Bharat Heavy Electricals Ltd
Electronics Division
Mysore Road, Bangalore – 560026

Tender Document for Design, Engg, Manufacturing, Testing and Supply in India for LIE/LIR for NTPC TELANGANA, KARIMNAGAR (2X800 MW) TPS & RFQ REF: SAM0000194

Technical Bid Opening Date: 22nd Jan, 2018 (Monday), 13:30 Hrs

Important Information:

Last Date and Time of Tender Submission in ***EPS Portal***: 22/01/2018 upto 13:00:00 Hrs.

Date and Time of Tender Opening in ***EPS Portal***: 22/01/2018, 13:30:00 Hrs.

Contact Person at BHEL EDN Bangalore:

1. **For Commercial Clarifications:-**
   Ms. Sarita Mohapatra: Sr. Purchase Officer (CE-MM-PR)
   Ph: 080-26998239, Mob: 07406555022
   Email:sarita@bhel.in

2. **For Technical Clarifications:-**
   Mr Lingutla Rajesh Kumar.: Sr. Engineer (CE-Engg/BPE)
   Ph: 080-26999527, Mob: 09900050260
   Email:lingutla.kumar@bhel.in

		बी एच ई एल BHEL A4-10		REF. : CE / 416 /NTPC TELA/ LIE-LIR / OT
				REV. NO. : 00
				PAGE : 01 0F 02

PROJECT : NTPC TALANGANA SG ISLAND PACKAGE 2 X 800MW STPP

CUSTOMER : M/s NTPC

SPECIFICATION
FOR
LOCAL INSTRUMENT ENCLOSURE (LIE) AND LOCAL INSTRUMENTS RACKS (LIR)

REVISION : 00	**APPROVED**		
	ASHISH MANJHI		
	PREPARED	**ISSUED**	**DATE**
	RAJESH LINGUTLA	**416**	**06/01/2018**

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GENERAL INSTRUCTIONS TO BIDDERS

SECTION- A

GENERAL INSTRUCTIONS TO BIDDERS:

1.0 All required documents against this Tender/Specification shall be submitted in English only.

2.0 Introduction: Bidders are required to offer Local Instrument Enclosure (LIE) & Local Instrument Rack (LIR) for a Thermal Power Plant Applications.

3.0 In order to accept the Technical offers / proposals from Bidders for the project mentioned in this Specification (refer Section C), certain Pre-qualification criteria are required to be met by Bidder.

4.0 Pre-qualification requirements are clearly mentioned in Section-B of this Specification. Bidder to read the same carefully and submit the details required for BHEL's acceptance.

5.0 Submit duly-filled Supplier Registration Form (SRF), which shall be downloaded by Bidder from our website "www.bhel.com.This is required for registration of new vendors at BHEL EDN against item Local Instrument Enclosure (LIE) & Local Instrument Rack (LIR). Those Vendors who are already approved by BHEL EDN against item Local instrument Enclosure (LIE) & Local instrument Rack (LIR) are not required to submit the Supplier Registration Form (SRF).

6.0 BHEL May visit vendor's work for verification of facilities offered and BHEL decision on suitability of manufacturing facility is final and binding.

7.0 In case Bidder does not include the details or meet the requirements of Pre-qualification requirements, their offer will be summarily rejected and Bidder's Technical offers will not be evaluated.

8.0 Submit duly-filled NTPC Sub Vendor Questionnaire attached as part of Technical specifications ref no: QS-01-QAI-P-04/F2-R2 who are the not approved by NTPC against item Local instrument Enclosure (LIE) & Local instrument Rack (LIR).Bidder to comply the same.

Evaluation methodology:

Evaluation methodology as below
BHEL shall initially open Bidder's PQR documents as per Section-B of this specification for review & acceptance.
If the Bidders who are meeting PQR requirements as per Section-B of this specification, Technical Offers of those bidders only will be considered for evaluation.
If the Bidders who are meeting technical requirements as per Section C of this specification, Those Bidders will be taken up with End user/Customer for approval.
If the Bidders who are approved by End user/Customer, Commercial bids of Those bidders will be considered for further evaluation by BHEL.

