running	:	Continuous RED
Drive Stop	:	Continuous GREEN
Drive disturbed	:	Flashing YELLOW
Valve open	:	Continuous RED
Valve closed	:	Continuous GREEN

The operator will initiate the operation of backwashing/regeneration/rinsing of a particular filter/ion-exchange unit, and the change from one step of the sequence to the next will be automatic. The system will employ a logical system, which will link the various steps such as closing/opening of different valves, starting/stopping of various pumps, which make a sequence. The logical system will adhere to the correct sequence of operation and the pre-determined (adjustable) time-intervals. The system will be interlocked so that the necessary pre-requisite for each step, are completed prior to proceeding to the next step. The automatic sequence of operations shall be interruptible at any time and the operator shall be able to take over the control to manual from that step onwards.

During regeneration, the progress of different sequence/sub-process shall be displayed to the operator in the form of step description, which is in progress, the set time & elapsed time for each step, the elapsed time for that step etc. Failure in any operation will also be indicated. Once a filter/exchanger has been regenerated it will not be put back into service automatically, but operator will have to manually put back into service through a selection switch.

Apart from complete automatic regeneration which includes fixed time rinsing facility, separate rinsing facility shall also be provided for each of the exchanger units to carry out rinsing remote manually, which will be required in cases:

- a) When a regenerated unit had been off the service for long time.
- b) When additional rinsing during the regeneration operation apart from the fixed automatic regeneration process is required to be carried out.

During automatic progress of the sequence the opening and closing of different valves shall also be indicated to the operator. To provide additional manual over-ride facility for individual type of filter or exchanger, each of them shall be provided with "Auto-Off-Manual" Key. Automatic sequential operations shall be carried out with individual A/M key in Auto position only. For cation and anion exchangers a separate key shall be provided for backwash, which is an

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optional step in a regeneration sequence. All the above functions shall be carried out by A/M keys and selection keys pertinent to interlock & sequence logic.

All the above mentioned keys are realized through SCADA soft buttons/selector switches on the operator station.

On exhaustion of unit, the particular filter/exchanger will be completely isolated from the system automatically and an alarm status will be displayed on the SCADA.

In semi-auto mode, the starting of a service / regeneration will be through Operator station to be initiated by operator. Once operator initiates the operation of regeneration, the sequence of operation shall be automatic. Upon completion of complete regeneration, the service cycle will proceed after initiation of the same by the operator.

Under remote – manual mode (Selector switch on SCADA screen), each step / sequence of regeneration will be initiated by the operator from SCADA. In local manual mode, the individual valves/ pumps etc. can be operated locally through Field push button (applicable only for drives in manual mode in MCC) and the operator can also decide duration of each step. Interlocking / Protection (Start permissive, trips etc.) of all pumps and equipment will be carried out in the PLC; Unloading of acid/alkali will be manual operation from the field.

All drive status (including Pumps, Agitators) will be available on the PLC by means of ON/OFF/TRIP indication configured on the SCADA. Soft selector switches shall be configured on the SCADA station for selecting particular Filter/Ion Exchanger units.

Each solenoid – operated valve status will be provided on the SCADA.

The sequential operation of the plant is broadly based on the valve sequence chart, which explains the status of valves & rotary equipment at stages of service or regeneration operation. The SCADA dynamic graphic screens shall indicate status of all filters, exchanger units rotary equipments in the plant, open / close condition of all auto valves during service, regeneration process or stand-by mode of the unit. Moreover display of analog values for all the flow / quantity parameters in the plant are available on these screens.

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Bharat Heavy Electricals Limited	
PROJECT ENGINEERING DEPARTMENT	
DESCRIPTION OF WORK	
01. APPROVED FOR SUBMITTAL TO THE CLIENT (DOCUMENT)	
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OPERATION PHILOSOPHY

DM PLANT:

When unit is brought into service the sequence of opening & closing of the valves shall be as per the valve sequence charts.

DM plant feed pump DMFP-A/B transfer the water from the Clarified water reservoir, located at pre-treatment plant.

The selected pump(s) in operation shall trip as mentioned below:

- 1) When the level in Degassed water storage tank goes high.

Flow transmitter (FT 5405A/5405B) mounted at the service outlet of each SAC unit provides input to PLC regarding the instantaneous flow through the exchanger unit. This flow is totalized in the PLC & an alarm signal is generated when the preset throughput is achieved. When the unit is operating in auto mode the control system automatically isolates the particular exchanger stream under the said condition.

The SAC unit shall be isolated in case of high sodium value and high throughput (located at the outlet of SAC unit) when in manual mode of operation only a "Throughput High" / "sodium value high" alarm shall be sounded in case of the above parameter going high. Operator shall have the flexibility of terminating or retaining the service mode of operation.

Opening and closing of the control valve, located at inlet of the De-gasser Tower, is controlled in proportion to the level in the DGWT by means of level transmitter (LT- 5404A/5404B). This control is fully automatic and is achieved by means of a software-based PID level loop in the PLC.

There are two De-gasified Water transfer Pumps (DGWTP-A/B) for each stream. At discharge header of degassed water transfer pump low pressure switch (PS-5404A/5404B) is provided to maintain header pressure by starting standby pump on low pressure and re-circulation by auto valve on high pressure.

On high pressure in the discharge header, re circulation valve (DFV5425A/B) shall be opened and will remain open till the pressure drops below the set high pressure.

Water from these pumps is passed through SBA and MB exchangers to the DM Water storage tank (DMWST A/B)

Conductivity instruments are mounted at the service outlet of SBA and MB exchangers. Silica analyzer is provided at service outlet of SBA (Single channel) & MB (Single channel). When the

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conductivity & silica in the service outlet line exceeds a preset value, high alarm is generated and the stream is isolated from the system.

Flow-transmitters mounted at the service outlet of each SBA and MB unit provide input to the PLC regarding the instantaneous flow through the exchanger unit. This flow is totalised in the PLC and an alarm signal is generated when the preset throughput is achieved.

When the unit is in auto mode of operation and a preset throughput is achieved through the respective exchanger a throughput high alarm is generated and the unit is isolated from the system. When the unit is operating in manual mode and throughput is achieved, only throughput high alarm shall be generated by the system. Operator shall have the flexibility of terminating or retaining the service mode of operation of the said exchangers if other parameters are favorable.

De-mineralized water will be stored in DM Water storage tank (DMWST A/B) & level of DM Water storage tank will be controlled through level transmitter (LT 5405A/B) and its inlet control valve (DFXV5459A/B)

Opening and closing of the control valve, located at inlet of the DMWST, is controlled in proportion to the level in the DMWST A/B by means of level transmitter (LT 5405A/5405B). This control is fully automatic and is achieved by means of a software-based PID level loop in the PLC.

DM Water storage tank (2 Nos.) are provided with one low level switch & one high level switch in each tank , also Float & Board type level indicator & level transmitter is provided in each tank.

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REGENERANT UNLOADING & STORAGE:

SAC exchangers are regenerated by hydrochloric acid and SBA exchangers are regenerated simultaneously by sodium hydroxide solution. As the MB exchanger contains Anion as, well as Cation resin, both the regenerants are passed through the unit during regeneration.

For unloading of hydrochloric acid into Bulk Acid Tank (BAST-A) and sodium hydroxide into Bulk Caustic Tank (BCST-A), Acid unloading pump AUP-A/B & Caustic unloading pump CUP-A/B are provided, Unloading operation is controlled manually through local push button station, Subsequent filling operation of the bulk tanks to measuring tanks is by gravity. Level gauges are provided on each tank for local monitoring & level switch for remote monitoring, alarm & tripping Level Switch (LS 5409 & LS 5407) are provided on BAST-A & BCST- A to trip the Unloading pump at High level.

Hydrochloric acid is transferred from the Bulk acid storage tank to the acid measuring tanks (2 Nos. for SAC, 2 Nos. for MB & 1 No. for N- pit) by means of gravity. From the measuring tanks (AMT–A/B/C/D) the HCl is transferred by ejector to get mixed, with water and used as regenerant. Flow indicator (FI 5408A/5408B/5408C) is provided to know the power water flow to ejector. Auto valves are provided at inlet of each measuring tank for filling the tanks based on the level switch in each tank and high, low alarm will be generated in PLC for monitoring purpose. However in case of acid measuring tank for N-pit (AMT-E) the outlet valve will be operated manually as required.

For regeneration of SBA and MB, caustic is required of concentration 30 % in caustic measuring tanks (CMTA/B, CMT C/D). Dilution of caustic from 48 % to 30% is performed in Caustic Measuring Tanks (CMT).

Dilution in Caustic measuring tank for SBA & MB regeneration is manual / automatic. Operator has to open and close the valve sequentially depending upon level. Agitator will stop if low level signal of level switch is read through PLC only. Auto valves are provided at the inlet of CMT A/B/C/D for filling the tanks based on the status of level switch. In each tank and high, low, alarm will be generated in PLC for monitoring purpose.

Before taking up regeneration of a stream or an exchanger, it has to be ensured by the operator that the respective measuring tanks are filled with required quantity of regenerants.

In case the regeneration tanks are not filled, regeneration sequence shall not proceed further.

REGENERATION

When a filter or exchanger unit is exhausted and isolated from the system, operator selects the same along with the drives and associated tanks for regeneration operation, in either auto or in Manual mode. The unit to be regenerated will be selected by the operator by the regeneration command on SCADA graphics. All exchangers are provided with a Manual operation facility in the SCADA command screen, through which the operator may carry operations like Backwash, Regeneration, and Rinse etc. in a step-wise manner.

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During the semi-auto mode of operation, the operator shall initiate regeneration process, after that all consecutive steps shall be executed through PLC. The automatic sequence shall be interruptible at any time by the operator and can be manually controlled from that step onwards. Moreover, operator shall be able to prolong a given step by inputting revised timing data in the field locations provided for the purpose. The operator shall also be able to Hold, Advance or Reset a step as and when desired by means of soft-keys provided on the SCADA command screens.

Additional selection keys are provided on the command screen for optional Backwash of the SAC and SBA units. Regeneration shall not be able to proceed till there is high level in the selected regenerant tanks. The steps of regeneration shall be time-based.

During the chemical injection steps of regeneration, sequence shall proceed to slow rinse only if level in the corresponding dosing tank goes low.

Backwashing & Air Scoring of PSF:

On reaching high differential pressure across the bed the system will automatically stopped. Operator has to initiate from SCADA for air scouring by the blower (ABL-01 A/B). On initiation of air scoring, air blower will start and air scoring will take place as per pre-set time and auto valve get closed after that. Next step automatically will come for backwash through to overhead tank and backwashing will take place as per pre-set time. Operator has option to repeat the activity through to PLC/ SCADA by auto or manual to get the desired filter cleaning.

Backwashing of ACF:

On reaching high differential pressure across the bed the system will be automatically stopped. Operator has to initiate from SCADA for ACF backwash mode and backwash will take place as per pre-set time. Operator has option to repeat the activity through to PLC/ SCADA by auto or manual to get the desired filter cleaning.

NEUTRALISING PIT:

Wastewater generated during the course of regeneration is collected in the Neutralizing Pit (NP) comprising of two sections, each capable of handling wastewater from regeneration of one stream at a time. Waste water recirculation is provided by means of auto valve depending upon the pH value. Operator initiates disposal of neutralized water by starting the Effluent Disposal Pumps NPITP A/B.

pH transmitter ([AE-5405](#)) is mounted on the discharge header of NPIT pumps- A/B for continuous monitoring of the waste water pH. An alarm is given when the pH value deviates from a certain pre-set range i.e. 6.8- 7.5. If the pH value does not fall within the pre-specified limits during disposal mode, the operator suspends disposal mode and opening the re-circulation valve manually re-circulates water.

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Notes:

1. Backwash mode is operator initiated.
2. #: PSF Air vent valve will have a settable time for normal operation/ backwash.
3. \$: PSF Rinse valve will open for a settable time during the startup operation. After the settable time PSF rinse valve will take open feedback from PSF outlet valve & the PSF rinse valve will close.
4. During backwash operation, Valves of running operation for corresponding steps will open first & then after 5 sec. Valves of previous step will close.

VALVE SEQUENCE FOR DM PLANT

Pressure Sand Filter (PSF-A/B)

Pressure Sand Filters will remain in service till occurrence of following conditions mentioned below;

1. Differential Pressure across filter bed increases beyond the set point.
2. Working hours i.e. 20 hrs. is completed.
3. High water level in both DGWST tank

The sequence of valve operation for Pressure sand Filter (PSF-A/B) shall be as follows:

Tag No.	Description	Valve Position				
		Service Mode	Back wash mode			
Type of Operation			Drain Down	Air Scouring	B/W	Final Rinse
DFXV5404A/B	PSF- A/B Inlet	Open	Close	Close	Close	Open
DFXV5405A/B	PSF- A/B Outlet	Open	Close	Close	Close	Close
DFXV5406A/B	PSF- A/B Backwash Inlet	Close	Close	Close	Open	Close
DFXV5407A/B	PSF - A/B Backwash Outlet	Close	Open	Close	Open	Close
DFXV5408A/B	PSF - A/B Air vent	Open #	Open	Open	Open #	Close
DFXV5409A/B	PSF - A/B Final rinse outlet	Open \$	Close	Close	Close	Open
DFXV5410A/B	PSF - A/B Air Inlet	Close	Close	Open	Close	Close
DMFP- A/B	DM Feed Pump - A/B	ON	OFF	OFF	OFF	ON

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ABL-01A/B	PSF Air Blower	OFF	OFF	ON	OFF	OFF
Duration (settable)		20 hrs	5 mins	10 mins	10 mins	5 mins

Notes:

1. Backwash mode is operator initiated.
2. #: PSF Air vent valve will have a settable time for normal operation/ backwash.
3. \$: PSF Rinse valve will open for a settable time during the startup operation. After the settable time PSF rinse valve will take open feedback from PSF outlet valve & the PSF rinse valve will close.
5. During backwash operation, Valves of running operation for corresponding steps will open first & then after 5 sec. Valves of previous step will close.

Activated carbon filter (ACF)

Activated Carbon filter will remain in service till occurrence of following conditions mentioned below;

1. Differential Pressure across filter bed increases beyond the set point.
2. Working hours i.e. 20 hrs is completed.

The sequence of valve operation for Activated Carbon Filter shall be as follows:

Tag No.	Description	Valve Position			
		Service Mode	Back wash mode		
Type of Operation			Drain Down	B/W	Final Rinse
DFXV5404A/B	PSF- A/B Inlet	Open	Close	Open	Open
DFXV5405A/B	PSF- A/B Outlet	Open	Close	Open	Open
DFXV5411A/B	ACF- A/B Inlet	Open	Close	Close	Open
DFXV5412A/B	ACF- A/B Outlet	Open	Close	Close	Close
DFXV5413A/B	ACF- A/B Backwash Inlet	Close	Close	Open	Close
DFXV5414A/B	ACF- A/B Backwash Outlet	Close	Open	Open	Close
DFXV5415A/B	ACF- A/B Air vent	Open #	Open	Open #	Close
DFXV5416A/B	ACF- A/B Final rinse outlet	Open \$	Close	Close	Open
DMFP- A/B	DM Feed Pump - A/B	ON	OFF	ON	ON

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DFXV5404A/B	PSF- A/B Inlet	Open	Open	Open	Close	Close	Close	Close	Close	Open
DFXV5405A/B	PSF- A/B Outlet	Open	Open	Open	Close	Close	Close	Close	Close	Open
DFXV5411A/B	ACF- A/B Inlet	Open	Open	Open	Close	Close	Close	Close	Close	Open
DFXV5412A/B	ACF- A/B Outlet	Open	Open	Open	Close	Close	Close	Close	Close	Open
DFXV5417A/B	SAC- A/B Inlet	Open	Close	Close	Close	Close	Close	Close	Close	Open
DFXV5418A/B	SAC- A/B Outlet	Open	Close	Close	Close	Close	Close	Close	Close	Close
DFXV5419A/B	SAC- A/B B/W Inlet	Close	Close	Open	Close	Close	Close	Close	Close	Close
DFXV5420A/B	SAC- A/B B/W Outlet	Close	Open	Open	Close	Close	Close	Close	Close	Close
DFXV5421A/B	SAC- A/B Air vent	Open #	Close	Open #	Close	Close	Close	Close	Close	Close
DFXV5422A/B	SAC- A/B Final rinse outlet	Close \$	Close	Close	Close	Close	Close	Close	Close	Open
DFXV5423A/B	SAC- A/B Mid collector inlet	Close	Open	Close	Close	Close	Close	Close	Close	Close
DFXV5424A/B	SAC- A/B Mid collector outlet	Close	Close	Close	Close	Open	Open	Open	Close	Close
DFXV5427A/B	SAC- A/B Acid injection	Close	Close	Close	Close	Open	Open	Open	Close	Close
DFXV5426A/B	SAC- A/B Acid injection block	Close	Close	Close	Close	Open	Open	Open	Close	Close
DFXV5428A/B	SAC- A/B Acid injection Bleed	Open	Open	Open	Open	Close	Close	Close	Open	Open
DFXV5425A/B	SAC- A/B Down flow	Close	Close	Close	Close	Close	Open	Open	Close	Close
DFXV5467A/B	AMT-A outlet	Close	Close	Close	Close	Close	Open	Close	Close	Close
DFXV5468A/B	Power water for SAC regeneration	Close	Close	Close	Close	Open	Open	Open	Close	Close
DMFP-A/B	DM Feed pump	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	ON
DGWTP-A/B	Degassed Water Transfer Pump	OFF	OFF	OFF	OFF	ON	ON	ON	OFF	OFF
Duration (Settable)		20 hrs	2 mins	5 mins	2mins	2 mins	20 mins	60 mins	2 mins	20 mins

Notes:

1. Backwash mode / regeneration mode is operator initiated.
2. #: SAC Air vent valve will have a settable time for normal operation/ backwash.

WIPRO WATER			
CLIENT	NTPC BHEL POWER PROJECT PVT. LTD.	Job No.	JWL 2194
CONSULTANT	DEVELOPMENT CONSULTANTS PRIVATE LIMITED	DATE	26.06.2013
PROJECT	DM PLANT FOR 1X100 MW NAMRUP COMBINED CYCLE REPLACEMENT POWER PROJECT (PHASE – 1) AT NAMRUP, ASSAM.		
Title	CONTROL PHILOSOPHY FOR DM PLANT, POTABLE WATER SYSTEM & REGENERATION SYSTEM.		
Doc. Ref. No.	A4-JWL-2194-CP-DM	REV	00

3. \$: SAC Rinse valve will open for a settable time during the startup operation. After the settable time rinse valve will take open feedback from SAC outlet valve & the rinse valve will close.
4. During backwash/ regeneration operation, Valves of running operation for corresponding steps will open first & then after 5 sec. Valves of previous step will close.

For Strong Base Anion (SBA) Exchanger

SBA Exchanger will remain in service till occurrence of following conditions mentioned below;

1. A preset quantity of water has passed through the SBA A/B unit (i.e. OBR Achieved).
2. Silica value at outlet of SBA unit deviates from preset value.
3. Conductivity at the outlet of the SBA unit deviates from a preset value.
4. Working hours i.e. 20 hr. are completed.
5. Low water level in both DGWST tank

The unit will remain in normal operation mode till the occurrence of any of the following three conditions mentioned below, then the inlet and outlet valves of the unit will be closed automatically and the unit will be ready for regeneration.

Regeneration steps will proceed automatically if the following conditions are satisfied:

1. Regeneration pumps are in working condition.
2. Water level in DMWST is not high (both tank)
3. Water level in both compartments of Neutralization tank is not high.
4. Level in caustic measuring tank level is high.

On completion of regeneration, all valves of the unit shall be closed. Completion of regeneration will be followed by message of "SBA-A/B Unit ready for Normal operation" and the system can be re-inducted into Normal operation mode.

Bharat Heavy Electricals Limited	
REGIONAL ENGINEERING DEPARTMENT	
DESCRIPTION OF WORK	
(i) APPROVED (ii) BUILT (iii) DRAWING (iv) DOCUMENTS (v) APPROVED (vi) MINOR COMMENTS (vii) TYPICAL PROCEDURE (viii) REVISIONS (ix) FOR QUALITY CONTROL (x) REVIEWED (xi) FOR QUALITY CONTROL (xii) FOR QUALITY CONTROL	
The approved data will be the basis for the construction of the unit. The unit will be constructed in accordance with the approved data and the unit will be ready for operation.	
Checked by: ☒ Drawn by: ☒	Approved by: ☒ Date: 26/06/2013

WIPRO WATER			
CLIENT	NTPC BHEL POWER PROJECT PVT. LTD.	Job No.	JWL 2194
CONSULTANT	DEVELOPMENT CONSULTANTS PRIVATE LIMITED	DATE	26.06.2013
PROJECT	DM PLANT FOR 1X100 MW NAMRUP COMBINED CYCLE REPLACEMENT POWER PROJECT (PHASE – 1) AT NAMRUP, ASSAM.		
Title	CONTROL PHILOSOPHY FOR DM PLANT, POTABLE WATER SYSTEM & REGENERATION SYSTEM.		
Doc. Ref. No.	A4-JWL-2194-CP-DM	REV	00

The sequence of valve operation for SBA-A/B exchanger shall be as follows:

Tag No.	Description	Valve Position			
Type of Operation		Service mode	Backwash Mode		
			SBA M/C Flush	SBA B/W	Settle Bed
			I	II	III
DFXV5430A/B	SBA-A/B Inlet	Open	Close	Close	Close
DFXV5431A/B	SBA-A/B Outlet	Open	Close	Close	Close
DFXV5432A/B	SBA-A/B B/W Inlet	Close	Close	Open	Close
DFXV5433A/B	SBA-A/B B/W Outlet	Close	Open	Open	Close
DFXV5434A/B	SBA-A/B Air vent	Open #	Close	Open #	Close
DFXV5435A/B	SBA-A/B Final rinse outlet	Close \$	Close	Close	Close
DFXV5436A/B	SBA-A/B M/C inlet	Close	Open	Close	Close
DFXV5437A/B	SBA-A/B M/C outlet	Close	Close	Close	Close
DFXV5440A/B	SBA-A/B caustic injection	Close	Close	Close	Close
DFXV5439A/B	SBA-A/B Caustic injection block	Close	Close	Close	Close
DFXV5441A/B	SBA-A/B Caustic injection Bleed	Open	Open	Open	Open
DFXV5438A/B	SBA-A/B Down flow	Close	Close	Close	Close
DFXV5463A/B	CMT-A outlet	Close	Close	Close	Close
DFXV5464A/B	Power water for SBA Regeneration	Close	Close	Close	Close
DGWTP-A/B	DG water transfer pump	ON	ON	ON	OFF
DMRP-A/B	DM Regeneration pump	OFF	OFF	OFF	OFF
Duration (Settable)		20 hrs	5 min.	2 min.	2 min.