9.0 Bidders are required to submit offers as detailed below :

aa. Documents pertaining to Pre-Qualification requirement (Cl AA of Section B of this Specification) shall be in a Separate cover /Soft Folder with reference no. "CE/416/LIE-LIR/PQR / Cl AA of Section B" marked on it.

bb. Documents pertaining to Pre-Qualification requirement (Cl BB of Section B of this Specification) shall be in a Separate cover/Soft Folder with reference no "CE/416/LIE-LIR/PQR / Cl BB of Section B" marked on it.

cc. Technical offers/proposals for the Project, whose requirements are mentioned in Sections C will be submitted in a separate cover/Soft Folder with RFQ Reference & Reference marked on it.

Note 1:-Whenever required during evaluation of PQR and Technical offers/bids, vendor is required to be present at BHEL Electronic Division, Bangalore, for discussions. Further in the event of order, during approval of the vendor documents by End users/Customers, if needed vendor shall accompany BHEL representative for discussions.
Note 2:- Changes in Technical Specifications will be discussed with the bidders who Qualified PQR for this tender.

SECTION – B

PRE-QUALIFICATIONS REQUIREMENTS

APPROVED

ASHISH MANJHI

PREPARED	ISSUED	DATE
RAJESH LINGUTLA	416	06/01/2018

SECTION- B

AA. Pre-Qualification Requirements (PQR) of Bidders for Local Instrument Enclosures and Local Instrument Rack (LIE-LIR), as a part of Offer:

1.0 Submit Reference List of Projects wherein LIE, LIR has been supplied.

2.0 The bidder should have executed/ completed work of Design and supply of complete LIE LIR package at least 2 units in power plant/process Industries. Bidder should have executed Complete LIE/LIR Package to accommodate minimum of 150 Pressure transmitters / switches.

3.0 Original Equipment Manufacturers based outside India, who are making offer for this tender shall have authorized representatives in India for support related to Documentation, Erection, Commissioning & any other co-ordination work.

3.0 Bidders shall have experienced welders for welding of materials specified in the Technical specification. Welder's certificate shall be provided for verification.

4.0 Bidders shall have a designated drawing office with AUTOCAD/other drafting software, Submission of drawings shall be in pdf format. Bidders to give compliance to the same.

5.0 Bidders shall have designated machine shop including sheet metal fabrication upto 4mm thick and cutting up to 10 mm thick plates, should have Painting facility for both epoxy based tank process painting and powder coating facility or if outsourced details to be provided.

6.0 Bidder shall have facility for performing hydro test on all individual lines (Hydro test pressure shall be 530Kg/Cm2).

7.0 Vendor shall have requisite space for physical inspection, loading facility etc for offering minimum of about 100 LIE and 100 LIRs at the same time for inspection.

8.0 BHEL shall submit vendor credentials to customer and await customer's decision for a maximum of one month from the date of PQ bid opening. If approval is not received within above period, BHEL shall treat the offer as "NOT Meeting PQ" criteria and offer shall be rejected.

BB. Along with the documents related to PQR above, following details shall also be included in the Offer:

1.0 Unpriced Purchase Order copies of LIE-LIR.
2.0 Documents and drawings of LIE-LIR supplied to power plant/Process Industries.
3.0 Details of Manufacturing, testing & inspection facility.
4.0 Bidder shall have facility for engineering activities, preparation of Documents Etc. Submit these details.
5.0 In Case of Foreign Vendors Name & registered address of the Indian branch office or Indian representative for support of E&C and after sales service with Organization chart.

Important Note: In case Bidder does not submit details mentioned in above Section (B) or meet the requirements of Pre-qualification requirements Section (B), Offers will be summarily rejected and Bidder's Technical offers/proposals will not be evaluated. Please read carefully the GENERAL INSTRUCTIONS in Section A of this specifications.

PROJECT : NTPC TELANGANA SG ISLAND PACKAGE 2 X 800MW STPP

CUSTOMER : M/s NTPC

TECHNICAL SPECIFICATION
FOR
LOCAL INSTRUMENT ENCLOSURE / RACKS
(LIE / LIR)

REVISIONS :

APPROVED BY

ASHISH MANJHI

PREPARED BY	ISSUED	DATE
RAJESH LINGUTLA	416	06/01/18

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PROJECT : NTPC TELANGANA SG ISLAND PACKAGE 2 X 800MW STPP

CUSTOMER : M/s NTPC

SCOPE OF SUPPLY
FOR
LOCAL INSTRUMENT ENCLOSURE / RACKS
(LIE / LIR)

REVISIONS :

APPROVED BY

ASHISH MANJHI

PREPARED BY	ISSUED	DATE
RAJESH LINGUTLA	416	06/01/18

Scope of supply

The Scope of supply is as per Technical requirements attached with this specification. Vendor shall quote for each line item of the Table A,B,C. The unit rate shall be valid until the completion of the contracts. For this purpose vendors shall maintain MS Excel file indicating total Bill of materials Table A,B,C.

TABLE: A

S.No	Page no of HUP Ref CE/416/NTPC TELA/HUP	Material Code	Description	Qty for U#1	Qty for U#2
1		PR0830000020	LIE TYPEA	17	19
2		PR0830000038	LIE TYPE B	39	39
3		PR0830000046	LIE TYPE C	24	24
4		PR0830000054	LIR TYPE A	1	6
5		PR0830000062	LIR TYPE B	1	1
6		PR0830000070	LIR TYPE C	4	4
7	2	PR0830000313	HOOK UP SCHEME PT/PS 1/2" P91 9000CL	11	11
8	4	PR0830000321	HOOK UP SCHEME DPT/DPS 1/2" P91 9000CL	6	6
9	6	PR0830000089	HOOK UP SCHEME PT/PS 1/2" P22 9000CL	4	4
	8	PR0830000402	HOOK UP SCHEME PT/PS 1/2" P22 6000CL	14	14
	10	PR0830000356	HOOK UP SCHEME DPT/DPS 1/2" P22 6000CL	14	14
	12	PR0830000100	Hook up PT/PS 6000 Steam and Water	2	2
	14	PR0830000119	HOOK UP DPT/FT/LT STEAM AND WATER A106 6K	26	26
	16	PR0830000127	Hook up PT/PS 3000 water	105	43
	18	PR0830000135	Hook up DPT/DPS 3000 water	36	22
	20	PR0830000305	Hook up PT/PS 3000 Sea Water 1/2" SS 316L	1	1
	22	PR0830000216	Hook up DPT/DPS Sea water SS316 L	4	4
	24	PR0830000151	Hook up PT/PS Clean air Top entry 3/4"	4	4
	26	PR0830000283	Hook up DPT/FT/DPS Clean air Top entry 3/4"	2	2
	28	PR0830000143	Hook up PT/PS Clean Air service	40	38
10	30	PR0830000194	Hook up DPT/FT/DPS Flue gas	93	91
11	32	PR0830000186	Hook up PT/PS Flue gas - F22	20	18
12	34	PR0830000208	Hook up DPT/FT/LT Flue gas -F22	10	9
13	36	PR0830000003	Hook up for Air Purging	49	49
14	36	PR0830000259	Hook up for Continuous Purging	162	162
15	36	PR0830000267	Hook up for Intermittent Purging	49	49
16		PR0450000290	Temp. Transmitter Junction Box - Type A	8	8
17		PR0450000303	Temp. Transmitter Junction Box - Type B	15	15
18		PR0450000311	Temp. Transmitter Junction Box - Type C	20	20
19		PR0900007443	Hardware for Loose Schemes	0	1
20		PR0830000275	Mandatory Spares for LIE/LIR	1	0

Note:

1. **Colour:, INTERNAL, EXTERNAL-(FRONT,REAR & TOP) RAL:9002**
   SIDE OF PANEL –RAL :5012 (FINAL COLOUR WILL BE DECIDED DURING DETAILED ENGG)
2. **IP55 Type test to be submitted for LIE and JB of LIR for approval. Report should not be older than Dec 2013.**