Continue.....

Tag No.	Description	Valve Position				
Type of Operation		Regeneration Mode				
		Power water	Alkali Inject.	Alkali Rinse	Settle Bed	Final Rinse - SBA
		IV	V	VI	VII	VIII
DFXV5430A/B	SBA-A/B Inlet	Close	Close	Close	Close	Open
DFXV5431A/B	SBA-A/B Outlet	Close	Close	Close	Close	Close
DFXV5432A/B	SBA-A/B B/W Inlet	Close	Close	Close	Close	Close
DFXV5433A/B	SBA-A/B B/W Outlet	Close	Close	Close	Close	Close
DFXV5434A/B	SBA-A/B Air vent	Close	Close	Close	Close	Close
DFXV5435A/B	SBA-A/B Final rinse outlet	Close	Close	Close	Close	Open

WIPRO WATER			
CLIENT	NTPC BHEL POWER PROJECT PVT. LTD.	Job No.	JWL 2194
CONSULTANT	DEVELOPMENT CONSULTANTS PRIVATE LIMITED	DATE	26.06.2013
PROJECT	DM PLANT FOR 1X100 MW NAMRUP COMBINED CYCLE REPLACEMENT POWER PROJECT (PHASE – 1) AT NAMRUP, ASSAM.		
Title	CONTROL PHILOSOPHY FOR DM PLANT, POTABLE WATER SYSTEM & REGENERATION SYSTEM.		
Doc. Ref. No.	A4-JWL-2194-CP-DM	REV	00

DFXV5436A/B	SBA-A/B M/C inlet	Close	Close	Close	Close	Close
DFXV5437A/B	SBA-A/B M/C outlet	Open	Open	Open	Close	Close
DFXV5440A/B	SBA-A/B caustic injection	Open	Open	Open	Close	Close
DFXV5439A/B	SBA-A/B Caustic injection block	Open	Open	Open	Close	Close
DFXV5441A/B	SBA-A/B Caustic injection Bleed	Close	Close	Close	Open	Open
DFXV5438A/B	SBA-A/B Down flow	Close	Open	Open	Close	Close
DFXV5463A/B	CMT-A outlet	Close	Open	Close	Close	Close
DFXV5464A/B	Power water for SBA Regeneration	Open	Open	Open	Close	Close
DGWTP-A/B	DG water transfer pump	OFF	OFF	OFF	OFF	ON
DMRP-A/B	DM Regeneration pump	ON	ON	ON	OFF	OFF
Duration (Settable)		2 mins	30 mins	35 mins	5 mins	5 mins

Notes:

1. Backwash mode / regeneration mode is operator initiated.
2. #: SBA Air vent valve will have a settable time for normal operation/ backwash.
3. \$: SBA Rinse valve will open for a settable time during the startup operation. After the settable time rinse valve will take open feedback from SBA outlet valve & the rinse valve will close.
4. During backwash/ regeneration operation, Valves of running operation for corresponding steps will open first & then after 5 sec. Valves of previous step will close.

For Mixed Bed Exchanger

Mixed Bed Exchanger will remain in service till occurrence of following conditions mentioned below;

1. A preset quantity of water has passed through the unit (i.e. OBR Achieved).
2. Conductivity at the outlet of the MB unit deviates from a preset value.
3. Silica at the outlet of the MB unit deviates from a preset value.
4. Working hours i.e. 140 hr. are completed.

Regeneration steps will proceed automatically if the following conditions are satisfied:

1. Regeneration pumps are in working condition.
2. Water level in both compartments of Neutralization tank is not high.
3. Level in caustic measuring tank & Acid measuring tank level is high.

WIPRO WATER			
CLIENT	NTPC BHEL POWER PROJECT PVT. LTD.	Job No.	JWL 2194
CONSULTANT	DEVELOPMENT CONSULTANTS PRIVATE LIMITED	DATE	26.06.2013
PROJECT	DM PLANT FOR 1X100 MW NAMRUP COMBINED CYCLE REPLACEMENT POWER PROJECT (PHASE – 1) AT NAMRUP, ASSAM.		
Title	CONTROL PHILOSOPHY FOR DM PLANT, POTABLE WATER SYSTEM & REGENERATION SYSTEM.		
Doc. Ref. No.	A4-JWL-2194-CP-DM	REV	00

On completion of regeneration, all valves of the unit shall be closed. Completion of regeneration will be followed by message of "MB-A/B Unit ready for Normal operation" and the system can be re-inducted into Normal operation mode.

The sequence of valve operation for MB exchanger shall be as follows:



Tag No.	Description	Valve Position						
		Service Mode	Regeneration Mode					
			M/C Flush	B/W	Settle bed	Power water	Alkali inject.	Alkali Rinse
			I	II	III	IV	V	VI
DFXV5430A/B	SBA-A/B Inlet	Open	Open	Open	Close	Close	Close	Close
DFXV5431A/B	SBA-A/B Outlet	Open	Open	Open	Close	Close	Close	Close
DFXV5442A/B	MB-A/B Inlet	Open	Close	Close	Close	Close	Close	Close
DFXV5443A/B	MB-A/B Outlet	Open	Close	Close	Close	Close	Close	Close
DFXV5444A/B	MB-A/B B/W Inlet	Close	Close	Open	Close	Close	Close	Close
DFXV5445A/B	MB-A/B B/W Outlet	Close	Open	Open	Close	Close	Close	Close
DFXV5446A/B	MB-A/B Air vent	Open #	Close	Open #	Close	Close	Close	Close
DFXV5447A/B	MB-A/B Final rinse outlet	Close \$	Close	Close	Close	Close	Close	Close
DFXV5448A/B	MB-A/B air inlet	Close	Close	Close	Close	Close	Close	Close
DFXV5449A/B	MB-A/B M/C inlet	Close	Open	Close	Close	Close	Close	Close
DFXV5450A/B	MB-A/B M/C outlet	Close	Close	Close	Close	Open	Open	Open
DFXV5454A/B	MB-A/B caustic injection	Close	Close	Close	Close	Open	Open	Open
DFXV5453A/B	MB-A/B Caustic injection block	Close	Close	Close	Close	Open	Open	Open
DFXV5455A/B	MB-A/B Caustic injection Bleed	Open	Open	Open	Open	Close	Close	Close
DFXV5451A/B	MB-A/B Up flow	Close	Close	Close	Close	Close	Open	Open
DFXV5457A/B	MB-A/B Acid injection	Close	Close	Close	Close	Close	Close	Close
DFXV5456A/B	MB-A/B acid injection block	Close	Close	Close	Close	Close	Close	Close
DFXV5458A/B	MB-A/B Acid injection Bleed	Open	Open	Open	Open	Open	Open	Open

WIPRO WATER			
CLIENT	NTPC BHEL POWER PROJECT PVT. LTD.	Job No.	JWL 2194
CONSULTANT	DEVELOPMENT CONSULTANTS PRIVATE LIMITED	DATE	26.06.2013
PROJECT	DM PLANT FOR 1X100 MW NAMRUP COMBINED CYCLE REPLACEMENT POWER PROJECT (PHASE – 1) AT NAMRUP, ASSAM.		
Title	CONTROL PHILOSOPHY FOR DM PLANT, POTABLE WATER SYSTEM & REGENERATION SYSTEM.		
Doc. Ref. No.	A4-JWL-2194-CP-DM	REV	00

DFXV5400A/B	MB-A/B Down flow	Close	Close	Close	Close	Close	Close	Close
DFXV5463C/D	CMT-B outlet	Close	Close	Close	Close	Close	Open	Close
DFXV5464C/D	Power water for MB-Anion Reg.	Close	Close	Close	Close	Open	Open	Open
DFXV5467C/D	AMT-B outlet	Close	Close	Close	Close	Close	Close	Close
DFXV5468C/D	Power water for MB-Cation Reg.	Close	Close	Close	Close	Close	Close	Close
DGWTP-A/B/C #	DG water transfer pump	ON	ON	ON	OFF	OFF	OFF	OFF
DMRP-A/B	DM Regeneration pump	OFF	OFF	OFF	OFF	ON	ON	ON
ABL- 03A/B	MB Blower	OFF	OFF	OFF	OFF	OFF	OFF	OFF
Duration (Settable)		140 hrs	2 min.	5 min.	2 min.	2 min.	30 min.	75 min.

Continue.....

Tag No.	Description	Valve Position						
Type of Operation		Regeneration mode						
		Settle Bed	Power water	Acid Inject.	Acid Rinse	Drain Down	Air Mixing	Final Rinse
		VII	VIII	IX	X	XI	XII	XIII
DFXV5430A/B	SBA-A/B Inlet	Close	Close	Close	Close	Close	Close	Open
DFXV5431A/B	SBA-A/B Outlet	Close	Close	Close	Close	Close	Close	Open
DFXV5442A/B	MB-A/B Inlet	Close	Close	Close	Close	Close	Close	Open
DFXV5443A/B	MB-A/B Outlet	Close	Close	Close	Close	Close	Close	Close
DFXV5444A/B	MB-A/B B/W Inlet	Close	Close	Close	Close	Close	Close	Close
DFXV5445A/B	MB-A/B B/W Outlet	Close	Close	Close	Close	Close	Close	Close
DFXV5446A/B	MB-A/B Air vent	Close	Close	Close	Close	Open	Open	Close
DFXV5447A/B	MB-A/B Final rinse outlet	Close	Open	Open	Open	Close	Close	Open
DFXV5448A/B	MB-A/B air inlet	Close	Close	Close	Close	Close	Open	Close
DFXV5449A/B	MB-A/B M/C inlet	Close	Close	Close	Close	Close	Close	Close
DFXV5450A/B	MB-A/B M/C outlet	Close	Close	Close	Close	Open	Close	Close
DFXV5454A/B	MB-A/B caustic injection	Close	Close	Close	Close	Close	Close	Close
DFXV5453A/B	MB-A/B Caustic injection block	Close	Close	Close	Close	Close	Close	Close
DFXV5455A/B	MB-A/B Caustic injection Bleed	Open	Open	Open	Open	Open	Open	Open
DFXV5451A/B	MB-A/B Up flow	Close	Close	Close	Close	Close	Close	Close
DFXV5457A/B	MB-A/B Acid injection	Close	Open	Open	Open	Close	Close	Close

WIPRO WATER			
CLIENT	NTPC BHEL POWER PROJECT PVT. LTD.	Job No.	JWL 2194
CONSULTANT	DEVELOPMENT CONSULTANTS PRIVATE LIMITED	DATE	26.06.2013
PROJECT	DM PLANT FOR 1X100 MW NAMRUP COMBINED CYCLE REPLACEMENT POWER PROJECT (PHASE – 1) AT NAMRUP, ASSAM.		
Title	CONTROL PHILOSOPHY FOR DM PLANT, POTABLE WATER SYSTEM & REGENERATION SYSTEM.		
Doc. Ref. No.	A4-JWL-2194-CP-DM	REV	00

DFXV5456A/B	MB-A/B acid injection block	Close	Open	Open	Open	Close	Close	Close
DFXV5458A/B	MB-A/B Acid injection Bleed	Open	Close	Close	Close	Open	Open	Open
DFXV5400A/B	MB-A/B Down flow	Close	Close	Open	Open	Close	Close	Close
DFXV5463C/D	CMT-B outlet	Close	Close	Close	Close	Close	Close	Close
DFXV5464C/D	Power water for MB-Anion Reg.	Close	Close	Close	Close	Close	Close	Close
DFXV5467C/D	AMT-B outlet	Close	Close	Open	Close	Close	Close	Close
DFXV5468C/D	Power water for MB-Cation Reg.	Close	Open	Open	Open	Close	Close	Close
DGWTP-A/B/C #	DG water transfer pump	OFF	OFF	ON	ON	OFF	OFF	ON
DMRP-A/B	DM Regeneration pump	OFF	ON	ON	ON	OFF	OFF	OFF
ABL- 03A/B	MB Blower	OFF	OFF	OFF	OFF	OFF	ON	OFF
Duration (Settable)		2 min.	2 min.	30 min.	75 min.	5 min	10 min	5 min

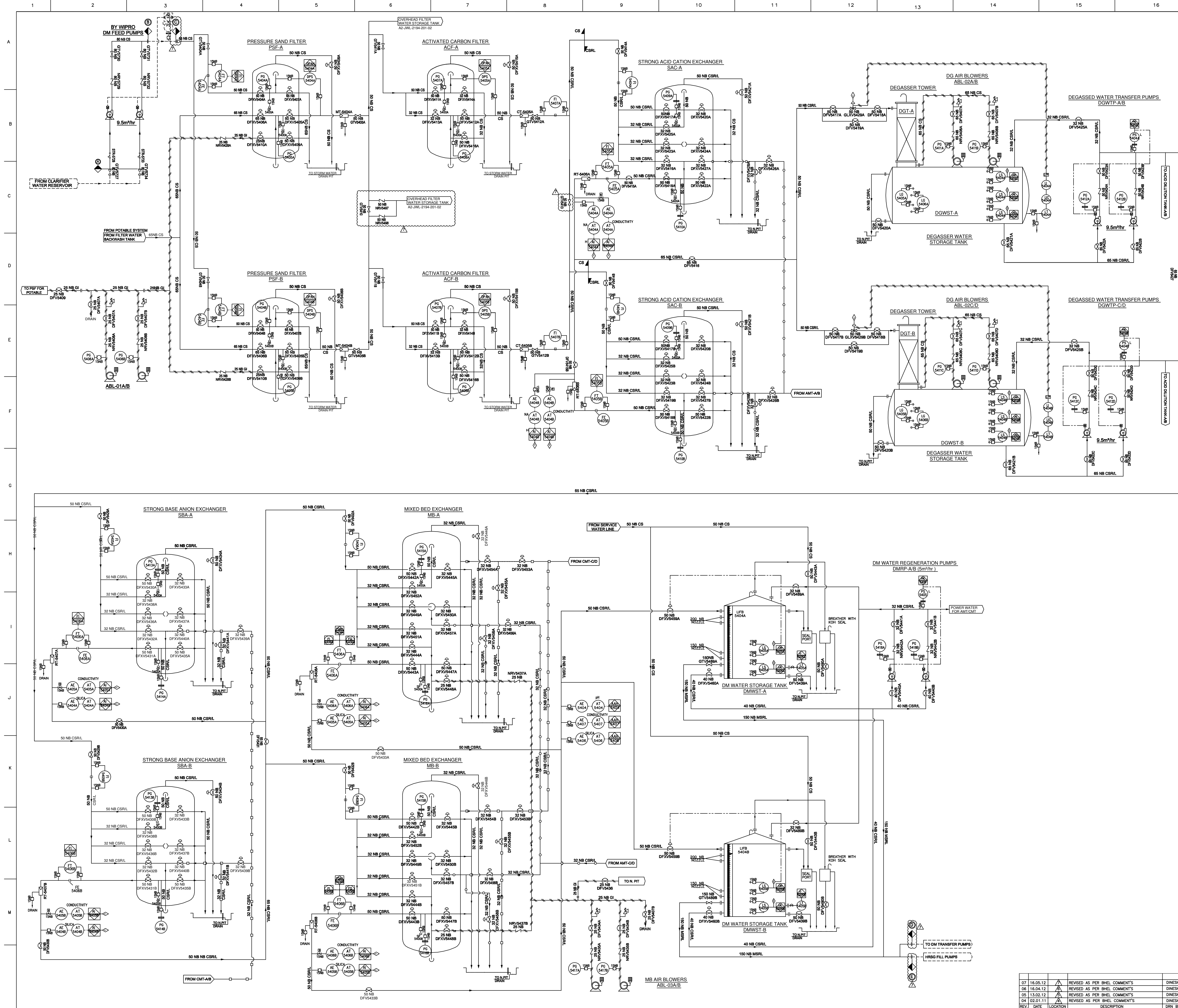
Notes:

1. Regeneration mode is operator initiated.
2. #: MB Air vent valve will have a settable time for normal operation/ backwash.
3. \$: MB final rinse valve will open for a settable time during the startup operation. After the settable time rinse valve will take open feedback from MB outlet valve & the rinse valve will close.
4. During backwash/ regeneration operation, Valves of running operation for corresponding steps will open first & then after 5 sec. Valves of previous step will close.

Notes:

1. In auto mode any vessel can be selected in any sequence for operation. But operator has to ensure corresponding valves are open for that particular vessel.

Bharat Heavy Electricals Limited	
PROJECT ENGINEERING DEPARTMENT	
DESIGNING OFFICE	
01. APPROVED DESIGN & BUILT DRAWING DOCUMENTS 02. APPROVED INSTRUMENTS/COMMERICALITY MAY PROCEED PLEASE RE-DESIGN FOR FINAL APPROVAL 03. APPROVAL FOR INSTRUMENT AND SUBMIT FOR APPROVAL 04. APPROVAL FOR INSTRUMENT	
The approval given by the design office is the responsibility to comply with the design specifications and all applicable codes and standards. Design has to ensure safe and successful operation and meet the intended performance of the equipment.	
Checked by: ☒ Approved by: ☐ Date: 10/07/13	Checked by: ☐ Approved by: ☐ Date: 10/07/13



NOTES :

- 1) P&ID SHALL BE READ IN CONJUNCTION WITH INTERLOCK LIST.
- 2) THE FOLLOWING CRITICAL ALARMS WILL BE PROVIDED WITH POTENTIAL FREE CONTACTS IN THE DM PLANT PLC FOR FURTHER ROUTING TO DCS BY BREL.
- 3) HIGH/LOW LEVEL IN THE DM STORAGE TANK.
- 4) CONDUCTIVITY pH & SILICA IN THE MIXED BED OUTLET HEADER.
- 5) PLC INDICATIONS ARE INDICATED AS 
- 6) DM FEED PUMPS SHALL BE TRIPPED ON LOW LEVEL OF CLARIFIED WATER STORAGE TANK.
- 7) ADDITIONAL VENT AT HIGH POINTS & DRAIN AT LOW POINT SHALL BE PROVIDED AS PER FINAL LAYOUT.
- 8) ALL HEADERS SHALL BE DESIGNED TO INCLUDE FLOW CAPACITY OF STANDBY SYSTEM.
- 9) AT TERMINAL POINTS COUNTER FLANGES, GASKETS, STUD & NUTS SHALL BE IN THE SCOPE OF WIPRO WATER.

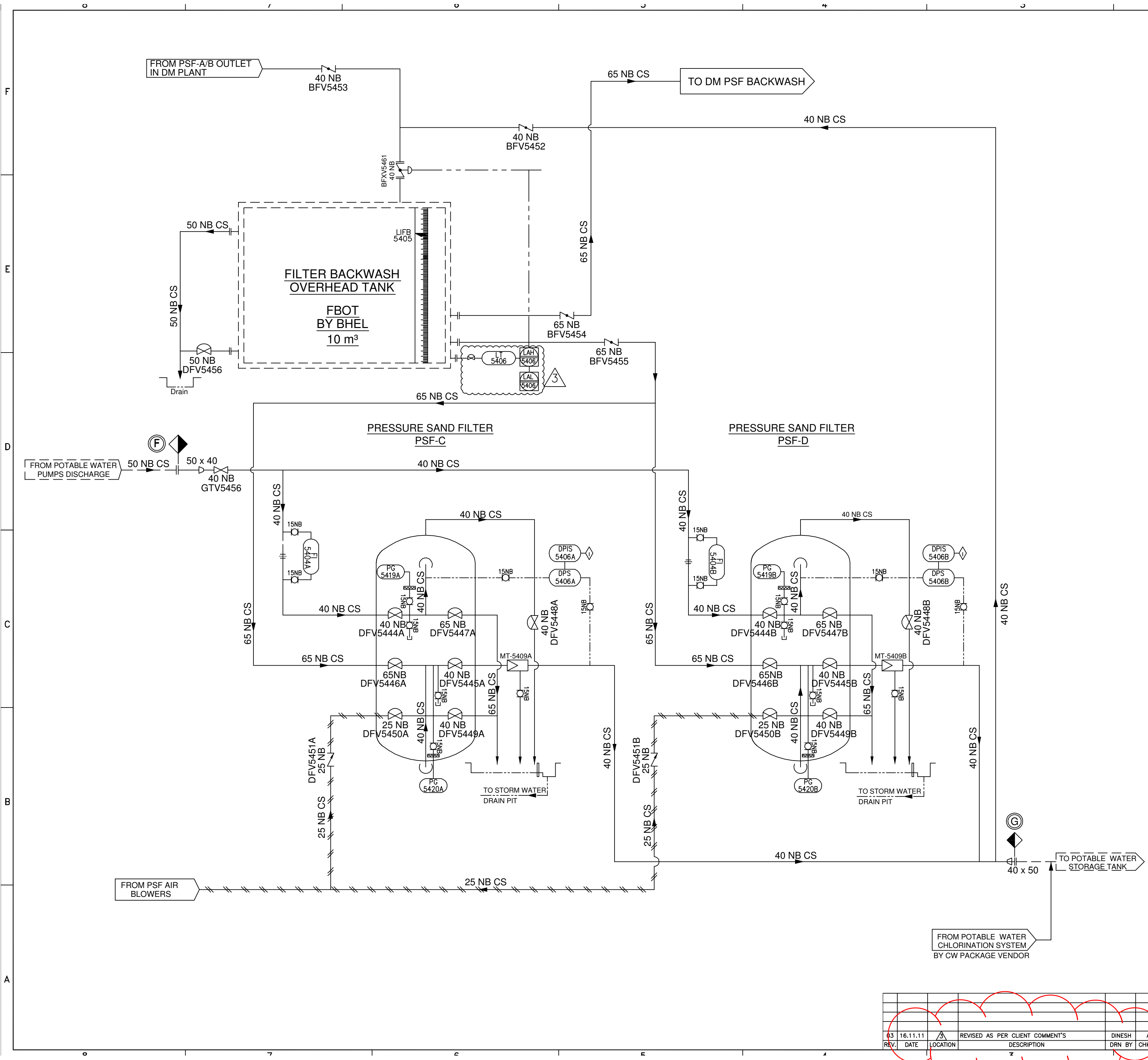
TERMINATION POINTS						
MARK NO.	DESCRIPTION	SIZE	FLOW m³/hr	PRESSURE kg/cm²	END CONNECTION	
(A)	AT THE INLET OF SUCTION STRAINER OF DM PLANT FEED PUMPS	80NB	9.5	FLOODED		
(B)	AT THE DISCHARGE OF DM FEED PUMPS	80NB	9.5	5kg/cm² (GPRX)	FLANGED AS PER AISI B 16.5 #150	
(C)	INLET OF PRESSURE SAND FILTER	80NB	9.5	5kg/cm² (GPRX)		
(D)	TO DM WATER TRANSFER PUMP	80NB	—	FLOODED		
(E)	TO HRSG FILL PUMP	150NB	—	FLOODED		

INSTRUMENTS	
MARK NO.	DESCRIPTION
(PG)	PRESSURE GAUGE
(LSH)	LEVEL SWITCH HIGH
(LSL)	LEVEL SWITCH LOW
(LSLL)	LEVEL SWITCH LOW LOW
(FE)	FLOW ELEMENT
(FT)	FLOW TRANSMITTER
(FI)	FLOW INDICATOR
(pHE)	pH ELEMENT
(pHT)	pH TRANSMITTER
(pHI)	pH INDICATOR
(LG)	LEVEL GAUGE
(CE)	CONDUCTIVITY ELEMENT
(CT)	CONDUCTIVITY TRANSMITTER
(CI)	CONDUCTIVITY INDICATOR
(LI)	LEVEL INDICATOR
(LIT)	LEVEL INDICATOR TRANSMITTER
(DPS)	DIFFERENTIAL PRESSURE SWITCH
(PSL)	PRESSURE SWITCH LOW
(LFB)	FLOAT & BOARD LEVEL INDICATOR
(SIA)	SILICA ANALYZER
(Na)	SODIUM ANALYZER

LEGEND	
	PNEUMATIC ACTUATED DIAPHRAGM VALVE
	MANUAL DIAPHRAGM VALVE
	MANUAL BALL VALVE
	NON RETURN VALVE
	PRESSURE RELIEF VALVE
	SAMPLING VALVE
	'Y' TYPE STRAINER
	VENT
	RESIN TRAP
	BLOWER
	CENTRIFUGAL PUMP WITH MOTOR
	FLOAT & BOARD LEVEL INDICATOR
	BY WIPRO WATER
	AIR LINE
	CAUSTIC LINE
	ACID LINE
	BY BHEL
	INSTRUMENT SIGNAL
	BHEL SCOPE
	WIPRO WATER SCOPE

	ASSAM POWER GENERATION CORPORATION LTD. GUWAHATI, ASSAM
	DEVELOPMENT CONSULTANTS (P) LTD. CONSULTING ENGINEERS
PROJECT:	1X100MW NAMRUP COMBINED CYCLE REPLACEMENT POWER PROJECT (PHASE-1) AT NAMRUP,ASSAM
	BHARAT HEAVY ELECTRICALS LTD. HYDERABAD
	NTPC BHEL POWER PROJECTS PVT. LTD. (A Joint Venture Company of NTPC & BHEL)

TITLE:					<u>PROCESS & INSTRUMENT FOR</u> DM PLANT				
Cv	ME	EL	CA&I		DEPT.	SCALE NTS.	VENDOR DOC. NO.: A0-JWL-2194-201-01		
					SIGN				
					DATE		SHT. NO:	1 OF 3	REV: 07



Bharat Heavy Electricals Limited
Ramachandrapuram, Hyderabad

PROJECT ENGINEERING DEPARTMENT

DESCRIPTION OF CODE :

✓ 01. APPROVED.SUBMIT AS BUILT DRAWINGS / DOCUMENTS.