MANDATORY SPARE

TABLE:B -1/2

SL. NO.	ITEM DESCRIPTION	QTY(NOs)
1	**VALVE MANIFOLD (10%)**	
1.1	TWO VALVE MANIFOLD WITH VENT PLUG PORT SIZE:1/2" NPTF/MATL.SS316 PR.TESTING:9000 PSI	3.00
1.2	TWO VALVE MANIFOLD WITH VENT PLUG PORT SIZE:1/2" NPTF/MATL.SS316 PR.TESTING:6000 PSI	4.00
1.3	TWO VALVE MANIFOLD WITH VENT PLUG PORT SIZE:1/2"NPTF/BODY:SS316 PR.TESTING:3000PSI	15.00
1.4	TWO VALVE MANIFOLD WITH VENT PLUG PORT SIZE:1/2"NPTF/BODY:SS316L PR.TESTING:3000PSI	1.00
1.5	FIVE VALVE MANIFOLD WITH VENT PLUG PORT SIZE:1/2" NPTF/MATL.SS316 PR.TESTING:9000 PSI	2.00
1.6	FIVE VALVE MANIFOLD WITH VENT PLUG PORT SIZE:1/2"NPTF/BODY:SS316 PR.TESTING:6000PSI	9.00
1.7	FIVE VALVE MANIFOLD WITH VENT PLUG PORT SIZE:1/2" NPTF/MATL.SS316 PR.TESTING:3000 PSI	28.00
1.8	FIVE VALVE MANIFOLD WITH VENT PLUG PORT SIZE:1/2" NPTF/MATL.SS316L PR.TESTING:3000 PSI	1.00
1.9	THREE VALVE MANIFOLD WITH VENT PLUG PORT SIZE:1/2"NPTF MATL:SS316 PR.TESTING:3000PSI	14.00
2	**VALVE (10%)**	
2.1	FORGED GLOBE VALVE MATL.BODY:ASTM -A182 F91 / STEM MATL:ASTM-A182 F6A SIZE:1/2"NB-SW/CL 3000 SPL	10.00
2.2	FORGED GLOBE VALVE MATL.BODY:ASTM -A182 F22/ STEM MATL:ASTM-A182 F6A SIZE:1/2"NB-SW/CL 3000SPL	20.00
2.3	FORGED GLOBE VALVE BODY:ASTM A105/STEM:ASTM A182 GR.F6A SIZE:1/2"NB-SW/CL:2500	23.00
2.4	FORGED GLOBE VALVE BODY:ASTM A105/STEM:ASTM A182 GR.F6A SIZE:1/2"NB-SW/CL:800	32.00
2.5	FORGED GLOBE VALVE BODY:ASTM A182F316L/STEM:ASTM A182 GR.F6A SIZE:1/2"NB-SW/CL:800	2.00
2.6	FOUR WAY VALVE SIZE :-2x3/4"NB SW x 2x1/2" NPTF MATL: A105, CL :800	48.00
2.7	FOUR WAY VALVE SIZE :-2x3/4"NB SW x 2x1/2" NPTF MATL: A182 F22, CL :800	9.00
2.8	NEEDLE VALVE CONN:1/2" OD SS TUBE MATL:SS-316	76.00
2.9	THREE WAY GAUGE COCK MATL: SS316 SIZE:1/2" NPTF X 1/2" NPTF X 1/2" NPTF	21.00
3	GATE/ISOLATION VALVE-SS316 PREOCESS CONNECTION: 1/2" OD SS TUBE	51.00
3.1	**SS TUBE FITTINGS (10%)**	
3.1.1	TUBE FITTING TYPE:DFDC MATL:SS316 SIZE:1/2"NPTM X TO SUIT 1/2"OD SS TUBE	360.00
3.1.2	TEE-TUBE UNION MATL: SS316 SIZE : OD OF 1/2" NB PIPE X TO SUIT 1/2" OD SS TUBE	54.00
3.1.3	TEE-TUBE UNION MATL: SS316 SIZE : OD OF 3/4" NB PIPE X TO SUIT 1/2" OD SS TUBE	55.00
3.1.4	QUICK DISCCONNECTING FITTING SIZE: 1/2" NPTM X TO SUIT WITH FEMALE COUPLER MATL:SS-304	108.00

Mandatory Spare

TABLE:B-2/2

SL. NO.	ITEM DESCRIPTION	QTY (Nos)
3.2	**OTHER FITTINGS(10%)**	
	FORGED EQUAL TEE	
3.2.1	FORGED EQUAL TEE / AS PER ANSI B16.11 SIZE:1/2" NB-SW / CL:9000LBS MATL:ASTM A182 F91	6.00
3.2.2	FORGED EQUAL TEE / AS PER ANSI B16.11 SIZE:1/2" NB-SW / CL:9000LBS MATL:ASTM A182 F22	1.00
3.2.3	FORGED EQUAL TEE / AS PER ANSI B16.11 SIZE:1/2" NB-SW / CL:6000LBS MATL:ASTM A182 F22	10.00
3.2.4	FORGED EQUAL TEE / AS PER ANSI B16.11 SIZE:1/2" NB-SW / CL:6000 MATL:ASTM A105	12.00
3.2.5	FORGED EQUAL TEE / AS PER ANSI B16.11 SIZE:1/2" NB-SW / CL:3000 MATL:ASTM A105	28.00
3.2.6	FORGED EQUAL TEE / AS PER ANSI B16.11 SIZE:1/2" NB-SW / CL:3000 MATL:ASTM A182F316L	3.00
3.2.7	FORGED EQUAL TEE AS PER ANSI B16.11 MATL:ASTM A105 SIZE:3/4"NB-SW CL:3000	48.00
3.2.8	FORGED EQUAL TEE AS PER ANSI B16.11 SIZE:3/4" NB-SW CL:3000LBS MATL:ASTM A182 F22	11.00
3.2.9	NIPPLE SIZE:3/4"NB-SCH-80 MATL:ASTM A106 GR C CONN:ONE END PLAIN X OTHER END 3/4"NPTM, 200mm LONG	48.00
	CAP SIZE:3/4"NPTF MATL:ASTM A105	48.00
3.3	NIPPLE SIZE:3/4"NB-SCH-80 MATL:ASTM A335 P22 CONN:ONE END PLAIN X OTHER END 3/4"NPTM 200mm LONG	11.00
	CAP SIZE:3/4"NPTF MATL:ASTM A182 F22	11.00
4	**PURGE ROTAMETER PROCESS CONN:1/4"NPTF AS PER SPECIFICATION (5%)**	18.00
5	**AIR FILLTER REGULATOR PROCESS CONN:1/2"NPTF AS PER SPECIFICATION (20%)**	20.00

Unit rate of each item for Mandatory Spare to be provided in the offer.

TABLE:C-HARD WARE FOR LOOSE SCHEMES

SL. NO.	ITEM DESCRIPTION	QTY
1	Bulk Head Union Material: Brass Size:1/4"NPTF	35 No's
2	Copper Tube in Coils-light brown Tempered: PVC Coated As per ASTM B 75 /: 1/4" OD X 1 MM Thick	100 Meter
3	Brass Male Connector DFDC Size:1/4" to suit 1/4" Copper tube	100 No's

Above items shall be assembled in the Where ever Instrument Type " I/P" is coming inside LIE/LIR as per Instrument schedule Ref:CE/416/NTPC TELA/INS
Unit rate of each item for Hardware for loose schemes to be provided in the offer.

PROJECT : NTPC TELANGANA SG ISLAND PACKAGE 2 X 800MW STPP

CUSTOMER : M/s NTPC

TECHNICAL REQUIREMENT
FOR
LOCAL INSTRUMENT ENCLOSURE / RACKS
(LIE / LIR)

REVISIONS :

APPROVED BY

ASHISH MANJHI

PREPARED BY	ISSUED	DATE
RAJESH LINGUTLA	416	06/01/18

TECHNICAL REQUIREMENTS FOR TRANSMITTER ENCLOSURES AND TRANSMITTER RACKS:

I. TRANSMITTER ENCLOSURES:

1. The Transmitter enclosures (Closed type) are provided for mounting Transmitters..etc. and located in Boiler area. This shall be constructed of **3** mm thick for C&I Package steel sheet material. These shall confirm to IP 55 protection class.

2. The Transmitter Enclosures shall be of following sizes (in millimeters).

   Type A – 1400(W) x 800(D) x 2200(H) (To Mount 5 or more transmitters)
   Type B - 1000(W) x 800(D) x 2200(H) (To Mount 3 to 4 transmitters)
   Type C - 700 (W) x 800(D) x 2200(H) (To Mount 1 to 2 transmitters)

3. These shall be reinforced as required to ensure true surfaces and to provide adequate Support for instruments and other equipment mounted therein. Double interlocking doors shall be provided and shall be arranged for maximum possible access to the module interior. Center posts or any member which would reduce access shall not be provided.

4. The doors shall be the three-point locking type constructed of not less than **1.6** mm steel sheet. Doors shall have concealed quick removal type pinned hinges and locking handles. Enclosure door locks shall accept the same / common key all over the plant. Gaskets shall be used between all mating sections to achieve dust proof enclosure rating for the modules and waterproof and dust tight rating on the Terminal / Junction boxes. All enclosures shall have access doors on Front and Rear sides.