02. APPROVED WITH MINOR COMMENTS.ACTIVITY MAY PROCEED.PLEASE RESUBMIT FOR FINAL APPROVAL.

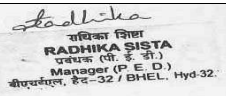
03. REVISE AS PER BHEL COMMENTS AND RESUBMIT FOR APPROVAL.

04. RETAINED FOR INFORMATION.

This approval does not absolve the vendor from the responsibility to comply with BHEL's specification and all applicable codes and standards. Vendor has to ensure safe and smooth operation and meet the intended performance of the equipment.

Comments as marked on drawing
✓

Comments as in enclosed document.


RADIKA BISTA
Manager (P. E. D.) Hyderabad
BHEL, Hyderabad

TERMINATION POINTS					
MARK NO.	DESCRIPTION	SIZE	FLOW m³/hr	PRESSURE kg/cm²	END CONNECTION
F	AT THE INLET HEADER OF PRESSURE SAND FILTER	50NB	8.2	4.0	FLANGED AS PER ANSI B 16.5 #150
G	AT THE OUTLET HEADER OF PRESSURE SAND FILTER	50NB	8.0	—	

INSTRUMENTS	
MARK NO.	DESCRIPTION
PG	PRESSURE GAUGE
DPS	DIFFERENTIAL PRESSURE SWITCH
LSH	LEVEL SWITCH HIGH
LSL	LEVEL SWITCH LOW
FE	FLOW ELEMENT
FI	FLOW INDICATOR
FT	FLOW TRANSMITTER
LIFB	FLOAT & BOARD LEVEL INDICATOR
SP	SAMPLING POINT

LEGEND FOR VALVES	
 MANUAL DIAPHRAGM VALVE	———— BY WIPRO WATER
 PNEUMATIC ACTUATED BUTTERFLY VALVE	----- BY BHEL
 MANUAL BUTTERFLY VALVE	==== AIR LINE
 MANUAL BALL VALVE	--- INSTRUMENT LINE
 MEDIA TRAP	BHEL SCOPE  WIPRO WATER SCOPE

CUSTOMER:
 ASSAM POWER GENERATION CORPORATION LTD.
GUWAHATI, ASSAM

CONSULTANT :
 DEVELOPMENT CONSULTANTS (P) LTD.
CONSULTING ENGINEERS

PROJECT:
1X100MW NAMRUP COMBINED CYCLE REPLACEMENT POWER PROJECT (PHASE-1) AT NAMRUP,ASSAM

EPC ONTRACTOR:
 BHARAT HEAVY ELECTRICALS LTD.
HYDERABAD

EPC SUB-CONTRACTOR:
 NTPC BHEL POWER PROJECTS PVT. LTD.
(A Joint Venture Company of NTPC & BHEL)

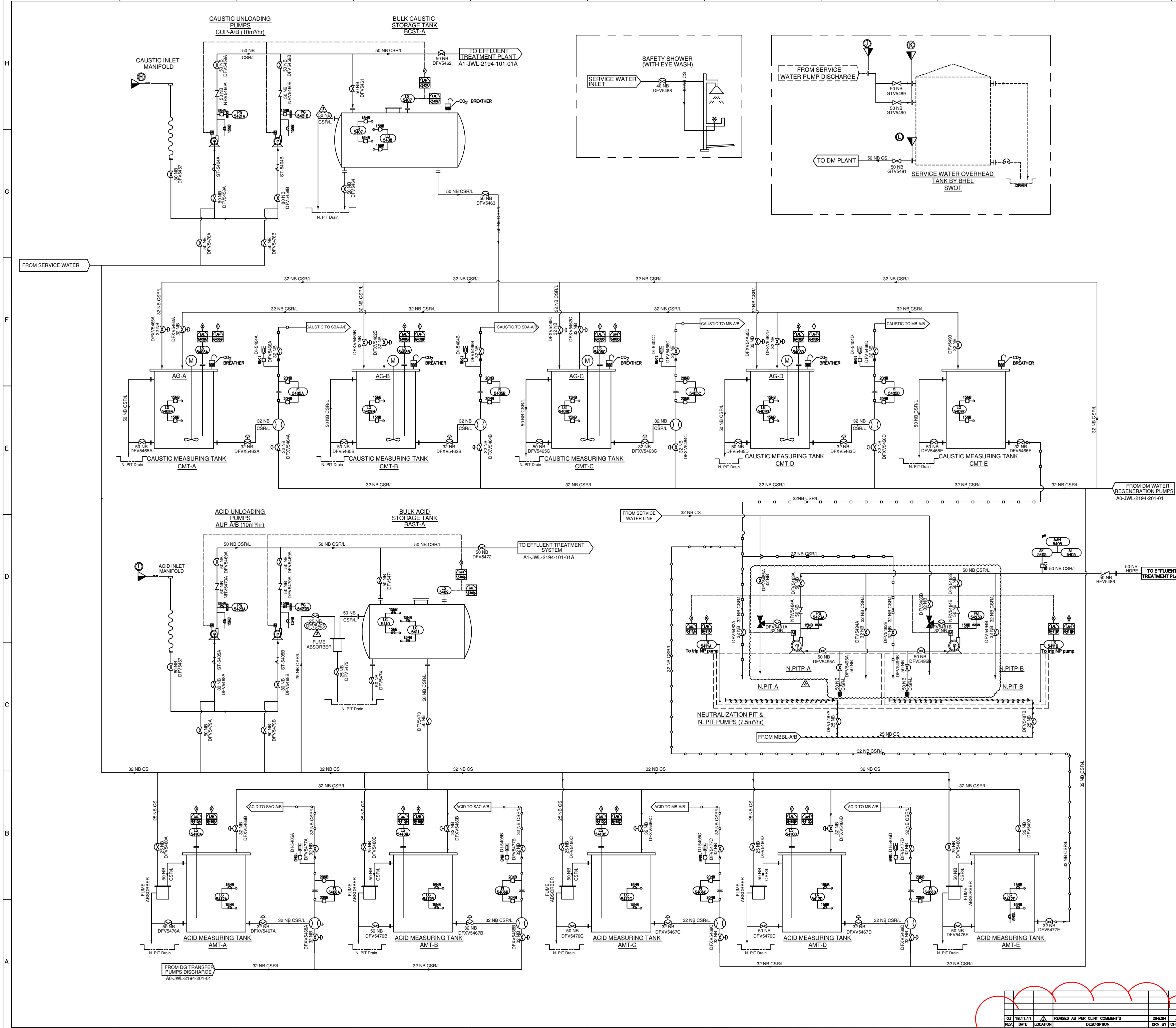
VENDOR:
 WIPRO WATER
SERENE PROPERTIES PVT LTD., SEZ,
AIROLI, NAVI MUMBAI-400708.

TITLE:
PROCESS & INSTRUMENT FOR POTABLE SYSTEM

REV.	DATE	LOCATION	DESCRIPTION	DRN BY	CHK. BY
03	16.11.11	A	REVISED AS PER CLIENT COMMENT'S	DINESH	AG.

CV	ME	EL	C&I	DEPT.	SCALE	VENDOR DOC. NO.:
					NTS.	A2-JWL-2194-201-02
				SIGN		SHT. NO: 2 OF 3
				DATE		REV: 03

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Bharat Heavy Electricals Limited
Bharat Heavy Electricals Limited, Hyderabad

PROJECT ENGINEERING DEPARTMENT

DESCRIPTION OF CODE:

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- 03. REVISE AS PER BHEL COMMENTS AND RESUBMIT FOR APPROVAL.
- 04. RETAINED FOR INFORMATION.

This approval does not absolve the vendor from the responsibility to comply with BHEL's specification and all applicable codes and standards. Vendor has to ensure safe and smooth operation and meet the intended performance of the equipment.

Comments as marked on drawing: ✓

Comments as in enclosed document:

TERMINATION POINTS				
MARK NO.	DESCRIPTION	SIZE	FLOW RATE	END CONNECTION
01	CAUSTIC INLET MANIFOLD	80NB	10	FLOODED
02	ACID INLET MANIFOLD	80NB	10	FLOODED
03	SERVICE WATER INLET AT DM PLANT (MAXIMUM 10m DISTANCE FROM THE SERVICE WATER TANK AT THE TOP OF THE DM-BUILDING)	80NB	-	-
04	SERVICE WATER AT THE INLET OF SERVICE WATER STORAGE TANK	50NB	-	-
05	SERVICE WATER AT THE OUTLET OF SERVICE WATER STORAGE TANK	50NB	-	-

INSTRUMENTS	
MARK NO.	DESCRIPTION
PG	PRESSURE GAUGE
LSH	LEVEL SWITCH HIGH
LSL	LEVEL SWITCH LOW
FI	FLOW INDICATOR
pHE	pH ELEMENT
pHT	pH TRANSMITTER
pHI	pH INDICATOR
LG	LEVEL GAUGE
DI	DENSITY INDICATOR

LEGEND	
	PNEUMATIC ACTUATED BUTTERFLY VALVE
	PNEUMATIC ACTUATED DIAPHRAGM VALVE
	MANUAL BUTTERFLY VALVE
	MANUAL DIAPHRAGM VALVE
	MANUAL BALL VALVE
	MANUAL NEEDLE VALVE
	NON RETURN VALVE
	SAMPLING VALVE
	TYPE STAINER
	VENT
	EJECTOR
	FOOT VALVE
	AGITATOR WITH MOTOR
	CENTRIFUGAL PUMP WITH MOTOR
	BY WIPRO WATER
	BY CLIENT
	INSTRUMENT SIGNAL
	BHEL SCOPE
	WIPRO SCOPE

CUSTOMER: ASSAM POWER GENERATION CORPORATION LTD. GUWAHATI, ASSAM

CONSULTANT: DEVELOPMENT CONSULTANTS (P) LTD. CONSULTING ENGINEERS

PROJECT: 1X100MW NAMRUP COMBINED CYCLE REPLACEMENT POWER PROJECT (PHASE-1) AT NAMRUP, ASSAM

EPC CONTRACTOR: BHARAT HEAVY ELECTRICALS LTD. HYDERABAD

EPC SUB-CONTRACTOR: NTPC BHEL POWER PROJECTS PVT. LTD. (A Joint Venture Company of NTPC & BHEL)

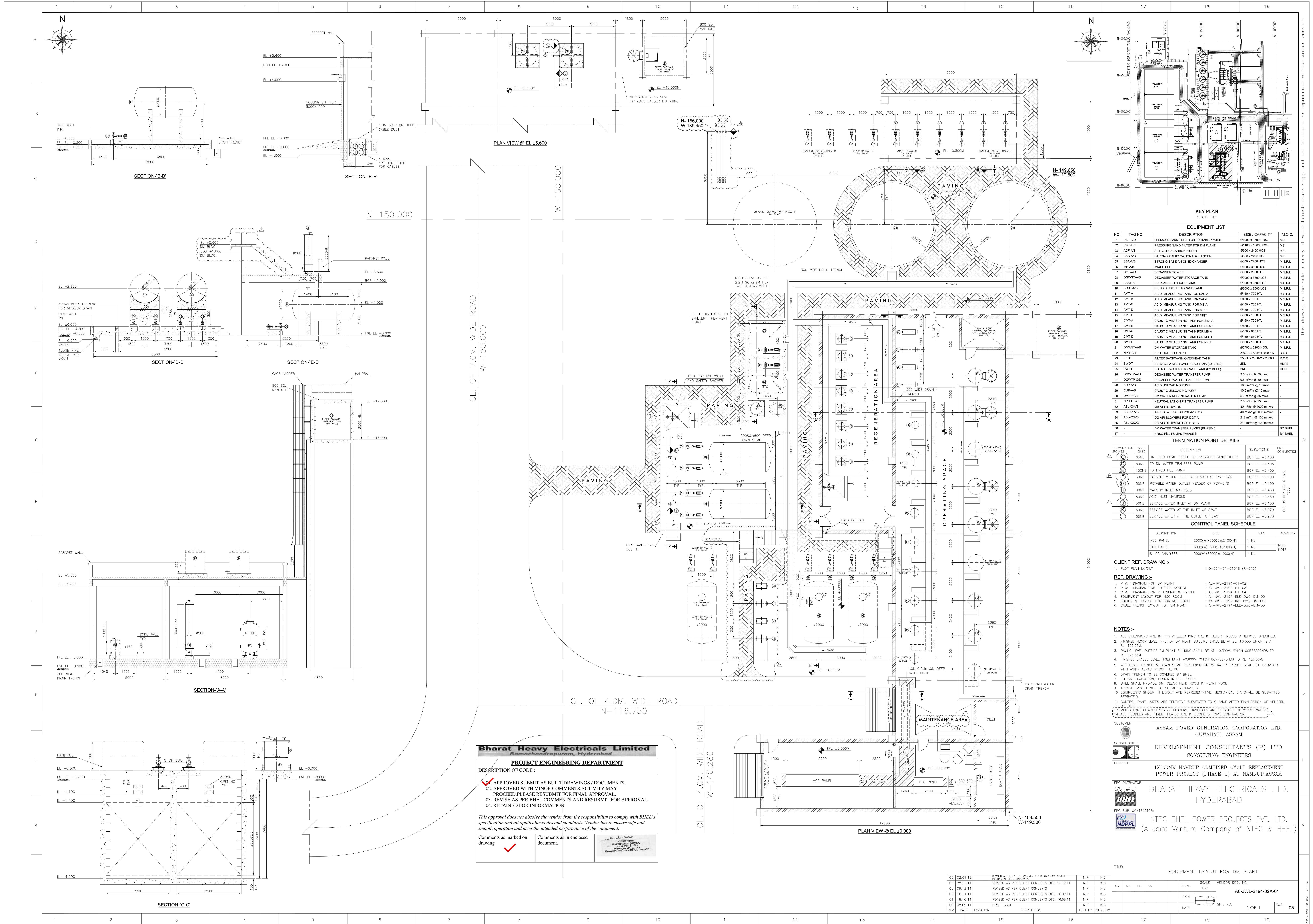
VENDOR: WIPRO WATER SERENE PROPERTIES PVT. LTD., SEZ, AIROLI, NAVI MUMBAI-400708.

TITLE: PIPING & INSTRUMENT FOR REGENERATION SYSTEM

ME	EL	CM	DEPT.	SCALE	VENDOR DOC. NO.
				NTS.	A1-JWL-2194-201-03
SIGN	DATE	DATE	DATE	SHT. NO.	03 OF 03
REV.	DATE	LOCATION	DESCRIPTION	DRN BY	CHK. BY

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WIPRO WATER ORIGINAL SIZE: A1



KEY PLAN
SCALE: NTS

EQUIPMENT LIST				
NO.	TAG NO.	DESCRIPTION	SIZE / CAPACITY	M.O.C.
01	PSF-C/D	PRESSURE SAND FILTER FOR PORTABLE WATER	Ø1100 x 1500 HOS.	MS.
02	PSF-A/B	PRESSURE SAND FILTER FOR DM PLANT	Ø1100 x 1500 HOS.	MS.
03	ACF-A/B	ACTIVATED CARBON FILTER	Ø900 x 2400 HOS.	MS.
04	SAC-A/B	STRONG ACIDIC CATION EXCHANGER	Ø800 x 2200 HOS.	MS.
05	SBA-A/B	STRONG BASE ANION EXCHANGER	Ø800 x 2200 HOS.	M.S.R.L
06	MB-A/B	MIXED BED	Ø500 x 3000 HOS.	M.S.R.L
07	DOT-A/B	DEGASSER TOWER	Ø500 x 2500 HT.	M.S.R.L
08	DOWT-A/B	DEGASSER WATER STORAGE TANK	Ø5000 x 2000 LOS.	M.S.R.L
09	BAST-A/B	BULK ACID STORAGE TANK	Ø2000 x 3000 LOS.	M.S.R.L
10	BCST-A/B	BULK CAUSTIC STORAGE TANK	Ø2000 x 3500 LOS.	M.S.R.L
11	AMT-A	ACID MEASURING TANK FOR SACA	Ø450 x 700 HT.	M.S.R.L
12	AMT-B	ACID MEASURING TANK FOR SABA	Ø450 x 700 HT.	M.S.R.L
13	AMT-C	ACID MEASURING TANK FOR MBA	Ø450 x 700 HT.	M.S.R.L
14	AMT-D	ACID MEASURING TANK FOR MB-B	Ø450 x 700 HT.	M.S.R.L
15	AMT-E	ACID MEASURING TANK FOR NPT	Ø450 x 1000 HT.	M.S.R.L
16	CMT-A	CAUSTIC MEASURING TANK FOR SBA	Ø450 x 700 HT.	M.S.R.L
17	CMT-B	CAUSTIC MEASURING TANK FOR SBA-B	Ø450 x 700 HT.	M.S.R.L
18	CMT-C	CAUSTIC MEASURING TANK FOR MBA	Ø450 x 600 HT.	M.S.R.L
19	CMT-D	CAUSTIC MEASURING TANK FOR MB-B	Ø450 x 600 HT.	M.S.R.L
20	CMT-E	CAUSTIC MEASURING TANK FOR NPT	Ø500 x 1000 HT.	M.S.R.L
21	DMVST-AB	DM WATER STORAGE TANK	Ø5700 x 6000 HOS.	R.C.C.
22	NPT-AB	NEUTRALIZATION PIT	2200 x 2200 x 2500 HT.	R.C.C.
23	FROT	FILTER BACKWASH OVERHEAD TANK	2500 x 2500 x 2000 HT.	R.C.C.
24	SWOT	SERVICE WATER OVERHEAD TANK (BY BHEL)	2KL	HDPE
25	PWST	POTABLE WATER STORAGE TANK (BY BHEL)	2KL	HDPE
26	DOVTP-AB	DEGASSER WATER TRANSFER PUMP	9.5 m ³ /hr @ 50 mm	-
27	DOVTP-CD	DEGASSER WATER TRANSFER PUMP	9.5 m ³ /hr @ 50 mm	-
28	AUP-AB	ACID UNLOADING PUMP	10.0 m ³ /hr @ 10 mm	-
29	CUP-AB	CAUSTIC UNLOADING PUMP	10.0 m ³ /hr @ 10 mm	-
30	DMVTP-AB	DM WATER REGENERATION PUMP	5.0 m ³ /hr @ 35 mm	-
31	NPTTP-AB	NEUTRALIZATION PIT TRANSFER PUMP	7.5 m ³ /hr @ 25 mm	-
32	ABL-03AB	MB AIR BLOWERS	30 m ³ /hr @ 5000 mm	-
33	ABL-01AB	AIR BLOWERS FOR PSF-A/B/C/D	40 m ³ /hr @ 5000 mm	-
34	ABL-02AB	DM AIR BLOWERS FOR SBA	212 m ³ /hr @ 100 mm	-
35	ABL-02CD	DM AIR BLOWERS FOR SBA-B	212 m ³ /hr @ 100 mm	-
36	-	DM WATER TRANSFER PUMPS (PHASE-I)	-	BY BHEL
37	-	HSSG FILL PUMPS (PHASE-I)	-	BY BHEL

TERMINATION POINT DETAILS				
TERMINATION POINTS	SIZE (NB)	DESCRIPTION	ELEVATIONS	END CONNECTION
(C)	65NB	DM FEED PUMP DISCH. TO PRESSURE SAND FILTER	BOF EL +0.100	-
(D)	80NB	DM TO DM WATER TRANSFER PUMP	BOF EL +0.405	-
(E)	150NB	DM TO HSSG FILL PUMP	BOF EL +0.405	-
(F)	50NB	POTABLE WATER INLET TO HEADER OF PSF-C/D	BOF EL +0.100	-
(G)	50NB	POTABLE WATER OUTLET HEADER OF PSF-C/D	BOF EL +0.100	-
(H)	80NB	CAUSTIC INLET MANFOLD	BOF EL +0.450	-
(I)	80NB	ACID INLET MANFOLD	BOF EL +0.450	-
(J)	50NB	SERVICE WATER INLET AT DM PLANT	BOF EL +0.100	-
(K)	50NB	SERVICE WATER AT THE INLET OF SWOT	BOF EL +5.970	-
(L)	50NB	SERVICE WATER AT THE OUTLET OF SWOT	BOF EL +5.970	-

CONTROL PANEL SCHEDULE				
DESCRIPTION	SIZE	QTY.	REMARKS	
MCC PANEL	2000(W)X800(D)X2100(H)	1 No.	SET	
PLC PANEL	500(W)X800(D)X2000(H)	1 No.	NOTE-11	
SILICA ANALYZER	500(W)X800(D)X1000(H)	1 No.		

CLIENT REF. DRAWING :-
1. PLOT PLAN LAYOUT : 0-381-01-01018 (R-070)
2. P & I DIAGRAM FOR DM PLANT : A2-WL-2194-01-02
3. P & I DIAGRAM FOR POTABLE SYSTEM : A2-WL-2194-01-03
4. P & I DIAGRAM FOR REGENERATION SYSTEM : A2-WL-2194-01-04
5. EQUIPMENT LAYOUT FOR MCC ROOM : A4-WL-2194-ELE-DWG-DM-005
6. EQUIPMENT LAYOUT FOR CONTROL ROOM : A4-WL-2194-INS-WEG-DM-006
7. CABLE TRENCH LAYOUT FOR DM PLANT : A4-WL-2194-ELE-DWG-DM-003

- NOTES :-
- ALL DIMENSIONS ARE IN mm & ELEVATIONS ARE IN METER UNLESS OTHERWISE SPECIFIED.
 - FINISHED FLOOR LEVEL (FFL) OF DM PLANT BUILDING SHALL BE AT EL +0.000 WHICH IS AT RL -126.6M.
 - PAVING LEVEL OUTSIDE DM PLANT BUILDING SHALL BE AT -0.300M WHICH CORRESPONDS TO RL -126.6M.
 - FINISHED GRADED LEVEL (FGL) IS AT -0.600M WHICH CORRESPONDS TO RL -126.36M.
 - WTP DRAIN TRENCH & DRAIN SUMP EXCLUDING STORM WATER TRENCH SHALL BE PROVIDED WITH ACID/ALKALI PROOF LINING.
 - DRAIN TRENCH TO BE COVERED BY BHEL.
 - ALL CIVIL EXECUTION/DESIGN IN BHEL SCOPE.
 - BHEL SHALL PROVIDE DM CLEAR HEAD ROOM IN PLANT ROOM.
 - TRENCH LAYOUT WILL BE SUBMIT SEPARATELY.
 - EQUIPMENTS SHOWN IN LAYOUT ARE REPRESENTATIVE, MECHANICAL GA SHALL BE SUBMITTED SEPARATELY.
 - CONTROL PANEL SIZES ARE TENTATIVE SUBJECTED TO CHANGE AFTER FINALIZATION OF VENDOR QUOTATION.
 - MECHANICAL ATTACHMENTS (LADDERS, HANDRAILS) ARE IN SCOPE OF WIPRO WATER.
 - ALL PIPES AND INSULATION PLATES ARE IN SCOPE OF CIVIL CONTRACTOR.

CUSTOMER: ASSAM POWER GENERATION CORPORATION LTD. GUWAHATI, ASSAM

CONSULTANT: DEVELOPMENT CONSULTANTS (P) LTD. CONSULTING ENGINEERS

PROJECT: 1X100MW NAMRUP COMBINED CYCLE REPLACEMENT POWER PROJECT (PHASE-I) AT NAMRUP, ASSAM

EPC CONTRACTOR: BHARAT HEAVY ELECTRICALS LTD. HYDERABAD

EPC SUB-CONTRACTOR: NTPC BHEL POWER PROJECTS PVT. LTD. (A Joint Venture Company of NTPC & BHEL)

EQUIPMENT LAYOUT FOR DM PLANT									
CV	ME	EL	C&I	DEPT.	SCALE	VENDOR DOC. NO.	A0-WL-2194-02A-01		
DATE	DATE	DATE	DATE	DATE	DATE	DATE	1 OF 1	REV	05

Bharat Heavy Electricals Limited
Ramachandrapuram, Hyderabad

PROJECT ENGINEERING DEPARTMENT

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Comments as marked on drawing: ✓

Comments as in enclosed document.

Signature: RAJESH K. SETHI
Director, Project Engineering Department, BHEL, Hyderabad

05	02.01.12	REVISED AS PER CLIENT COMMENTS DTD 02.01.12 DURING MEETING AT BHEL, HYDERABAD	N/P	K.G.	
04	26.12.11	REVISED AS PER CLIENT COMMENTS DTD 23.12.11	N/P	K.G.	
03	09.12.11	REVISED AS PER CLIENT COMMENTS	N/P	K.G.	
02	16.11.11	REVISED AS PER CLIENT COMMENTS DTD 16.09.11	N/P	K.G.	
01	18.10.11	REVISED AS PER CLIENT COMMENTS DTD 16.09.11	N/P	K.G.	
00	08.09.11	FIRST ISSUE	N/P	K.G.	
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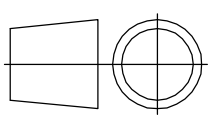
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Comments as marked on drawing	Comments as in enclosed document	
		Date: 06.08.13

CUSTOMER :- M/s. ASSAM POWER GENERATION CORPORATION LTD.
GUWAHATI, ASSAM

CONSULTANT :- M/s. DEVELOPMENT CONSULTANTS (P) LTD.LTD.

PROJECT :- DM PLANT FOR 1X 100 NAMRUP COMBINED CYCLE
REPLACEMENT POWER PROJECT

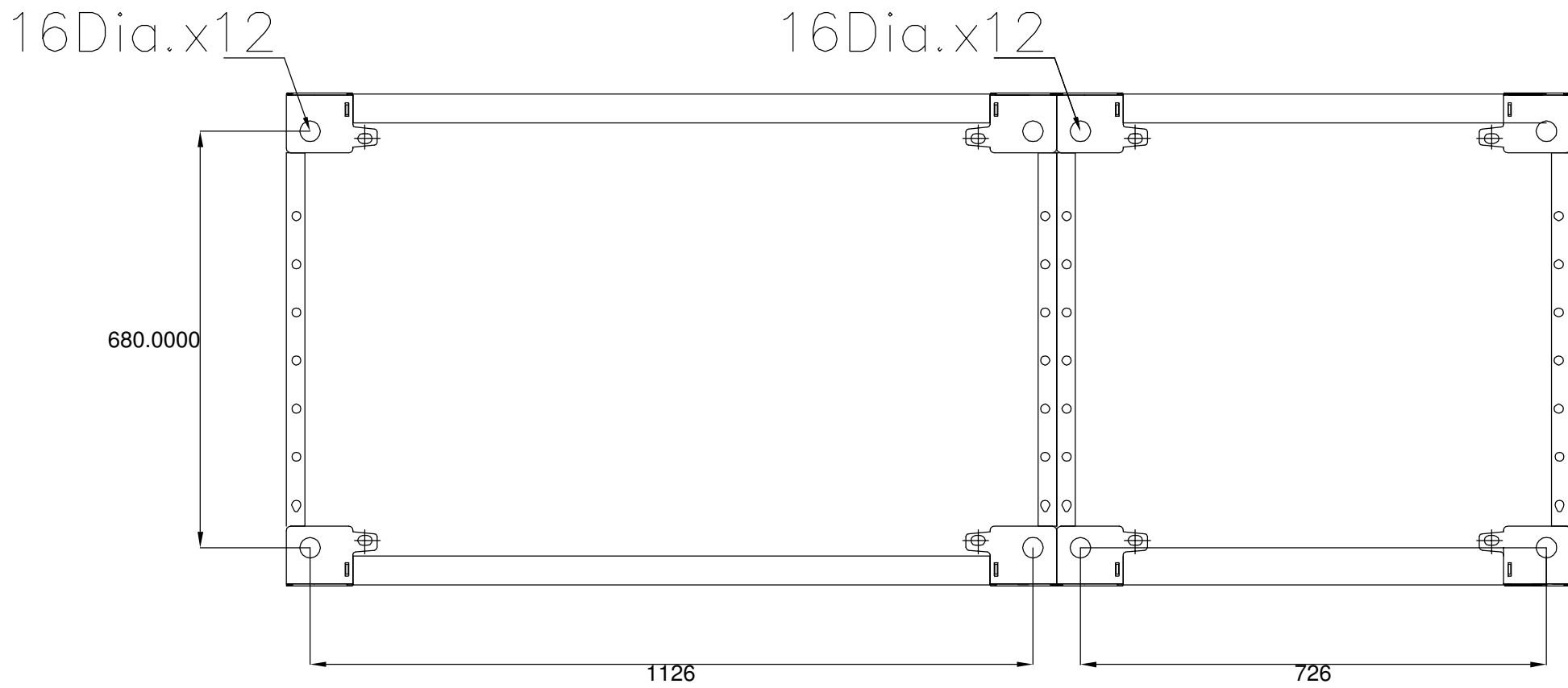
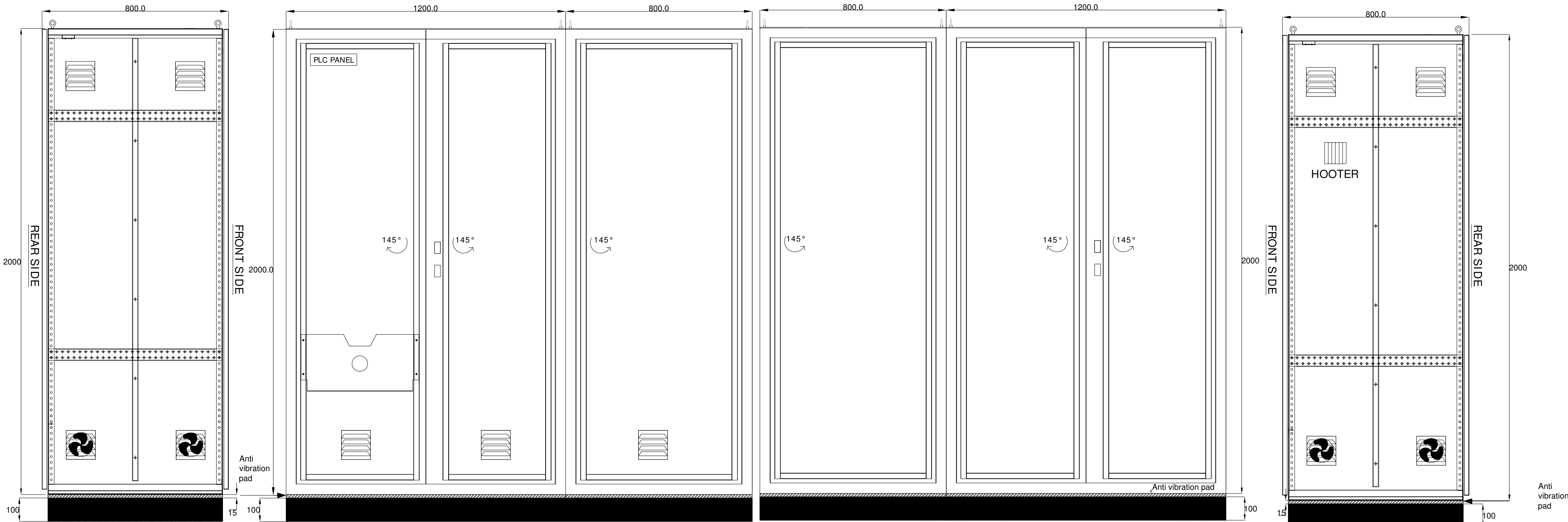
TITLE :- GA AND POWER DISTRIBUTION

CUSTOMER:		ASSAM POWER GENERATION CORPORATION LTD. GUWAHATI, ASSAM									
CONSULTANT :		DEVELOPMENT CONSULTANTS (P) LTD. CONSULTING ENGINEERS									
PROJECT:		1X100MW NAMRUP COMBINED CYCLE REPLACEMENT POWER PROJECT (PHASE-1) AT NAMRUP,ASSAM									
EPC ONTRACTOR:		BHARAT HEAVY ELECTRICALS LTD. HYDERABAD									
EPC SUB-CONTRACTOR:		NTPC BHEL POWER PROJECTS PVT. LTD. (A Joint Venture Company of NTPC & BHEL)									
VENDOR:		WIPRO WATER SERENE PROPERTIES PVT LTD., SEZ, AIROLI, NAVI MUMBAI-400708.									
TITLE:		PLC Panel GA & Power Distribution									
CV	ME	EL	C&I			DEPT.	SCALE NTS	DOC. NO.:			
						SIGN		A4-JWL-2194-INS-DWG-DM-003			
						DATE		SHT. NO:	1 OF 6	REV:	01

01	12-07-13		As Per Comments	AM	KK
00	12-06-13		Preliminary Submission	AM	KK
REV.	DATE	LOCATION	DESCRIPTION	DRN BY	CHK. BY

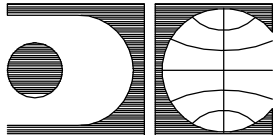
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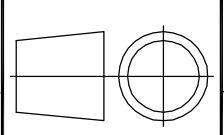
PANEL GA



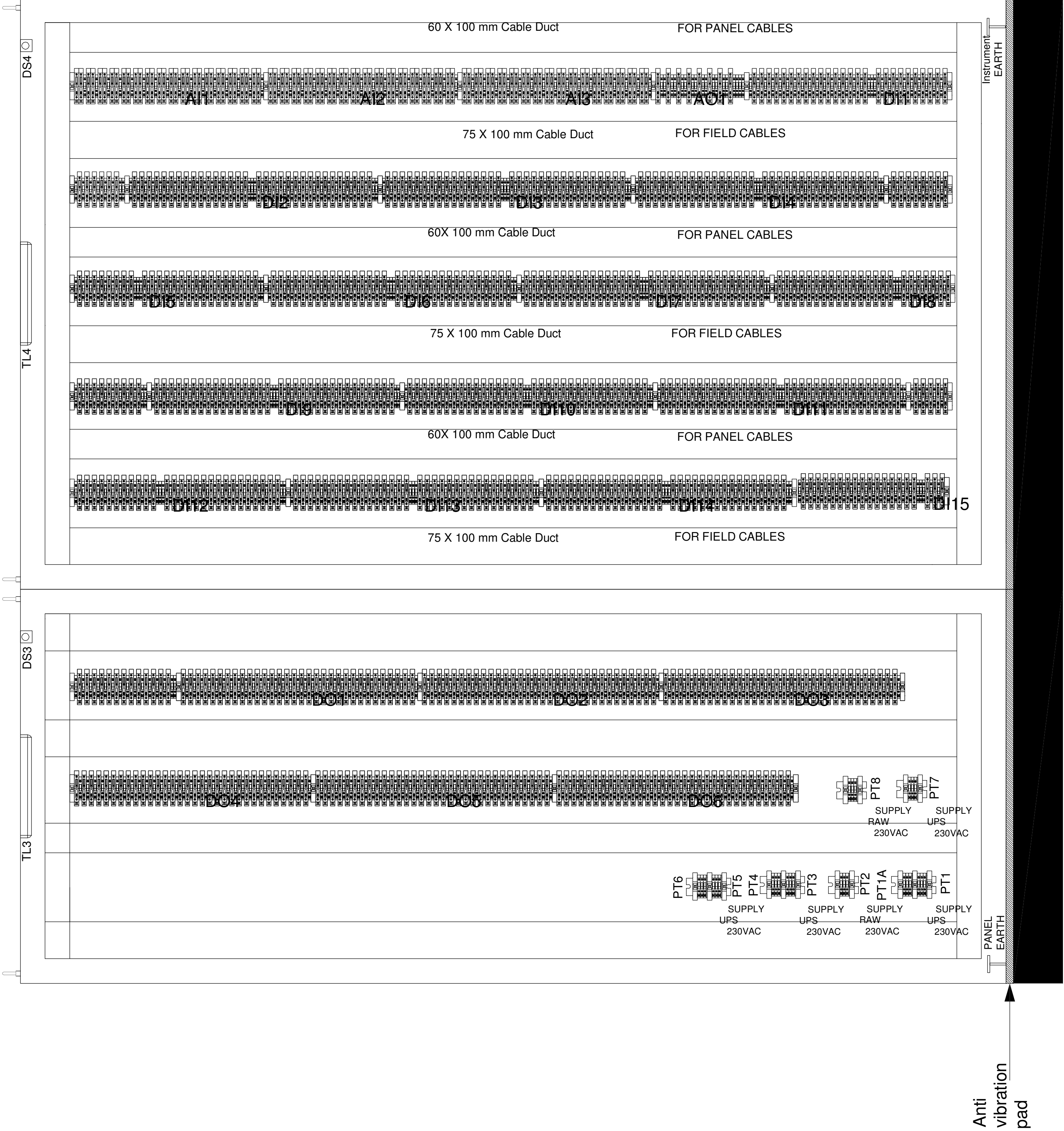
Bharat Heavy Electricals Limited Ramachandrapuram, Hyderabad		
PROJECT ENGINEERING DEPARTMENT		
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Comments as marked on drawing	Comments as in enclosed document	 Date: 06.08.13

PANEL MAKE	RITTAL PANEL
PANEL SIZE	2000H(+100) x 2000W x 800D DULY WIRED UP
PANEL INCLOSURE	IP-55
WIRED UP PANEL	IP-41
COLOUR	RAL 7035
PANEL ACCESS	FRONT & REAR ACCESS
CABLE ENTRY	BOTTOM
APPROX WEIGHT	1500 KGS
SHEET THICKNESS	SIDE PLATES- 1.5, DOOR- 2.0 & MOUNTING PLATE- 3.0
	ALL DIMENSIONS ARE IN MM

CUSTOMER:	ASSAM POWER GENERATION CORPORATION LTD. GUWAHATI, ASSAM		
CONSULTANT :	 DEVELOPMENT CONSULTANTS (P) LTD. CONSULTING ENGINEERS		
PROJECT:	1X100MW NAMRUP COMBINED CYCLE REPLACEMENT POWER PROJECT (PHASE-1) AT NAMRUP, ASSAM		
EPC ONTRACTOR:	 BHARAT HEAVY ELECTRICALS LTD. HYDERABAD		
EPC SUB-CONTRACTOR:	 NTPC BHEL POWER PROJECTS PVT. LTD. (A Joint Venture Company of NTPC & BHEL)		
VENDOR:	 WIPRO WATER SERENE PROPERTIES PVT LTD., SEZ, AIROLI, NAVI MUMBAI-400708.		
TITLE:	PLC Panel GA & Power Distribution		

								CV	ME	EL	C&I				DEPT.	SCALE NTS	DOC. NO.:
															SIGN		A4-JWL-2194-INS-DWG-DM-003
															DATE		SHT. NO:
																	2 OF 6
																	REV: 01
01	12-07-13		As Per Comments					AM	KK								
00	12-06-13		Preliminary Submission					AM	KK								
REV.	DATE	LOCATION	DESCRIPTION					DRN BY	CHK. BY								

INTERNAL LAYOUT



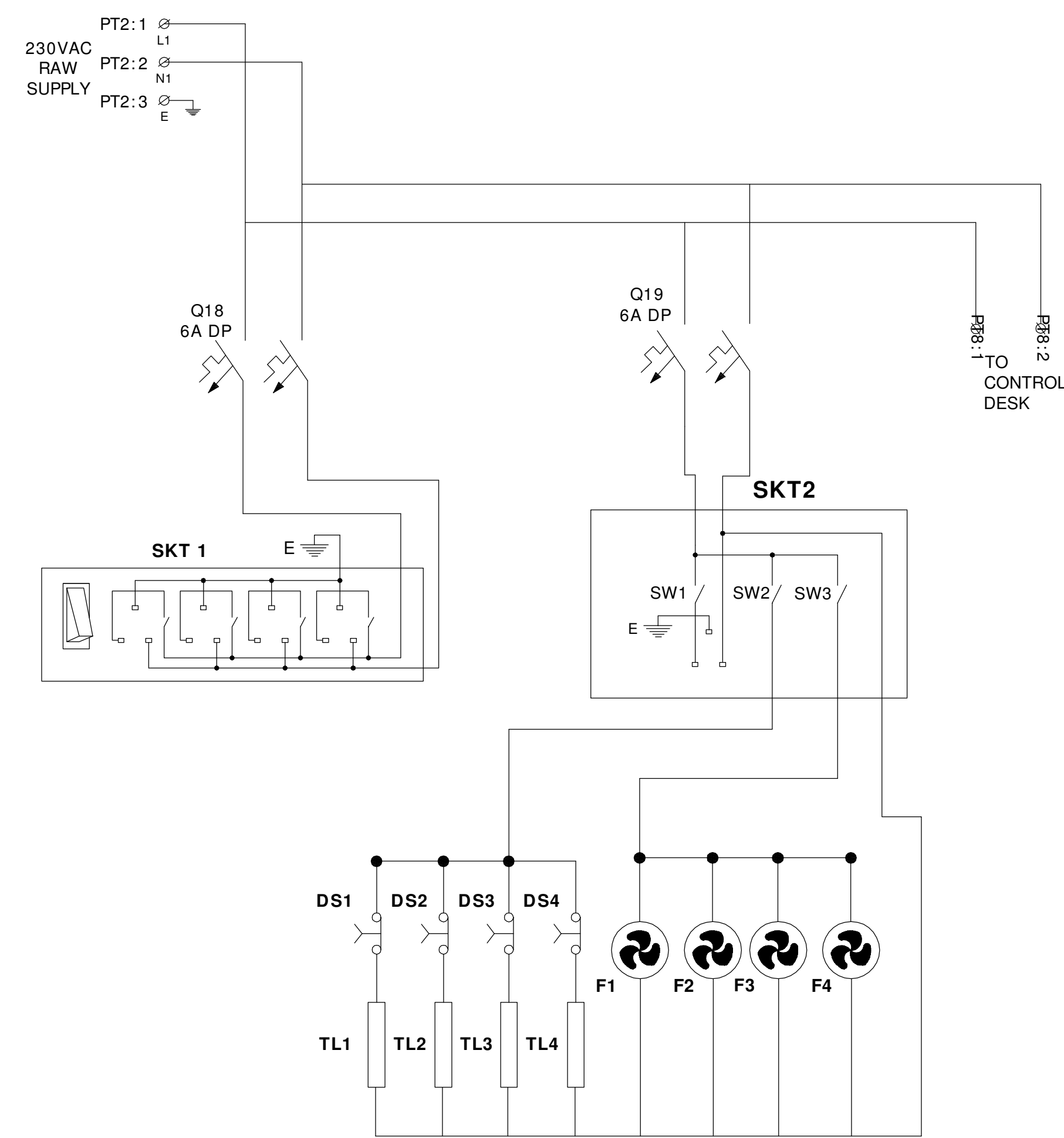
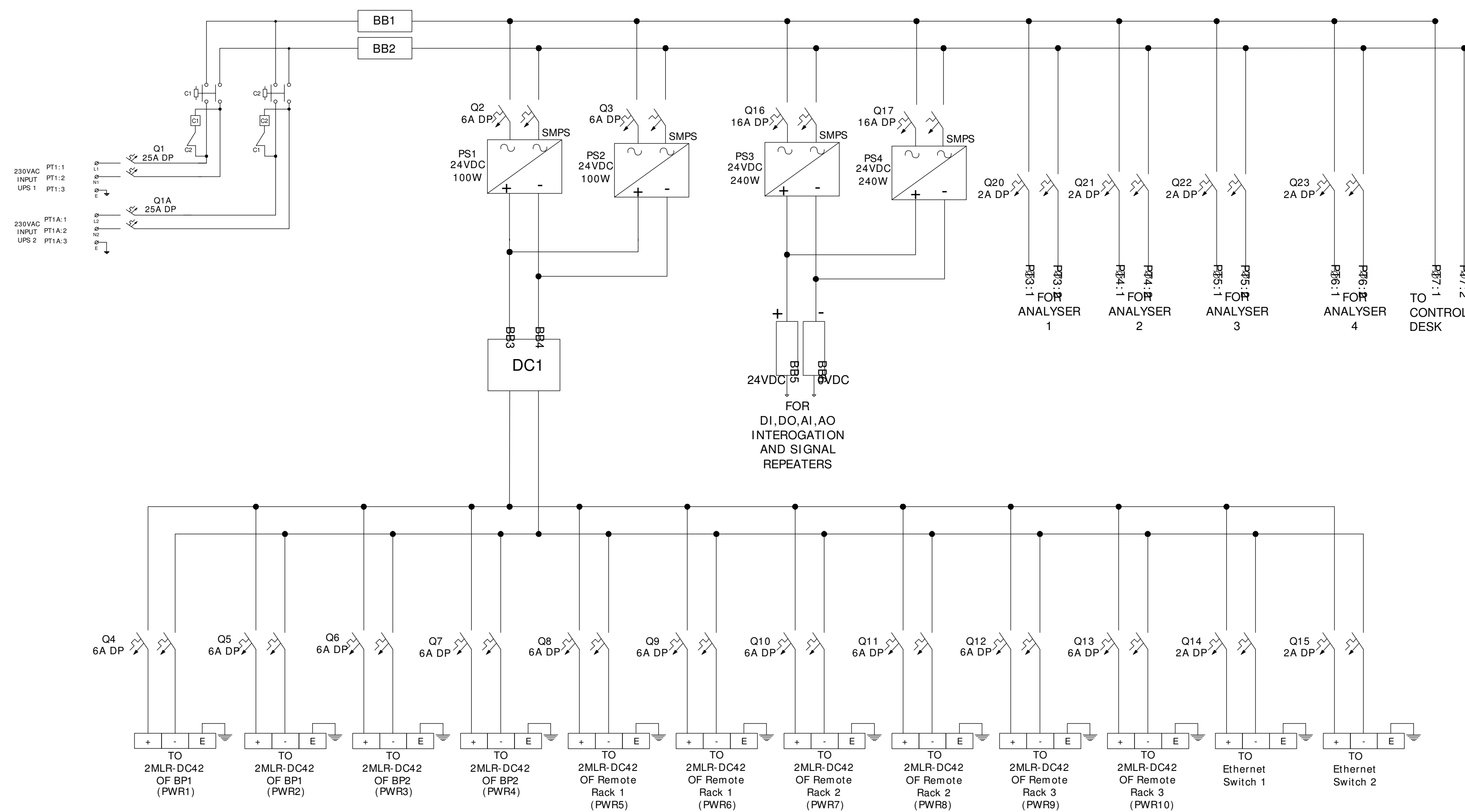
75 X 100 mm Cable Duct

Bharat Heavy Electricals Limited <i>Ramachandrapuram, Hyderabad</i>	
PROJECT ENGINEERING DEPARTMENT	
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Comments as marked on drawing 	Comments as in enclosed document
	Date:06.08.13

CUSTOMER: 	ASSAM POWER GENERATION CORPORATION LTD. GUWAHATI, ASSAM
CONSULTANT : 	DEVELOPMENT CONSULTANTS (P) LTD. CONSULTING ENGINEERS
PROJECT:	1X100MW NAMRUP COMBINED CYCLE REPLACEMENT POWER PROJECT (PHASE-1) AT NAMRUP,ASSAM
EPC ONTRACTOR: 	BHARAT HEAVY ELECTRICALS LTD. HYDERABAD
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VENDOR: 	WIPRO WATER SERENE PROPERTIES PVT LTD., SEZ, AIROLI, NAVI MUMBAI-400708.
TITLE: PLC Panel GA & Power Distribution	

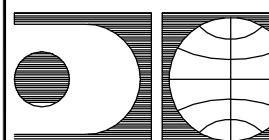
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					SIGN 	A4-JWL-2194-INS-DWG-DM-003
				DATE	REV. NO.	REV:
					4 OF 6	01

POWER DISTRIBUTION



Bharat Heavy Electricals Limited Ramachandrapuram, Hyderabad		
<u>PROJECT ENGINEERING DEPARTMENT</u>		
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Comments as marked on drawing 	Comments as in enclosed document	 PROJECT ENGINEER Date: 06.08.13

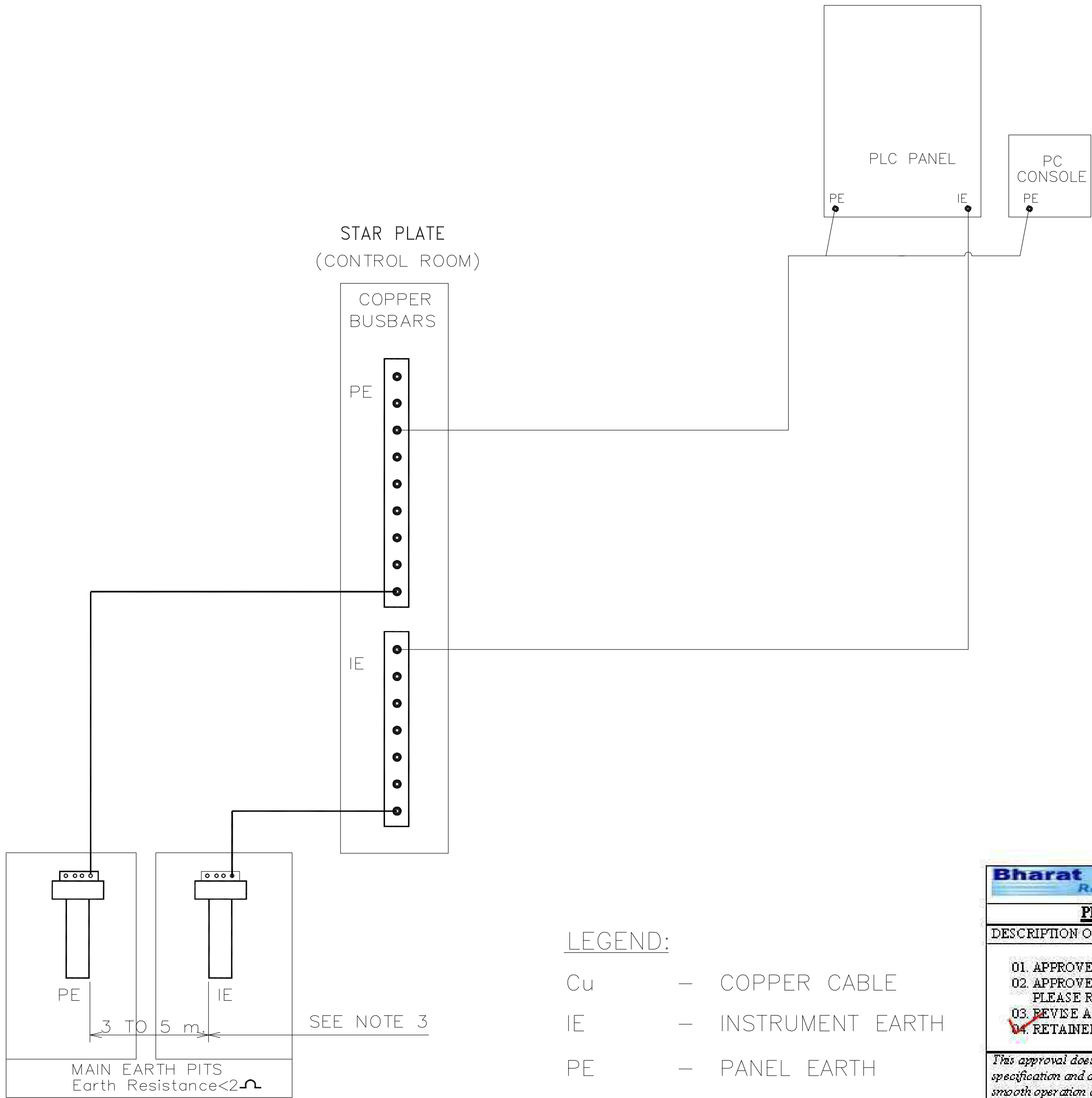
Wiring Colour Codes and Sizing details	
Power wiring	
230VAC/ 110VAC	1.5-4.0 sq.mm. RED colour
Neutral	1.5-4.0 sq.mm. BLACK colour
Control wiring	
24VDC	0.5 sq.mm. BROWN colour
0VDC	0.5 sq.mm. BLUE colour
Analog Inputs	0.5 sq.mm. WHITE colour
Digital Inputs	0.5 sq.mm. GRAY colour
Digital Outputs	0.5 sq.mm. GRAY colour
Earthing	
Instrument earth	0.75 sq.mm. GREEN colour
Panel earth	2.5 sq.mm. GREEN colour

CUSTOMER: 	ASSAM POWER GENERATION CORPORATION LTD. GUWAHATI, ASSAM
CONSULTANT : 	DEVELOPMENT CONSULTANTS (P) LTD. CONSULTING ENGINEERS
PROJECT:	1X100MW NAMRUP COMBINED CYCLE REPLACEMENT POWER PROJECT (PHASE-1) AT NAMRUP, ASSAM
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VENDOR:	WIPRO WATER SERENE PROPERTIES PVT LTD., SEZ, AIROLI, NAVI MUMBAI-400708.
	
TITLE:	PLC Panel GA & Power Distribution

[illegible]

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EARTHING SCHEME



LEGEND:

- Cu — COPPER CABLE
- IE — INSTRUMENT EARTH
- PE — PANEL EARTH

NOTES:

- DISTANCE BETWEEN STAR PLATE IN CONTROL ROOM AND MAIN EARTH PIT SHOULD BE LESS THAN 100 Mtr.
- EARTHING CABLE FROM STAR PLATE TO EARTH PIT SHALL BE SINGLE RUN ONLY
- EARTHING DISTRIBUTION BUSBAR SHALL BE PLACED IN CONTROL ROOM.
- LAYING OF CABLE FROM DISTRIBUTION BUSBAR
- PE BUSBAR:MOC=ALUMINIUM;
CROSS SECTION=50mmx10mm;LENGTH=500mm.
- EE BUSBAR:MOC=ALUMINIUM;
CROSS SECTION=50mmx6mm;LENGTH=500mm.

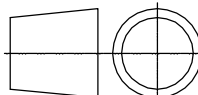
Bharat Heavy Electricals Limited Ramachandrapuram, Hyderabad		
PROJECT ENGINEERING DEPARTMENT		
DESCRIPTION OF CODE :		
01. APPROVED SUBMIT AS BUILT DRAWINGS / DOCUMENTS.		
02. APPROVED WITH MINOR COMMENTS ACTIVITY MAY PROCEED. PLEASE RE-SUBMIT FOR FINAL APPROVAL.		
03. REVISE AS PER BHEL COMMENTS AND RESUBMIT FOR APPROVAL.		
04. RETAINED FOR INFORMATION.		
This approval does not absolve the vendor from the responsibility to comply with BHEL's specification and all applicable codes and standards. Vendor has to ensure safe and smooth operation and meet the intended performance of the equipment.		
Comments as marked on drawing	Comments as in enclosed document	Date: 06.08.13

CUSTOMER:	ASSAM POWER GENERATION CORPORATION LTD. GUWAHATI, ASSAM					
CONSULTANT :	DEVELOPMENT CONSULTANTS (P) LTD. CONSULTING ENGINEERS					
PROJECT:	1X100MW NAMRUP COMBINED CYCLE REPLACEMENT POWER PROJECT (PHASE-1) AT NAMRUP, ASSAM					
EPC ONTRACTOR:	BHARAT HEAVY ELECTRICALS LTD. HYDERABAD					
EPC SUB-CONTRACTOR:	NTPC BHEL POWER PROJECTS PVT. LTD. (A Joint Venture Company of NTPC & BHEL)					
VENDOR:	WIPRO WATER SERENE PROPERTIES PVT LTD., SEZ, AIROLI, NAVI MUMBAI-400708.					
TITLE: Earthing Scheme						
CV	ME	EL	C&I	DEPT.	SCALE NTS	DOC. NO.: A4-JWL-2194-INS-DWG-DM-003
				SIGN		SHT. NO.: 6 OF 6
				DATE		

REV.	DATE	LOCATION	DESCRIPTION	DRN BY	CHK. BY
01	12-07-13		As Per Comments	AM	KK
00	12-06-13		Preliminary Submission	AM	KK

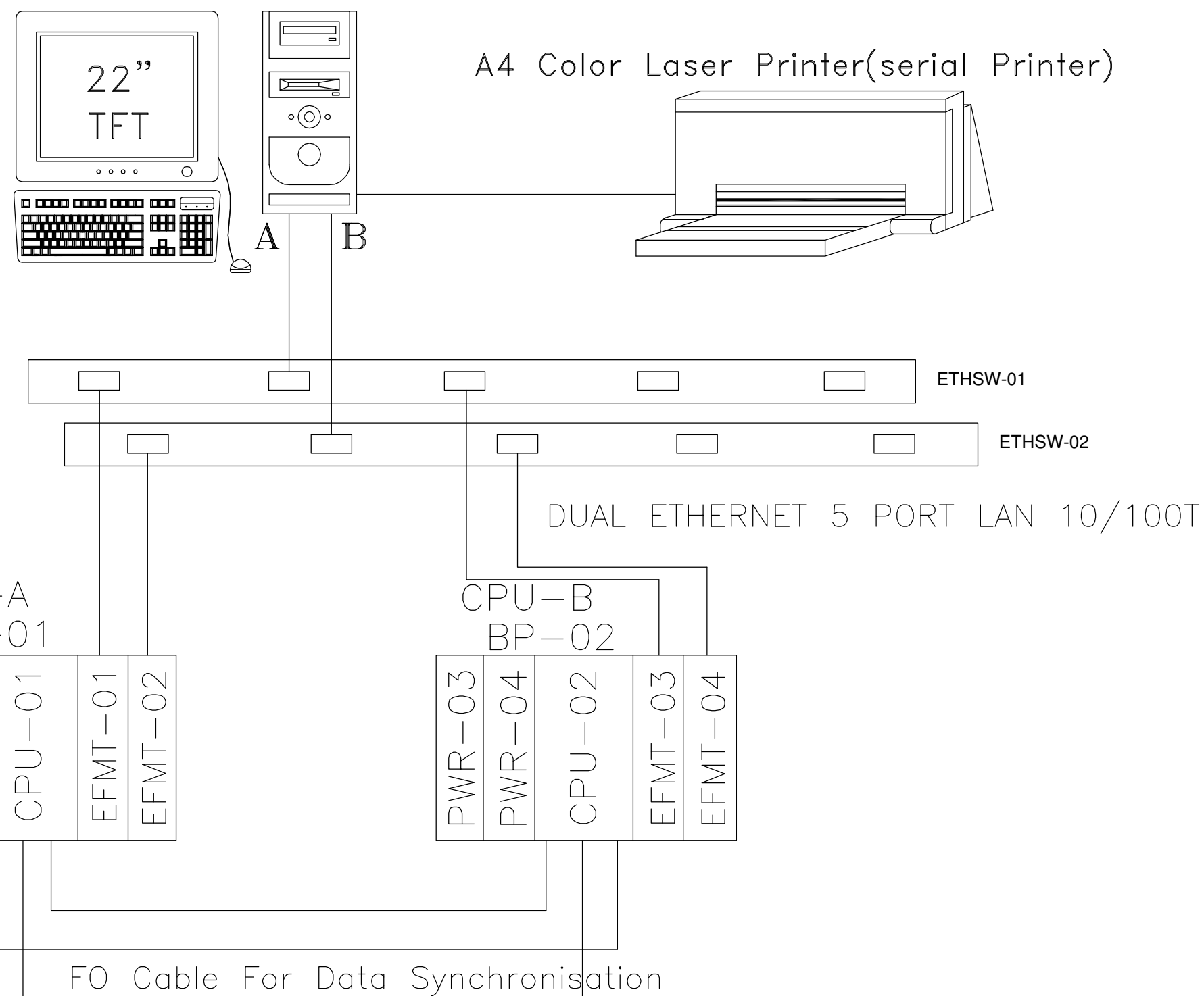
TITLE :- SYSTEM CONFIGURATION

Bharat Heavy Electricals Limited Ramachandrapuram, Hyderabad		
<u>PROJECT ENGINEERING DEPARTMENT</u>		
DESCRIPTION OF CODE :		
01. APPROVED SUBMIT AS BUILT DRAWINGS /DOCUMENTS . 02. APPROVED WITH MINOR COMMENTS ACTIVITY MAY PROCEED. PLEASE RE-SUBMIT FOR FINAL APPROVAL. 03. REVISE AS PER BHEL COMMENTS AND RESUBMIT FOR APPROVAL. 04. RETAINED FOR INFORMATION.		
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Comments as marked on drawing 	Comments as in enclosed document.	 Date: 06.08.13

CUSTOMER:		ASSAM POWER GENERATION CORPORATION LTD. GUWAHATI, ASSAM									
CONSULTANT :		DEVELOPMENT CONSULTANTS (P) LTD. CONSULTING ENGINEERS									
PROJECT:		1X100MW NAMRUP COMBINED CYCLE REPLACEMENT POWER PROJECT (PHASE-1) AT NAMRUP,ASSAM									
EPC CONTRACTOR:		BHARAT HEAVY ELECTRICALS LTD. HYDERABAD									
EPC SUB-CONTRACTOR:		NTPC BHEL POWER PROJECTS PVT. LTD. (A Joint Venture Company of NTPC & BHEL)									
VENDOR:		WIPRO WATER SERENE PROPERTIES PVT LTD., SEZ, AIROLI, NAVI MUMBAI-400708.									
TITLE:		PLC System Configuration									
CV	ME	EL	C&I			DEPT.	SCALE NTS	DOC. NO.:			
						SIGN		A4-JWL-2194-INS-DWG-DM-003			
						DATE		SHT. NO:	1 OF 2	REV:	01

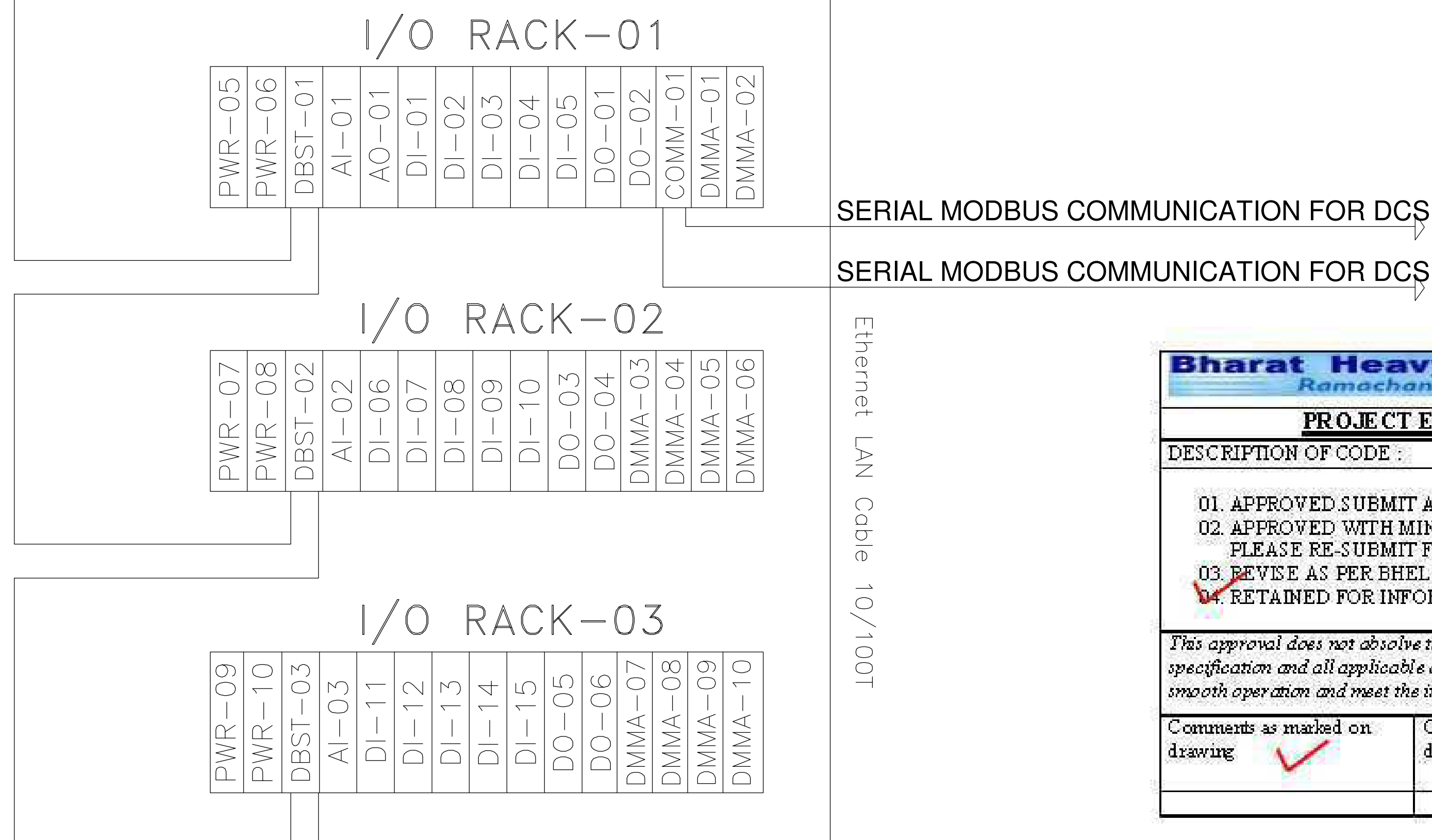
SYSTEM CONFIGURATION

EWS + OWS (22" LCD)

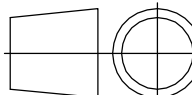


B I L L O F M A T E R I A L

Tag name	PLC Hardware	Catalog No.	PLC-1
CPU 01-02	Redundant CPU Module	2MLR-CPUH/ T	2
PWR 01-04	Power Supply Module 24 VDC (7.5A-5VDC)	2MLR-DC42	4
EFMT 01-04	High Speed Ethernet Communication Card	2MLL-EFMT	4
	Synchronization cable for redundant CPU	2MLC-F201	1
BP 01-02	CPU Main Rack - 02 slots	2MLR-M02P	2
	I/ O Hardware	Catalog No.	PLC-1
DBST 01-03	I/ O Interface Module, TP/ CAT5	2MLR-DBST	3
PWR 05-10	Power Supply Module 24 VDC (7.5A-5VDC)	2MLR-DC42	6
AI 01-03	16 channel AI Module - 4 to 20 mA	2MLF-AD16A	3
AO 01	08 Channel AO Module - 4 to 20 mA	2MLF-DC8A	1
DI 01-15	32 Channel DI Module - 24 VDC	2MLI-D24A	15
DO 01-06	32 Channel DO Module - 24 VDC	2MLQ-TR4B	6
COMM -01	02 Channel RS-485 Com. Module	2MLL-Q42A	1
I/ O RACK 01-03	I/ O Expansion Racks - 12 Slot	2MLR-E12P	3
DMMA 01-10	Cover Plates for Empty slots	2MLT-DMMA	10
	PLC Programming Software Package	Catalog No.	PLC-1
	Softmaster PLC Programming package	SSS-MLPT	1
	USB Cable for Softmaster	USB-301A	1
	PLC SCADA Software Packages (Runtime+Development)	Catalog No.	PLC-1
	Experion HS Target System	EP-HROBMT	1
	Microsoft SQL DEV CAL	MZ-SQLCL4	1
	Experion HS Media Kit	EP-HME400	1



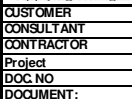
Bharat Heavy Electricals Limited Ramachandrapuram, Hyderabad		
PROJECT ENGINEERING DEPARTMENT		
DESCRIPTION OF CODE :		
01. APPROVED SUBMIT AS BUILT DRAWINGS / DOCUMENTS. 02. APPROVED WITH MINOR COMMENTS ACTIVITY MAY PROCEED. PLEASE RE-SUBMIT FOR FINAL APPROVAL. 03. REVISE AS PER BHEL COMMENTS AND RESUBMIT FOR APPROVAL. 04. RETAINED FOR INFORMATION.		
<i>This approval does not absolve the vendor from the responsibility to comply with BHEL specification and all applicable codes and standards. Vendor has to ensure safe and smooth operation and meet the intended performance of the equipment.</i>		
Comments as marked on drawing 	Comments as in enclosed document.	 CH. PRASAD RAO Director, Project Engineering Dept., BHEL Hyderabad, India.
		Date: 06.08.13

CUSTOMER:		ASSAM POWER GENERATION CORPORATION LTD. GUWAHATI, ASSAM									
CONSULTANT :		DEVELOPMENT CONSULTANTS (P) LTD. CONSULTING ENGINEERS									
PROJECT:		1X100MW NAMRUP COMBINED CYCLE REPLACEMENT POWER PROJECT (PHASE-1) AT NAMRUP,ASSAM									
EPC ONTRACTOR:		BHARAT HEAVY ELECTRICALS LTD. HYDERABAD									
EPC SUB-CONTRACTOR:		NTPC BHEL POWER PROJECTS PVT. LTD. (A Joint Venture Company of NTPC & BHEL)									
VENDOR:		WIPRO WATER SERENE PROPERTIES PVT LTD., SEZ, AIROLI, NAVI MUMBAI-400708.									
TITLE:		PLC System Configuration									
CV	ME	EL	C&I			DEPT.	SCALE NTS	DOC. NO.:			
						SIGN		A4-JWL-2194-INS-DWG-DM-003			
					DATE	SHT. NO:		2 OF 2	REV:	01	

01	12-07-13		As Per Comments	AM	KK
00	12-06-13		Preliminary Submission	AM	KK
REV.	DATE	LOCATION	DESCRIPTION	DRN BY	CHK. BY

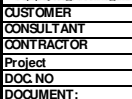
CUSTOMER		NTPCBHEL POWER PROJECT PVT. LTD																Issued For		Approval	
CONSULTANT		DEVELOPMENT CONSULTANT PVT. LTD																Job No.		JWL-2194	
CONTRACTOR		WIPRO WATER																Date		25.06.2013	
Project		DM PLANT FOR 1X100 MW NAMRUP COMBINED CYCLE REPLACEMENT POWER PROJECT																Revision		R1	
DOC NO		A4-JWL-2194-INS-SQH-DM-002																			
DOCUMENT:		PLCIO LIST FOR DM PLANT																			
SR	TAGNO.	PLC Tag No.	DESCRIPTION	SIGNAL SOURCE	SIGNAL DEST.	SIGNAL TYPE	CONT NO/ NC	DI	DO	AI	AO	INST RANGE	ENGG UNIT	REDUN DANCY	ALARMS HH	H	LL	L	SCALE RANGE	REF. P. & I. D.	Rev No
DIGITAL INPUT																					
1	DMFP-A	XL DMFP-A RFB	DM Plant Feed Pump A Run feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
2	DMFP-A	XL DMFP-A TFB	DM Plant Feed Pumps A Trip feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
3	DMFP-A	XL DMFP-A RTS	DM Plant Feed Pumps A Ready To Start feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
4	DMFP-A	XL DMFP-A STP	DM Plant Feed Pumps A Stop feedback	MCC	PLC	Pot free	NC	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
5	DMFP-B	XL DMFP-B RFB	DM Plant Feed Pumps B Run feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
6	DMFP-B	XL DMFP-B TFB	DM Plant Feed Pumps B Trip feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
7	DMFP-B	XL DMFP-B RTS	DM Plant Feed Pumps B Ready To Start feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
8	DMFP-B	XL DMFP-B STP	DM Plant Feed Pumps B Stop feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
9	ABL-01-A	XL ABL-01-A RFB	PSF Blower -A Run feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
10	ABL-01-A	XL ABL-01-A TFB	PSF Blower -A Trip feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
11	ABL-01-A	XL ABL-01-A RTS	PSF Blower -A Ready To Start feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
12	ABL-01-A	XL ABL-01-A STP	PSF Blower -A Stop feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
13	ABL-01-B	XL ABL-01-B RFB	PSF Blower -B Run feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
14	ABL-01-B	XL ABL-01-B TFB	PSF Blower -B Trip feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
15	ABL-01-B	XL ABL-01-B RTS	PSF Blower -B Ready To Start feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
16	ABL-01-B	XL ABL-01-B STP	PSF Blower -B Stop feedback	MCC	PLC	Pot free	NC	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
17	ABL-02-A	XL ABL-02-A RFB	Degasser Blower -A Run feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
18	ABL-02-A	XL ABL-02-A TFB	Degasser Blower -A Trip feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
19	ABL-02-A	XL ABL-02-A RTS	Degasser Blower -A Ready To Start feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
20	ABL-02-A	XL ABL-02-A STP	Degasser Blower -A Stop feedback	MCC	PLC	Pot free	NC	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
21	ABL-02-B	XL ABL-02-B RFB	Degasser Blower -B Run feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
22	ABL-02-B	XL ABL-02-B TFB	Degasser Blower -B Trip feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
23	ABL-02-B	XL ABL-02-B RTS	Degasser Blower -B Ready To Start feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
24	ABL-02-B	XL ABL-02-B STP	Degasser Blower -B Stop feedback	MCC	PLC	Pot free	NC	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
25	ABL-02-C	XL ABL-02-C RFB	Degasser Blower -C Run feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
26	ABL-02-C	XL ABL-02-C TFB	Degasser Blower -C Trip feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
27	ABL-02-C	XL ABL-02-C RTS	Degasser Blower -C Ready To Start feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
28	ABL-02-C	XL ABL-02-C STP	Degasser Blower -C Stop feedback	MCC	PLC	Pot free	NC	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
29	ABL-02-D	XL ABL-02-D RFB	Degasser Blower -D Run feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
30	ABL-02-D	XL ABL-02-D TFB	Degasser Blower -D Trip feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
31	ABL-02-D	XL ABL-02-D RTS	Degasser Blower -D Ready To Start feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
32	ABL-02-D	XL ABL-02-D STP	Degasser Blower -D Stop feedback	MCC	PLC	Pot free	NC	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
33	DGWTP-A	XL DGWTP-A RFB	Degassed Water Transfer Pumps-A Run feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
34	DGWTP-A	XL DGWTP-A TFB	Degassed Water Transfer Pumps-A Trip feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
35	DGWTP-A	XL DGWTP-A RTS	Degassed Water Transfer Pumps-A Ready To Start feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
36	DGWTP-A	XL DGWTP-A STP	Degassed Water Transfer Pumps-A Stop feedback	MCC	PLC	Pot free	NC	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
37	DGWTP-B	XL DGWTP-B RFB	Degassed Water Transfer Pumps-B Run feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
38	DGWTP-B	XL DGWTP-B TFB	Degassed Water Transfer Pumps-B Trip feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
39	DGWTP-B	XL DGWTP-B RTS	Degassed Water Transfer Pumps-B Ready To Start feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
40	DGWTP-B	XL DGWTP-B STP	Degassed Water Transfer Pumps-B Stop feedback	MCC	PLC	Pot free	NC	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
41	DGWTP-C	XL DGWTP-C RFB	Degassed Water Transfer Pumps-C Run feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
42	DGWTP-C	XL DGWTP-C TFB	Degassed Water Transfer Pumps-C Trip feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
43	DGWTP-C	XL DGWTP-C RTS	Degassed Water Transfer Pumps-C Ready To Start feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
44	DGWTP-C	XL DGWTP-C STP	Degassed Water Transfer Pumps-C Stop feedback	MCC	PLC	Pot free	NC	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
45	DGWTP-D	XL DGWTP-D RFB	Degassed Water Transfer Pumps-D Run feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
46	DGWTP-D	XL DGWTP-D TFB	Degassed Water Transfer Pumps-D Trip feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
47	DGWTP-D	XL DGWTP-D RTS	Degassed Water Transfer Pumps-D Ready To Start feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
48	DGWTP-D	XL DGWTP-D STP	Degassed Water Transfer Pumps-D Stop feedback	MCC	PLC	Pot free	NC	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
49	ABL-03-A	XL ABL-03-A RFB	MB Air Blower ABL-A Run feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
50	ABL-03-A	XL ABL-03-A TFB	MB Air Blower ABL-A Trip feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
51	ABL-03-A	XL ABL-03-A RTS	MB Air Blower ABL-A Ready To Start feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
52	ABL-03-A	XL ABL-03-A STP	MB Air Blower ABL-A Stop feedback	MCC	PLC	Pot free	NC	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
53	ABL-03-B	XL ABL-03-B RFB	MB Air Blower ABL-B Run feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
54	ABL-03-B	XL ABL-03-B TFB	MB Air Blower ABL-B Trip feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
55	ABL-03-B	XL ABL-03-B RTS	MB Air Blower ABL-B Ready To Start feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
56	ABL-03-B	XL ABL-03-B STP	MB Air Blower ABL-B Stop feedback	MCC	PLC	Pot free	NC	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
57	DMRP-A	XL DMRP-A RFB	DM water Regeneration pump-A Run feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
58	DMRP-A	XL DMRP-A TFB	DM water Regeneration pump-A Trip feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
59	DMRP-A	XL DMRP-A RTS	DM water Regeneration pump-A Ready To Start feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
60	DMRP-A	XL DMRP-A STP	DM water Regeneration pump-A Stop feedback	MCC	PLC	Pot free	NC	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2	
61	DMRP-B																				

WIPRO		IO LIST-DM PLANT																	Issued For		Approval	
CUSTOMER		NTPCBHEL POWER PROJECT PVT. LTD																	Job No.		JWL-2194	
CONSULTANT		DEVELOPMENT CONSULTANT PVT. LTD																	Date		25.06.2013	
CONTRACTOR		WIPRO WATER																	Revision		R1	
Project		DM PLANT FOR 1X100 MW NAMRUP COMBINED CYCLE REPLACEMENT POWER PROJECT																				
DOC NO		A4-JWL-2194-INS-SOH-DM-002																				
DOCUMENT:		PLCIO LIST FOR DM PLANT																				
SR	TAGNO.	PLC Tag No.	DESCRIPTION	SIGNAL SOURCE	SIGNAL DEST.	SIGNAL TYPE	CONT NO/ NC	DI	DO	AI	AO	INST RANGE	ENGG. UNIT	REDUN DANCY	ALARMS HH	H	LL	L	SCALE RANGE	REF. P. & I. D.	Rev No	
81	AG-C	XL AG-C RFB	Agitator for Caustic Measuring Tank-C Run feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	AO-JWL-2194-201/202/203-01-R2		
82	AG-C	XL AG-C TFB	Agitator for Caustic Measuring Tank-C Trip feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	AO-JWL-2194-201/202/203-01-R2		
83	AG-C	XL AG-C RTS	Agitator for Caustic Measuring Tank-C Ready To Start feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	AO-JWL-2194-201/202/203-01-R2		
84	AG-C	XL AG-C STP	Agitator for Caustic Measuring Tank-C Stop feedback	MCC	PLC	Pot free	NC	1	---	---	---	---	---	N	---	---	---	---	---	AO-JWL-2194-201/202/203-01-R2		
85	AG-D	XL AG-D RFB	Agitator for Caustic Measuring Tank-D Run feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	AO-JWL-2194-201/202/203-01-R2		
86	AG-D	XL AG-D TFB	Agitator for Caustic Measuring Tank-D Trip feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	AO-JWL-2194-201/202/203-01-R2		
87	AG-D	XL AG-D RTS	Agitator for Caustic Measuring Tank-D Ready To Start feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	AO-JWL-2194-201/202/203-01-R2		
88	AG-D	XL AG-D STP	Agitator for Caustic Measuring Tank-D Stop feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	AO-JWL-2194-201/202/203-01-R2		
89	AUP-A	XL AUP-A RFB	Acid Unloading Pumps-A Run feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	AO-JWL-2194-201/202/203-01-R2		
90	AUP-A	XL AUP-A TFB	Acid Unloading Pumps-A Trip feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	AO-JWL-2194-201/202/203-01-R2		
91	AUP-A	XL AUP-A RTS	Acid Unloading Pumps-A Ready To Start feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	AO-JWL-2194-201/202/203-01-R2		
92	AUP-A	XL AUP-A STP	Acid Unloading Pumps-A Stop feedback	MCC	PLC	Pot free	NC	1	---	---	---	---	---	N	---	---	---	---	---	AO-JWL-2194-201/202/203-01-R2		
93	AUP-B	XL AUP-B RFB	Acid Unloading Pumps-B Run feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	AO-JWL-2194-201/202/203-01-R2		
94	AUP-B	XL AUP-B TFB	Acid Unloading Pumps-B Trip feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	AO-JWL-2194-201/202/203-01-R2		
95	AUP-B	XL AUP-B RTS	Acid Unloading Pumps-B Ready To Start feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	AO-JWL-2194-201/202/203-01-R2		
96	AUP-B	XL AUP-B STP	Acid Unloading Pumps-B Stop feedback	MCC	PLC	Pot free	NC	1	---	---	---	---	---	N	---	---	---	---	---	AO-JWL-2194-201/202/203-01-R2		
97	N.PITP-A	XL N.PITP-A RFB	N.Pit pumps-A Run feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	AO-JWL-2194-201/202/203-01-R2		
98	N.PITP-A	XL N.PITP-A TFB	N.Pit pumps-A Trip feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	AO-JWL-2194-201/202/203-01-R2		
99	N.PITP-A	XL N.PITP-A RTS	N.Pit pumps-A Ready To Start feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	AO-JWL-2194-201/202/203-01-R2		
100	N.PITP-A	XL N.PITP-A STP	N.Pit pumps-A Stop feedback	MCC	PLC	Pot free	NC	1	---	---	---	---	---	N	---	---	---	---	---	AO-JWL-2194-201/202/203-01-R2		
101	N.PITP-B	XL N.PITP-B RFB	N.Pit pumps-B Run feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	AO-JWL-2194-201/202/203-01-R2		
102	N.PITP-B	XL N.PITP-B TFB	N.Pit pumps-B Trip feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	AO-JWL-2194-201/202/203-01-R2		
103	N.PITP-B	XL N.PITP-B RTS	N.Pit pumps-B Ready To Start feedback	MCC	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	AO-JWL-2194-201/202/203-01-R2		
104	N.PITP-B	XL N.PITP-B STP	N.Pit pumps-B Stop feedback	MCC	PLC	Pot free	NC	1	---	---	---	---	---	N	---	---	---	---	---	AO-JWL-2194-201/202/203-01-R2		
105	LSH-5404A	LSH-5404A	DGWSLT-A Level High	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	1	---	---	---	AO-JWL-2194-201/202/203-01-R2		
106	LSH-5404A	LSL-5404A	DGWSLT-A Level Low	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	1	---	AO-JWL-2194-201/202/203-01-R2		
107	LSL-5404A	LSL-5404A	DGWSLT-A Level Low Low	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	1	---	AO-JWL-2194-201/202/203-01-R2		
108	LSH-5404B	LSH-5404B	DGWSLT-B Level High	Field	PLC	Pot free	NC	1	---	---	---	---	---	N	---	1	---	---	---	AO-JWL-2194-201/202/203-01-R2		
109	LSH-5404B	LSL-5404B	DGWSLT-B Level Low	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	1	---	AO-JWL-2194-201/202/203-01-R2		
110	LSL-5404B	LSL-5404B	DGWSLT-B Level Low Low	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	1	---	AO-JWL-2194-201/202/203-01-R2		
111	LSH-5405A	LSH-5405A	DMWSLT-A Level High	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	1	---	---	---	AO-JWL-2194-201/202/203-01-R2		
112	LSH-5405A	LSL-5405A	DMWSLT-A Level Low	Field	PLC	Pot free	NC	1	---	---	---	---	---	N	---	---	---	1	---	AO-JWL-2194-201/202/203-01-R2		
113	LSH-5405B	LSH-5405B	DMWSLT-B Level High	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	1	---	---	---	AO-JWL-2194-201/202/203-01-R2		
114	LSH-5405B	LSL-5405B	DMWSLT-B Level Low	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	1	---	AO-JWL-2194-201/202/203-01-R2		
115	LSH-5407	LSH-5407	BCST-A Level High	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	1	---	---	---	AO-JWL-2194-201/202/203-01-R2		
116	LSH-5407	LSL-5407	BCST-A Level Low	Field	PLC	Pot free	NC	1	---	---	---	---	---	N	---	---	---	1	---	AO-JWL-2194-201/202/203-01-R2		
117	LSH-5408A	LSH-5408A	QMT-A Level High	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	1	---	---	---	AO-JWL-2194-201/202/203-01-R2		
118	LSH-5408A	LSL-5408A	QMT-A Level Low	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	1	---	AO-JWL-2194-201/202/203-01-R2		
119	LSH-5408B	LSH-5408B	QMT-B Level High	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	1	---	---	---	AO-JWL-2194-201/202/203-01-R2		
120	LSH-5408B	LSL-5408B	QMT-B Level Low	Field	PLC	Pot free	NC	1	---	---	---	---	---	N	---	---	---	1	---	AO-JWL-2194-201/202/203-01-R2		
121	LSH-5408C	LSH-5408C	QMT-C Level High	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	1	---	AO-JWL-2194-201/202/203-01-R2		
122	LSH-5408C	LSL-5408C	QMT-C Level Low	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	1	---	---	---	AO-JWL-2194-201/202/203-01-R2		
123	LSH-5408D	LSH-5408D	QMT-D Level High	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	1	---	AO-JWL-2194-201/202/203-01-R2		
124	LSH-5408D	LSL-5408D	QMT-D Level Low	Field	PLC	Pot free	NC	1	---	---	---	---	---	N	---	---	---	1	---	AO-JWL-2194-201/202/203-01-R2		
125	LSH-5409	LSH-5409	BAST-A Level High	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	1	---	---	---	AO-JWL-2194-201/202/203-01-R2		
126	LSH-5409	LSL-5409	BAST-A Level Low	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	1	---	AO-JWL-2194-201/202/203-01-R2		
127	LSH-5410A	LSH-5410A	AMT-A Level High	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	1	---	---	---	AO-JWL-2194-201/202/203-01-R2		
128	LSH-5410A	LSL-5410A	AMT-A Level Low	Field	PLC	Pot free	NC	1	---	---	---	---	---	N	---	---	---	1	---	AO-JWL-2194-201/202/203-01-R2		
129	LSH-5410B	LSH-5410B	AMT-B Level High	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	1	---	---	---	AO-JWL-2194-201/202/203-01-R2		
130	LSH-5410B	LSL-5410B	AMT-B Level Low	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	1	---	AO-JWL-2194-201/202/203-01-R2		
131	LSH-5410C	LSH-5410C	AMT-C Level High	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	1	---	---	---	AO-JWL-2194-201/202/203-01-R2		
132	LSH-5410C	LSL-5410C	AMT-C Level Low	Field	PLC	Pot free	NC	1	---	---	---	---	---	N	---	---	---	-1	---	AO-JWL-2194-201/202/203-01-R2		
133	LSH-5410D	LSH-5410D	AMT-D Level High	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	-1	---	AO-JWL-2194-201/202/203-01-R2		
134	LSH-5410D	LSL-5410D	AMT-D Level Low	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	1	---	---	---	AO-JWL-2194-201/202/203-01-R2		
135	LSH-5411A	LSH-5411A	N.PIT-A Level High	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	1	---	AO-JWL-2194-201/202/203-01-R2		
136	LSH-5411A	LSL-5411A	N.PIT-A Level Low	Field	PLC	Pot free	NC	1	---	---	---	---	---	N	---	---	---	1	---	AO-JWL-2194-201/202/203-01-R2		
137	LSH-5411B	LSH-5411B	N.PIT-B Level High	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	1	---	AO-JWL-2194-201/202/203-01-R2		
138	LSH-5411B	LSL-5411B	N.PIT-B Level Low	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	1	---	AO-JWL-2194-201/202/203-01-R3		
139	DPS-5404A	DPS-5404A	Across PSF-A	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	1	---	---	---	AO-JWL-2194-201/202/203-01-R2		



Bharat Heavy Electricals Limited <i>(Government Heavy Industry, Hyderabad)</i>	
PROJECT ENGINEERING DEPARTMENT	
DESCRIPTION OF CODE	
01. APPROVED SUBMIT AS BUILT DRAWING / DOCUMENT 02. APPROVED WITH MINOR COMMENTS ACTIVITY MAY PROCEED 03. REJECT AS PER SHEET COMMENTS AND REQUEST FOR APPROVAL 04. RETAINED FOR INFORMATION	
This approval does not absolve the vendor of his responsibility to comply with ISO 9000 and to call upon customer's aid and assistance. Vendor has to ensure safe and smooth operation and meet the intended performance of the equipment.	
Comments to be noted on drawing	Comments to be enclosed document
Date: 20.08.2013	

CUSTOMER CONSULTANT CONTRACTOR		NTPCBHEL POWER PROJECT PVT. LTD. DEVELOPMENT CONSULTANT PVT. LTD. WIPO WATER DM PLANT FOR 1X100 MW NAMRUP COMBINED CYCLE REPLACEMENT POWER PROJECT A4-JWL-2194-INS SCH- DM-002 PLC I/O LIST FOR DM PLANT										IS APPROVED STREET AS BUILT/TASMAH DOCUMENTS APPLY TO THE BUILT/TASMAH THAT MAY BE USED BEFORE THE STREET FOR FINAL APPROVAL APPLY TO THE BUILT/TASMAH AND RETURNED FOR APPROVAL RETURNED FOR INFORMATION										Issued For Lib No.		Approval JWL-2194	
Project DOC NO																						Date		25.06.2013	
DOCUMENT:																						Revision		R1	
SR	TAGNO.	PLC Tag No.	DESCRIPTION	SIGNAL SOURCE	SIGNAL DEST.	SIGNAL TYPE	CONT NO / NC	I O T Y P E				INST RANGE	ENG. UNIT	REDUN DANCY	ALARMS				SCALE RANGE	REF. P. & I. D.	Rev No				
								DI	DO	AI	AO				HH	H	LL	L							
243	DFXV-5421B	DFXV-5421B-QLS	Air Vent valve For Stronge Acid Cation Exchanger SAC-B Close Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
244	DFXV-5428B	DFXV-5428B-OPN	Acid I/L Valve For Stronge Acid Cation Exchanger SAC-B Open Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
245	DFXV-5428B	DFXV-5428B-QLS	Acid I/L Valve For Stronge Acid Cation Exchanger SAC-B Open Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
246	DFXV-5426B	DFXV-5426B-OPN	Acid Drain valve For Stronge Acid Cation Exchanger SAC-B Open Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
247	DFXV-5426B	DFXV-5426B-QLS	Acid Drain valve For Stronge Acid Cation Exchanger SAC-B Open Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
248	DFXV-5430A	DFXV-5430A-OPN	Service I/L Valve For Strong Base Anion Exchanger SBA-A Open Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
249	DFXV-5430A	DFXV-5430A-QLS	Service I/L Valve For Strong Base Anion Exchanger SBA-A Close Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
250	DFXV-5438A	DFXV-5438A-OPN	Balance Water I/L Valve For Strong Base Anion Exchanger SBA-A Open Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
251	DFXV-5438A	DFXV-5438A-QLS	Balance Water I/L Valve For Strong Base Anion Exchanger SBA-A Open Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
252	DFXV-5436A	DFXV-5436A-OPN	Middle Collect or I/L valve For Strong Base Anion Exchanger SBA-A Open Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
253	DFXV-5436A	DFXV-5436A-QLS	Middle Collect or I/L valve For Strong Base Anion Exchanger SBA-A Open Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
254	DFXV-5432A	DFXV-5432A-OPN	Backwash I/L valve For Strong Base Anion Exchanger SBA-A Open Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
255	DFXV-5432A	DFXV-5432A-QLS	Backwash I/L valve For Strong Base Anion Exchanger SBA-A Open Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
256	DFXV-5431A	DFXV-5431A-OPN	Service O/L valve For Strong Base Anion Exchanger SBA-A Open Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
257	DFXV-5431A	DFXV-5431A-QLS	Service O/L valve For Strong Base Anion Exchanger SBA-A Close Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
258	DFXV-5433A	DFXV-5433A-OPN	Backwash O/L valve For Strong Base Anion Exchanger SBA-A Open Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
259	DFXV-5433A	DFXV-5433A-QLS	Backwash O/L valve For Strong Base Anion Exchanger SBA-A Close Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
260	DFXV-5437A	DFXV-5437A-OPN	Middle Collect or O/L valve For Strong Base Anion Exchanger SBA-A Open Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
261	DFXV-5437A	DFXV-5437A-QLS	Middle Collect or O/L valve For Strong Base Anion Exchanger SBA-A Close Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
262	DFXV-5440A	DFXV-5440A-OPN	Caustic Injection valve For Strong Base Anion Exchanger SBA-A Open Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
263	DFXV-5440A	DFXV-5440A-QLS	Caustic Injection valve For Strong Base Anion Exchanger SBA-A Close Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
264	DFXV-5435A	DFXV-5435A-OPN	Rinse O/L valve For Strong Base Anion Exchanger SBA-A Open Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
265	DFXV-5435A	DFXV-5435A-QLS	Rinse O/L valve For Strong Base Anion Exchanger SBA-A Close Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
266	DFXV-5434A	DFXV-5434A-OPN	Air Vent valve For Strong Base Anion Exchanger SBA-A Open Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
267	DFXV-5434A	DFXV-5434A-QLS	Air Vent valve For Strong Base Anion Exchanger SBA-A Close Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
268	DFXV-5439A	DFXV-5439A-OPN	Caustic I/L Valve For Strong Base Anion Exchanger SBA-A Open Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
269	DFXV-5439A	DFXV-5439A-QLS	Caustic I/L Valve For Strong Base Anion Exchanger SBA-A Close Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
270	DFXV-5441A	DFXV-5441A-OPN	Caustic Drain valve For Strong Base Anion Exchanger SBA-A Open Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
271	DFXV-5441A	DFXV-5441A-QLS	Caustic Drain valve For Strong Base Anion Exchanger SBA-A Close Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
272	DFXV-5430B	DFXV-5430B-OPN	Service I/L Valve For Strong Base Anion Exchanger SBA-B Open Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
273	DFXV-5430B	DFXV-5430B-QLS	Service I/L Valve For Strong Base Anion Exchanger SBA-B Close Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
274	DFXV-5438B	DFXV-5438B-OPN	Balance Water I/L valve For Strong Base Anion Exchanger SBA-B Open Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
275	DFXV-5438B	DFXV-5438B-QLS	Balance Water I/L valve For Strong Base Anion Exchanger SBA-B Open Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
276	DFXV-5436B	DFXV-5436B-OPN	Middle Collect or I/L valve For Strong Base Anion Exchanger SBA-B Open Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
277	DFXV-5436B	DFXV-5436B-QLS	Middle Collect or I/L valve For Strong Base Anion Exchanger SBA-B Close Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
278	DFXV-5432B	DFXV-5432B-OPN	Backwash I/L Valve For Strong Base Anion Exchanger SBA-B Open Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
279	DFXV-5432B	DFXV-5432B-QLS	Backwash I/L Valve For Strong Base Anion Exchanger SBA-B Close Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
280	DFXV-5431B	DFXV-5431B-OPN	Service O/L valve For Strong Base Anion Exchanger SBA-B Open Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
281	DFXV-5431B	DFXV-5431B-QLS	Service O/L valve For Strong Base Anion Exchanger SBA-B Close Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
282	DFXV-5433B	DFXV-5433B-OPN	Backwash O/L valve For Strong Base Anion Exchanger SBA-B Open Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
283	DFXV-5433B	DFXV-5433B-QLS	Backwash O/L valve For Strong Base Anion Exchanger SBA-B Close Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
284	DFXV-5437B	DFXV-5437B-OPN	Middle Collect or O/L valve For Strong Base Anion Exchanger SBA-B Open Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
285	DFXV-5437B	DFXV-5437B-QLS	Middle Collect or O/L valve For Strong Base Anion Exchanger SBA-B Close Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
286	DFXV-5440B	DFXV-5440B-OPN	Caustic Injection valve For Strong Base Anion Exchanger SBA-B Open Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
287	DFXV-5440B	DFXV-5440B-QLS	Caustic Injection valve For Strong Base Anion Exchanger SBA-B Close Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
288	DFXV-5435B	DFXV-5435B-OPN	Rinse O/L Valve For Strong Base Anion Exchanger SBA-B Open Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
289	DFXV-5435B	DFXV-5435B-QLS	Rinse O/L Valve For Strong Base Anion Exchanger SBA-B Close Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
290	DFXV-5434B	DFXV-5434B-OPN	Air Vent valve For Strong Base Anion Exchanger SBA-B Open Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
291	DFXV-5434B	DFXV-5434B-QLS	Air Vent valve For Strong Base Anion Exchanger SBA-B Close Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
292	DFXV-5439B	DFXV-5439B-OPN	Caustic I/L Valve For Strong Base Anion Exchanger SBA-B Open Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
293	DFXV-5439B	DFXV-5439B-QLS	Caustic I/L Valve For Strong Base Anion Exchanger SBA-B Close Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
294	DFXV-5441B	DFXV-5441B-OPN	Caustic Drain valve For Strong Base Anion Exchanger SBA-B Open Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
295	DFXV-5441B	DFXV-5441B-QLS	Caustic Drain valve For Strong Base Anion Exchanger SBA-B Close Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
296	DFXV-5442A	DFXV-5442A-OPN	Service I/L Valve For Mixed Bed Exchanger MB-A Open Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
297	DFXV-5442A	DFXV-5442A-QLS	Service I/L valve For Mixed Bed Exchanger MB-A Close Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
298	DFXV-5452A	DFXV-5452A-OPN	Acid Balance water I/L Valve For Mixed Bed Exchanger MB-A Open Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
299	DFXV-5452A	DFXV-5452A-QLS	Acid Balance water I/L valve For Mixed Bed Exchanger MB-A Close Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
300	DFXV-5449A	DFXV-5449A-OPN	Middle collector I/L valve For Mixed Bed Exchanger MB-A Open Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
301	DFXV-5449A	DFXV-5449A-QLS	Middle collector I/L Valve For Mixed Bed Exchanger MB-A Close Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
302	DFXV-5451A	DFXV-5451A-OPN	Badwash I/L Valve For Mixed Bed Exchanger MB-A Open Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
303	DFXV-5451A	DFXV-5451A-QLS	Backwash I/L Valve For Mixed Bed Exchanger MB-A Close Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
304	DFXV-5444A	DFXV-5444A-OPN	Caustic Balance water I/L Valve For Mixed Bed Exchanger MB-A Open Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
305	DFXV-5444A	DFXV-5444A-QLS	Caustic Balance water I/L Valve For Mixed Bed Exchanger MB-A Close Feedback	Field	PLC	Pot free	NO	1	---	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2					
306	DFXV-5443A	DFXV-5443A-OPN	Service O/L Valve For Mixed Bed Exchanger MB-A Open Feedback	Field	PLC	Pot free	NO	1	---</																



Bharat Heavy Electricals Limited <i>(Government of India Enterprise)</i>	
PROJECT ENGINEERING DEPARTMENT	
DESCRIPTION OF WORK	
01. APPROVED SUBMIT AS BUILT FOR DRAWING DOCUMENTED 02. APPROVED WITH MARK FOR COMMENTS ACTIVITY MAY PROCEED. PLEASE RE-SUBMIT FOR FINAL APPROVAL ☒ 03. REJECT AS PER SHEET COMMENTS AND RE-SUBMIT FOR APPROVAL RETAINED FOR INFORMATION	This approval does not absolve the vendor from the responsibility to accept with 100% specification and all applicable codes and standards. Vendor has to ensure safety and environmental protection and meet the required performance of the equipment. Comments to be noted on drawing: ☒ Comments to be noted on document: ☐
Date: _____ Signature: _____ Name: _____ Designation: _____	

[illegible]

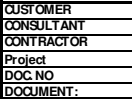


Bharat Heavy Electricals Limited Ramachandrapuram, Hyderabad		
<u>PROJECT ENGINEERING DEPARTMENT</u>		
DESCRIPTION OF CODE :		
01. APPROVED SUBMIT AS BUILT DRAWINGS /DOCUMENTS . 02. APPROVED WITH MINOR COMMENTS ACTIVITY MAY PROCEED. PLEASE RE-SUBMIT FOR FINAL APPROVAL. 03. REVISE AS PER BHEL COMMENTS AND RESUBMIT FOR APPROVAL. 04. RETAINED FOR INFORMATION.		
<i>This approval does not absolve the vendor from the responsibility to comply with BHEL specification and all applicable codes and standards. Vendor has to ensure safe and smooth operation and meet the intended performance of the equipment.</i>		
Comments as marked on drawing	Comments as in enclosed document.	
		Date: 21.08.13



CUSTOMER		NTPCBHEL POWER PROJECT PVT. LTD																		Issued For		Approval	
CONSULTANT		DEVELOPMENT CONSULTANT PVT. LTD																		Job No.		JWL-2194	
CONTRACTOR		WIPRO WATER																		Date		25.06.2013	
Project		DMI PLANT FOR 1X100 MW NAMRUP COMBINED CYCLE REPLACEMENT POWER PROJECT																		Revision		R1	
DOC NO		A4-JWL-2194-INSCH-DM-002																					
DOCUMENT:		PLC I/O LIST FOR DMI PLANT																					
SR	TAGNO.	PLCT ag No.	DESCRIPTION	SIGNAL SOURCE	SIGNAL DEST.	SIGNAL TYPE	CONT NO/ NC	DI	DO	AI	AO	INST RANGE	ENGG. UNIT	REDUND.	ALARMS HH	H	LL	L	SCALE RANGE	REF. P. & I. D.	Rev No		
23	AUP-A	HS AUP-A STR/ STP	Acid Unloading Pumps-A Start / Stop	PLC	MCC	Pot free	NO	---	1	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2			
24	AUP-B	HS AUP-B STR/ STP	Acid Unloading Pumps-B Start / Stop	PLC	MCC	Pot free	NO	---	1	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2			
25	N.PITP-A	HS N.PITP-A STR/ STP	N.Pit pumps-A Start / Stop	PLC	MCC	Pot free	NO	---	1	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2			
26	N.PITP-B	HS N.PITP-B STR/ STP	N.Pit pumps-B Start / Stop	PLC	MCC	Pot free	NO	---	1	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2			
27	DFXV-5404A	DFXV-5404A-OPN/ QLSQMD	Service I/ L valve For Pressure Sand Filter PSF-A Open/ Close Command	PLC	Field	Pot free	NO	---	1	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2			
28	DFXV-5406A	DFXV-5406A-OPN/ QLSQMD	Backwash I/ L valve For Pressure Sand Filter PSF-A Open/ Close Command	PLC	Field	Pot free	NO	---	1	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2			
29	DFXV-5410A	DFXV-5410A-OPN/ QLSQMD	Air I/ L valve For Pressure Sand Filter PSF-A Open/ Close Command	PLC	Field	Pot free	NO	---	1	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2			
30	DFXV-5407A	DFXV-5407A-OPN/ QLSQMD	Backwash O/ L valve For Pressure Sand Filter PSF-B Open/ Close Command	PLC	Field	Pot free	NO	---	1	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2			
31	DFXV-5405A	DFXV-5405A-OPN/ QLSQMD	Service O/ L valve For Pressure Sand Filter PSF-B Open/ Close Command	PLC	Field	Pot free	NO	---	1	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2			
32	DFXV-5409A	DFXV-5409A-OPN/ QLSQMD	Rinse O/ L valve For Pressure Sand Filter PSF-A Open/ Close Command	PLC	Field	Pot free	NO	---	1	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2			
33	DFXV-5408A	DFXV-5408A-OPN/ QLSQMD	Air O/ L valve For Pressure Sand Filter PSF-A Open/ Close Command	PLC	Field	Pot free	NO	---	1	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2			
34	DFXV-5404B	DFXV-5404B-OPN/ QLSQMD	Service I/ L valve For Pressure Sand Filter PSF-B Open/ Close Command	PLC	Field	Pot free	NO	---	1	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2			
35	DFXV-5406B	DFXV-5406B-OPN/ QLSQMD	Backwash I/ L valve For Pressure Sand Filter PSF-B Open/ Close Command	PLC	Field	Pot free	NO	---	1	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2			
36	DFXV-5410B	DFXV-5410B-OPN/ QLSQMD	Air I/ L valve For Pressure Sand Filter PSF-B Open/ Close Command	PLC	Field	Pot free	NO	---	1	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2			
37	DFXV-5407B	DFXV-5407B-OPN/ QLSQMD	Backwash O/ L valve For Pressure Sand Filter PSF-B Open/ Close Command	PLC	Field	Pot free	NO	---	1	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2			
38	DFXV-5405B	DFXV-5405B-OPN/ QLSQMD	Service O/ L valve For Pressure Sand Filter PSF-B Open/ Close Command	PLC	Field	Pot free	NO	---	1	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2			
39	DFXV-5409B	DFXV-5409B-OPN/ QLSQMD	Rinse O/ L valve For Pressure Sand Filter PSF-B Open/ Close Command	PLC	Field	Pot free	NO	---	1	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2			
40	DFXV-5408B	DFXV-5408B-OPN/ QLSQMD	Air O/ L valve For Pressure Sand Filter PSF-B Open/ Close Command	PLC	Field	Pot free	NO	---	1	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2			
41	DFXV-5411A	DFXV-5411A-OPN/ QLSQMD	Service I/ L valve For Activated Carbon Filter ACF-A Open/ Close Command	PLC	Field	Pot free	NO	---	1	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2			
42	DFXV-5413A	DFXV-5413A-OPN/ QLSQMD	Backwash I/ L valve For Activated Carbon Filter ACF-A Open/ Close Command	PLC	Field	Pot free	NO	---	1	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2			
43	DFXV-5414A	DFXV-5414A-OPN/ QLSQMD	Backwash O/ L valve For Activated Carbon Filter ACF-A Open/ Close Command	PLC	Field	Pot free	NO	---	1	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2			
44	DFXV-5412A	DFXV-5412A-OPN/ QLSQMD	Service O/ L valve For Activated Carbon Filter ACF-A Open/ Close Command	PLC	Field	Pot free	NO	---	1	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2			
45	DFXV-5416A	DFXV-5416A-OPN/ QLSQMD	Rinse O/ L valve For Activated Carbon Filter ACF-A Open/ Close Command	PLC	Field	Pot free	NO	---	1	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2			
46	DFXV-5415A	DFXV-5415A-OPN/ QLSQMD	Air O/ L valve For Activated Carbon Filter ACF-A Open/ Close Command	PLC	Field	Pot free	NO	---	1	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2			
47	DFXV-5411B	DFXV-5411B-OPN/ QLSQMD	Service I/ L valve For Activated Carbon Filter ACF-B Open/ Close Command	PLC	Field	Pot free	NO	---	1	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2			
48	DFXV-5413B	DFXV-5413B-OPN/ QLSQMD	Backwash I/ L valve For Activated Carbon Filter ACF-B Open/ Close Command	PLC	Field	Pot free	NO	---	1	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2			
49	DFXV-5414B	DFXV-5414B-OPN/ QLSQMD	Backwash O/ L valve For Activated Carbon Filter ACF-B Open/ Close Command	PLC	Field	Pot free	NO	---	1	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2			
50	DFXV-5412B	DFXV-5412B-OPN/ QLSQMD	Service O/ L valve For Activated Carbon Filter ACF-B Open/ Close Command	PLC	Field	Pot free	NO	---	1	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2			
51	DFXV-5416B	DFXV-5416B-OPN/ QLSQMD	Rinse O/ L valve For Activated Carbon Filter ACF-B Open/ Close Command	PLC	Field	Pot free	NO	---	1	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2			
52	DFXV-5415B	DFXV-5415B-OPN/ QLSQMD	Air O/ L valve For Activated Carbon Filter ACF-B Open/ Close Command	PLC	Field	Pot free	NO	---	1	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2			
53	DFXV-5417A	DFXV-5417A-OPN/ QLSQMD	Service I/ L valve For Stronge Acid Cation Exchanger SAC-A Open/ Close Command	PLC	Field	Pot free	NO	---	1	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2			
54	DFXV-5425A	DFXV-5425A-OPN/ QLSQMD	Balance Water I/ L valve For Stronge Acid Cation Exchanger SAC-A Open/ Close Command	PLC	Field	Pot free	NO	---	1	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2			
55	DFXV-5423A	DFXV-5423A-OPN/ QLSQMD	Middle Collector I/ L valve For Stronge Acid Cation Exchanger SAC-A Open/ Close Command	PLC	Field	Pot free	NO	---	1	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2			
56	DFXV-5419A	DFXV-5419A-OPN/ QLSQMD	Backwash I/ L valve For Stronge Acid Cation Exchanger SAC-A Open/ Close Command	PLC	Field	Pot free	NO	---	1	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2			
57	DFXV-5418A	DFXV-5418A-OPN/ QLSQMD	Service O/ L valve For Stronge Acid Cation Exchanger SAC-A Open/ Close Command	PLC	Field	Pot free	NO	---	1	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2			
58	DFXV-5420A	DFXV-5420A-OPN/ QLSQMD	Backwash O/ L valve For Stronge Acid Cation Exchanger SAC-A Open/ Close Command	PLC	Field	Pot free	NO	---	1	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2			
59	DFXV-5424A	DFXV-5424A-OPN/ QLSQMD	Middle Collector O/ L valve For Stronge Acid Cation Exchanger SAC-A Open/ Close Command	PLC	Field	Pot free	NO	---	1	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2			
60	DFXV-5427A	DFXV-5427A-OPN/ QLSQMD	Acid Injection valve For Stronge Acid Cation Exchanger SAC-A Open/ Close Command	PLC	Field	Pot free	NO	---	1	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2			
61	DFXV-5422A	DFXV-5422A-OPN/ QLSQMD	Rinse O/ L valve For Stronge Acid Cation Exchanger SAC-A Open/ Close Command	PLC	Field	Pot free	NO	---	1	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2			
62	DFXV-5421A	DFXV-5421A-OPN/ QLSQMD	Air Vent. valve For Stronge Acid Cation Exchanger SAC-A Open/ Close Command	PLC	Field	Pot free	NO	---	1	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2			
63	DFXV-5428A	DFXV-5428A-OPN/ QLSQMD	Acid I/ L valve For Stronge Acid Cation Exchanger SAC-A Open/ Close Command	PLC	Field	Pot free	NO	---	1	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2			
64	DFXV-5426A	DFXV-5426A-OPN/ QLSQMD	Acid Drain valve For Stronge Acid Cation Exchanger SAC-A Open/ Close Command	PLC	Field	Pot free	NO	---	1	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2			
65	DFXV-5417B	DFXV-5417B-OPN/ QLSQMD	Service I/ L valve For Stronge Acid Cation Exchanger SAC-B Open/ Close Command	PLC	Field	Pot free	NO	---	1	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2			
66	DFXV-5425B	DFXV-5425B-OPN/ QLSQMD	Balance Water I/ L valve For Stronge Acid Cation Exchanger SAC-B Open/ Close Command	PLC	Field	Pot free	NO	---	1	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2			
67	DFXV-5423B	DFXV-5423B-OPN/ QLSQMD	Middle Collector I/ L valve For Stronge Acid Cation Exchanger SAC-B Open/ Close Command	PLC	Field	Pot free	NO	---	1	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2			
68	DFXV-5419B	DFXV-5419B-OPN/ QLSQMD	Backwash I/ L valve For Stronge Acid Cation Exchanger SAC-B Open/ Close Command	PLC	Field	Pot free	NO	---	1	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2			
69	DFXV-5418B	DFXV-5418B-OPN/ QLSQMD	Service O/ L valve For Stronge Acid Cation Exchanger SAC-B Open/ Close Command	PLC	Field	Pot free	NO	---	1	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2			
70	DFXV-5420B	DFXV-5420B-OPN/ QLSQMD	Backwash O/ L valve For Stronge Acid Cation Exchanger SAC-B Open/ Close Command	PLC	Field	Pot free	NO	---	1	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2			
71	DFXV-5424B	DFXV-5424B-OPN/ QLSQMD	Middle Collector O/ L valve For Stronge Acid Cation Exchanger SAC-B Open/ Close Command	PLC	Field	Pot free	NO	---	1	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2			
72	DFXV-5427B	DFXV-5427B-OPN/ QLSQMD	Acid Injection valve For Stronge Acid Cation Exchanger SAC-B Open/ Close Command	PLC	Field	Pot free	NO	---	1	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2			
73	DFXV-5422B	DFXV-5422B-OPN/ QLSQMD	Rinse O/ L valve For Stronge Acid Cation Exchanger SAC-B Open/ Close Command	PLC	Field	Pot free	NO	---	1	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2			
74	DFXV-5421B	DFXV-5421B-OPN/ QLSQMD	Air Vent. valve For Stronge Acid Cation Exchanger SAC-B Open/ Close Command	PLC	Field	Pot free	NO	---	1	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2			
75	DFXV-5428B	DFXV-5428B-OPN/ QLSQMD	Acid I/ L valve For Stronge Acid Cation Exchanger SAC-B Open/ Close Command	PLC	Field	Pot free	NO	---	1	---	---	---	---	N	---	---	---	---	---	A0-JWL-2194-201/202/203-01-R2			

Bharat Heavy Electricals Limited Bharat Heavy Electricals, Hyderabad PROJECT ENGINEERING DEPARTMENT	
DESCRIPTION OF WORK: 01. APPROVED FOR MTS AS BUILT DRAWINGS / DOCUMENTS - 02. APPROVED WITH MINOR COMMENTS ACTIVITY MAT PROCEED, PLEASE RE-SUBMIT FOR FINAL APPROVAL 03. REJECT AS PER SHELL COMMENTS AND REQUEST FOR APPROVAL RETIRED FOR INFORMATION	
This approval does not absolve the vendor from the responsibility to comply with ISIRI specifications and all applicable codes and standards. Vendor has to ensure the safety and health of personnel and the environment in the course of the work.	
Comments to be filled in during	Comments to be enclosed.
	



Bharat Heavy Electricals Limited Harnamchandrapuram, Hyderabad	
PROJECT ENGINEERING DEPARTMENT	
DESCRIPTION OF CODE	
01. APPROVED AS BUILT DRAWINGS / DOCUMENTS 02. APPROVED WITH MINOR COMMENTS ACTIVITY MAY PROCEED. PLEASE RE-SUBMIT FOR FINAL APPROVAL. 03. REJECT AS PER SHEET COMMENTS AND RE-SUBMIT FOR APPROVAL. 04. RETAINED FOR INFORMATION.	
This approval does not absolve the vendor from the responsibility to comply with all specifications and all applicable codes and standards. Vendor has to ensure safe and successful operation and must the sustained performance of the equipment.	
Comments to be noted on drawing.	Comments to be enclosed document.
✓	✓

NTPCBHEL POWER PROJECT PVT. LTD														Development Consultant Pvt. 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Bharat Heavy Electricals Limited Rameshchandrapuram, Hyderabad		
<u>PROJECT ENGINEERING DEPARTMENT</u>		
DESCRIPTION OF CODE :		
01. APPROVED SUBMIT AS BUILT DRAWINGS / DOCUMENTS . 02. APPROVED WITH MINOR COMMENTS ACTIVITY MAY PROCEED. 03. PLEASE RE-SUBMIT FOR FINAL APPROVAL. 04. REVISE AS PER BHEL COMMENTS AND RESUBMIT FOR APPROVAL. 05. RETAINED FOR INFORMATION.		
<i>This approval does not absolve the vendor from the responsibility to comply with BHEL specification and all applicable codes and standards. Vendor has to ensure safe and smooth operation and meet the intended performance of the equipment.</i>		
Comments as marked on drawing 	Comments as in enclosed document.	
		Date: 21.08.13



WIPRO WATER

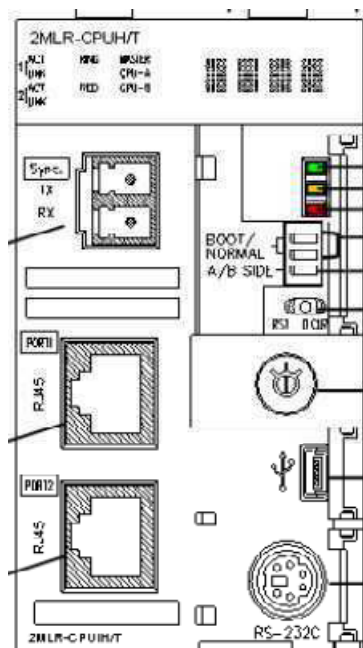
SHEET 1 OF 18

REV : 0 **R1**

DOC NO.: A4-JWL-2194-INS-DTS-DM-017

PLC SYSTEM DATASHEET

CUSTOMER	M/s. NTPC BHEL POWER PROJECTS PVT. LTD.
PROJECT	DM PLANT FOR 1X 100 NAMRUPCOMBINED CYCLE REPLACEMENT POWER PROJECT
END USER	M/s. ASSAM POWER GENERATION CORPORATION LTD.
CONSULTANT	M/s. DEVELOPMENT CONSULTANT PVT.LTD.



Redundant CPU Module

Product Name	Master logic-200
Module Type	Redundant CPU
Backplane Support	Dual backplane bus support - PCI & serial bus
Boolean Execution Speed	0.042μs/Step
Master Switching time	22ms
Processing Speed	0.042 μs/Step
Redundant Type	Hot Redundant
User Logic Memory	7MB
Type of Memory Storage	9 Mbytes of battery-backed RAM & 16MB Flash memory
I/O Discrete Points	16K
I/O Analog Points	16K
Max no Of extension stations	31
Max no Of slots	372
Max no of I/O	23808 using 64 chanel DI/DO
	11904 using 32 chanel DI/DO
current consumption	980mA
Communication	USB for softmaster PC
	RS 232 for peripheral (Modbus Supported)
	Ethernet TCP-IP

MODBUS protocol shall be RS-485 RTU. RS-232 to be modified to RS 485.



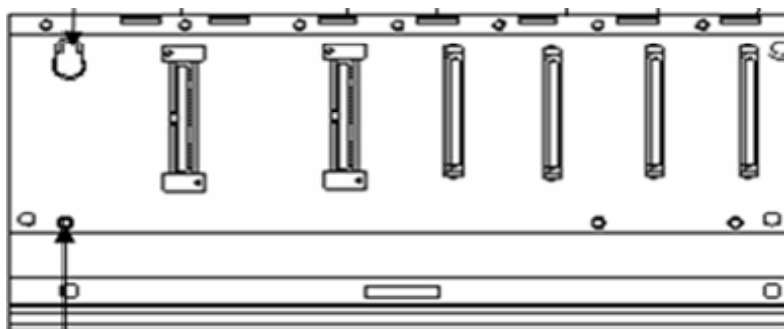
Power Supply Module 24 VDC (7.5A @ 5VDC)

Rated input voltage	DC24V
Input voltage range	19.2~28.8V DC
Inrush current	80A peak or lower
Input fuse	Built in(not replaceable by a user) AC: 250V / 3.15A
Efficiency	65% or more
Output voltage	DC 5V ($\pm 2\%$)
Output current	7.5A
Output power	37.5W at 55°C
Over current protection	9.0 A~17.0A
Rated switching voltage/current	DC 24V, 0.5A
Response time	OFF→ON/ ON→OFF: 10ms or less/12ms or less
Dimension (W x H x D mm)	55 x 95 x 110
Weight	417g



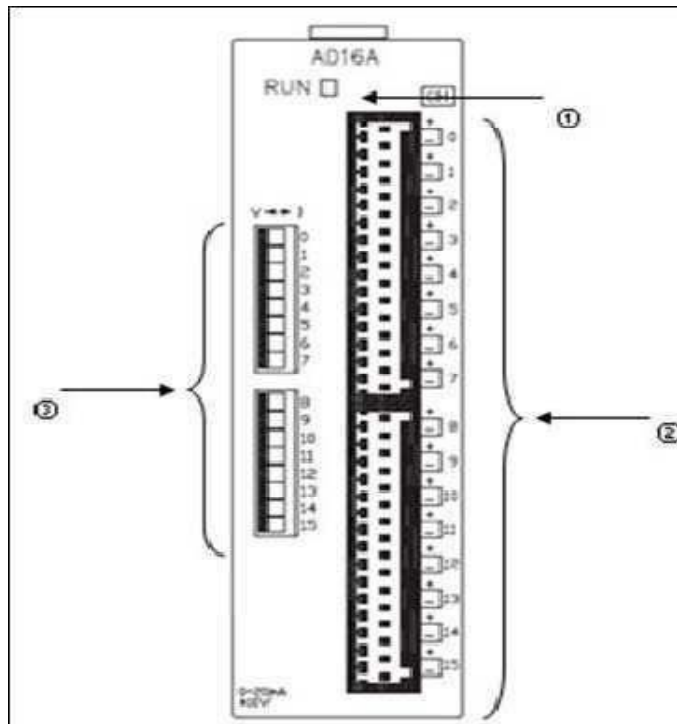
8 Point Analog Output Module

Channels	8
Analog output	0-20mA, 4-20mA
Accuracy	$\pm 2\%$
Maximum conversion Speed	250 μ s/channel
Absolute maximum output	± 24 mA
Insulation method	Photo-coupler insulation between input terminal and PLC power (no insulation between channels)
Current consumption	243mA
Weight (g)	150g



CPU MAIN BASE

No. of modules	Base 2 slot
Installed module	CPU
Current Consumption	0.2A



16 Channel Analog input module-2MLF-AD16A

Channels	16 current/voltage
Maximum conversion speed	500μs/channel
Isolation method	Photo-coupler isolation between input terminal and PLC power (no isolation between
Internal-consumed current	330mA
Weight	115g
RUN LED	Displays the operation status of analog input module (voltage
	On: Operation normal
	Flickering: Error occurs (for more details, refer to Error codes
	Off: DC 5V disconnected, analog input module error.
Voltage/current selection sw	Switch to select voltage/current (left: voltage, right: current).
Input current	4 to 20mA/0-10V



32-point digital input module (source/sink type)

Channels	32-point
Isolation method	Photo coupler isolation
Rated input voltage	DC24V
Rated input current	About 4mA
Operation voltage range	DC20.4~28.8V (ripple rate < 5%)
On voltage/current	DC19V or higher / 3mA or higher
Off voltage/current	DC11V or lower / 1.7mA or lower
Input resistance	About 5.6kΩ
Response time	1ms/3ms/5ms/10ms/20ms/70ms/100ms (CPU parameter)
Isolation resistance	10MΩ or more by megger
Current consumption (mA)	50mA
Operation indicator	Input On, LED On
External connection method	40-point connector
Weight	0.1kg



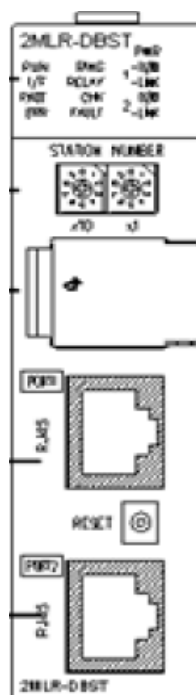
32-point transistor digital output module (source type)

Output point	32-point
Isolation method	Photo coupler isolation
Rated input voltage	DC24V
Rated input current	About 4mA
Operation voltage range	DC20.4~28.8V (ripple rate < 5%)
Off voltage/current	0.1mA or less
Maximum inrush current	4A / 10ms or less
Current consumption	130mA
External connection method	40 Pin Connector
Response time	1ms or less
Weight	0.1kg
Maximum voltage drop (On)	DC 0.3V or less



HMI Interface Module

Ethernet processor	32 bit	
Number of Ethernet PortS	01 - 10/100T with auto-sensing RJ-45 connection.	
Current consumption	410mA	
LEDs	HS	On during HS Link service
	P2P	On P2P service
	PADT	On remote service
	PC	On dedicated service use
	ERR	ON when a fatal error occurs
	RUN	Normal
	I/F	Blink when Normal ON when a fatal error occurs
	TX	Blinks when sending
	RX	Blinks when receiving
Connectvity	10/100	Off 10Mbps Media check
	To HMI S/W	



Normal Base copper Slave Communication Module

Media	Electrical
Max. distance between Extension bases	Electrical (100m)
Loader connection	Extension drive USB
Range of station no.	1 ~ 31 (other no. will generate an error)
Install position	CPU parts(CPU0 connector) in extension base
Weight (g)	100
Current Consumption	550mA



DELL industrial PC

Processor	Intel Core2 Duo (2.33Ghz) or equivalent
System memory (RAM)	2 GB or more
Networking	Dual 100/100 mbps Ethernet
Video Resolution	22 " 1280*1024 or 1600*1200
Video memory per channel	256 VRAM
Operating System	microsoft windows 7, 32 bit
Browser type	internet explorer 7
Load Device	DVD RW
Hard Drive	160 GB. SATA 3mbps



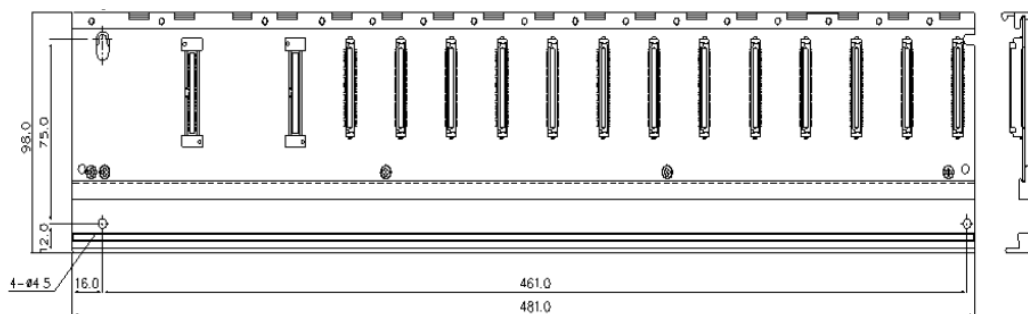
Experion SCADA Release 400.1

max. no. of composite SCADA points	8050 SCADA Points
max. no. of stations	10
max. no. of active alarms	2000
max. no. of active messages	1000
max. no of events (burst condition)	1000 events
max. no of sustained alarms/sec.	20/sec
max. no. of events in online events database	1.2 million
redundancy	supports redundant & non-redundant server topologies
trend pens per set	32
points per operating group	8
no. of parameters assigned to history	2000-50000 parameters



RS-485 Serial Communication Module (Snet)

Comm. Settings	Interface Standard	2 channel- RS422/ RS485
	Start Bit	1
	Data Bits	7 or 8
	Stop Bits	1 or 2
	Parity	Odd/Even/None
	Baud Rate	300/600/1200/2400/4800/9600/19200/38400/57600/115200 bps
	Synchronization	Asynchronous
	Transmission Distance	500m Max.
	Network Configuration	1:1, 1:N, N:M
	Station No. Settings	Setting range: 0-31
	Service/Protocol	Modbus RTU/ASCII master, User defined Protocol Master
	Configuration Software	Software master-NM
	LED's	RUN, I/F, TX, RX, ERR
	Network Diagnostics	Auto Scan, Frame Monitor, Link Monitor, Loop Back
	Current Consumption	300mA



IO Normal Expansion Racks

No. of modules	12 Module
Installed module	All modules except FEnet, RAPIEnet
Dimension (mm)	481 X 98 X 19
Distance of hole for panel attachment	461X 75
Weight (g)	700



Phoenix make 5 port Ethernet Switch - SFNB5TX

Interface	1 Ethernet (RJ45)
No. of ports	5 (RJ45 ports)
Connection method	RJ45 female connector, auto negotiation & autocrossing
Transmission physics	Ethernet in RJ45 twisted pair
Transmission speed	10/100 MBit/s (RJ45)
Basic functions	10/100T switch / autonegotiation, store and forward switching mode
Diagnostics	LEDs: US, link and activity per port
Supply voltage	
Supply voltage	24 V DC
Residual ripple	3.6 VPP (within the permitted voltage range)
Supply voltage range	12 V DC ... 48 V DC
Current consumption	185 mA (@24 V DC)
General data	Width 28 mm
	Height 110 mm
	Depth 70 mm
Mounting type	DIN rail



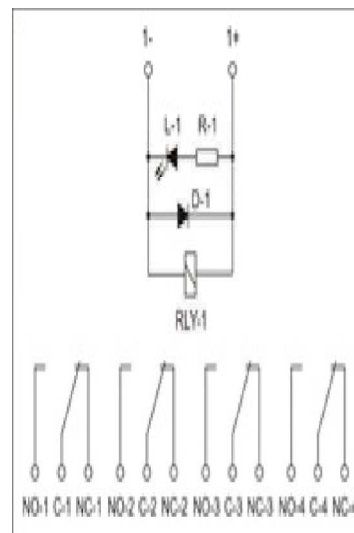
SMPS 24 VDC / 100W - PSS100/24/4.2

Output	Power ratings	100W
	Output voltage (VDC)	24 V
	Output current	4.2A @ 24VDC
	Ripple (typical)	100 mV
	Rise time (typical)	150ms
	Hold time (typical)	30 ms
Efficiency		86%
Input	Voltage	115/230 (Auto Select)
	Frequency	47 to 63 Hz
	Current (typical)	2.4 @ 90VAC
	Leakage current	0.25 mA
	Inrush current	30/60A @ 110/230VAC
	Power Dissipation	15 Watts
Additional functions	Input Fuse	T6.3A/250VAC Internal
	Surge Protection	Variastor
	Overload protection	140%
	Overvoltage protection	33 VDC, Auto Recovery after fault removal
Other	MTBF	456000 hrs min.
	Isolation Voltage	3000 VAC
	Isolation Resistance	100 MΩ
	Output indicator	DC ON (Green), DC Low (Red) LED
	Dimensions	90H x 54W x 114D mm
	Weight	1380gm



SMPS 24 VDC / 240W - PSS240/24/10

Output	Power ratings	240W
	Output voltage (VDC)	24 V
	Output current	10A @ 24VDC
	Ripple (typical)	100 mV
	Rise time (typical)	150ms
	Hold time (typical)	30 ms
Efficiency		88%
Input	Voltage	115/230 (Auto Select)
	Frequency	47 to 63 Hz
	Current (typical)	4.4/1.6A @ 110/230 VAC
	Leakage current	0.25 mA
	Inrush current	30/60A @ 110/230VAC
	Power Dissipation	35 Watts
Additional functions	Input Fuse	T6.3A/250VAC Internal
	Surge Protection	Variastor
	Overload protection	145%
	Overvoltage protection	33 VDC, Auto Recovery after fault removal
Other	MTBF	423000 hrs min.
	Isolation Voltage	3000 VAC
	Isolation Resistance	100 MΩ
	Output indicator	DC ON (Green), DC Low (Red) LED
	Dimensions	124.5H x 83.5W x 123.6D
	Weight	1380gm



8 Channel 4 C/O Relay plate using Omron Relays - IMRE4SS8/24/OM

RELAY GENERAL SPECS	
RELAY TYPE	4PDT - 4CO
NO.OF RELAY	8
TYPE	PLUGGABLE RELAY WITH SCHRACK OR EQ. SOCKET
COIL DATA	
OPERATING VOLTAGE	24 VDC
RELEASE VOLTAGE	3.6 VDC
CONSUMPTION	21.8mA
RESISTANCE	275 Ω
CONTACT DATA	
CONTACT MATERIALS	AgCdO
RELATED CONTACT CURRENT	5A
LOAD VOLTAGE RANGE	250 VAC, 125 VDC
MAX. OPERATING FREQ.	1800 Hz
LIFE EXPECTANCY	20,000,000 OPERTAIONS MECHANICAL,100,000 OPERTAIONS ELECTRICAL
TERMINATIONS	
TYPE OF CONNECTION	Screw Connection
WIRE CONNECTION	I/P: 20 CORE CABLE, O/P: 0.5 TO 2.5 SQMM
SRIPPRING LENGTH	8.3 MM
TORQUE	0.5 NM
GENERAL SPECIFICATIONS	
OPERATING TEMP.	-20 TO 50 DEG AMBIENT
INDICATION	3 MM RED LED FOR COILSTATUS
PROTECTION	1N4007 FREEWHEELING DIODE ACROSS RELAY COIL
MOUNTING	DIN32 / DIN35 / DIN35-15 / PANEL
DIMENSIONS	257(L) X 88(W) X 74(H)mm