5. Internal wirings between the Transmitters and Terminal / Junction box shall run through flexible dust tight conduits.

6. Anti Vibration Pads of minimum 15 mm thickness shall be provided for supporting each enclosure.

7. Construction of same shall be typically as per enclosed drawing **CE/416/LIE/LIR/OGA2.**

8. Service Power and Lighting

Each enclosure shall be provided with one receptacle, one light fixture with wire guard and one lighting switch and suitable MCBs. Lighting switches may be doors actuated, mounted door. Light switches and receptacles shall be installed inside the enclosure on the wall near the latch side of the enclosure door. Light fixtures shall be installed on the ceilings of the enclosures. Power supplies for miscellaneous devices shall be provided with fuses located within the Enclosure JB. Fuses shall be mounted in fuse blocks. Fuse ratings will be given on electrical schematic diagrams. Power supply shall be 240 V AC.

9. Equipment Installation

a. Enclosures shall be provided to mount field instrument, equipment and accessories. Vendor shall prepare enclosures and piping drawings indicating the layout for each enclosure.

Special attention shall be given in the piping layout to avoid air traps in liquid filled piping, or water pockets in piping intended to be dry.

b. Drawings shall indicate the arrangement of all Piping, Valves and Fittings within the enclosures.

10. **Impulse Piping /Tubing**

a. Transmitter enclosures shall be complete with impulse tubing piping, valves from enclosure bulkhead connection to all instruments and necessary drain / blow down connections. The type, sizes, material and pressure class of pipes/tubes, fittings, valves etc. shall be suitable for the intended applications as per the Schemes / Tagging list of Instrument, provided by BHEL.

b. Bulkhead connection shall be used when instrument piping/ tubing enters the enclosure through Bulkhead plate. Typically through Bulk heads, Impulse pipe entry shall be through Top side of the Enclosure for Steam and Liquid services and for Air / flue gas services, impulse pipe entry shall be from Bottom side.

c. All Instrument Blow down lines, except those measuring vacuum shall be connected to a two-inch header, which is extended through one end of the enclosure and turned downward at other end.

d. Instrument piping and tubing shall be hydrostatically tested at one and one-half times the maximum Design pressure(As per instrument schedule Ref:**CE/416/NTPC TELA/INS**) for that instrument except for low pressure (below Design Pressure 5.34Kg/Cm2) and vacuum measurement the test pressure will be 8 Kg / Cm2.

11. For Purging :

a. Pneumatic tubing shall be installed for all pneumatic devices, such as Air filter Regulator, Purge rotameters, Isolation valves, distribution air-header etc. Pneumatic tubing shall be installed in a neat workmanlike manner in protected locations with suitable supports. All Pipes / Tubes, which enter or leave the enclosure, shall be terminated on bulkhead fittings in the bulkhead plate. Pneumatic tubing material shall be ½" OD SS316 tubing Flareless SS- Tube fittings shall be used for tubing connections.

b. Instrument tubing schematic, connection and interconnections diagrams shall be furnished.

12. Wiring Within Enclosures and Grounding

Vendor shall furnish general arrangement and wiring diagrams for each transmitter Enclosures for approval.

13. **Enclosure Electrical Junction Box**

a. IP 55 junction box for the termination of all internal wiring shall be provided for each transmitter enclosure.

b. Junction boxes for enclosures shall be located inside the Enclosure on one end of each enclosure assembly to accept field wiring through the bottom of the junction box. The Junction box shall be 800 x 200 x200 mm minimum dimension. A hinged door shall give on side access to the interior of the junction box. Same key shall be used to lock both Junction box. Tb shall be in multiple of 12 nos.

II. OPEN TYPE TRANSMITTER RACKS:

1. Transmitter racks is provided for mounting transmitters and other accessories, in buildings and closed areas like the power house building / turbine hall.

2. The Transmitter Racks shall be of following sizes (in millimeters).

   Type A- 1650(W) x 800(D) x 2200(H) (To mount 7 to 8 transmitters)
   Type B- 1330(W) x 800(D) x 2200(H) (To mount 5 to 6 transmitters)
   Type C- 1010(W) x 800(D) x 2200(H) (To Mount 1 to 4 transmitters)

3. Racks shall be constructed on structural members of adequate strength and rigidity to ensure proper support to the mounted instruments and equipment. Racks shall be of welded construction. Each rack shall be provided with a canopy thickness not less than **3mm** to protect the instrument from dripping water or falling objects.

4. All Valves & Manifolds shall be securely mounted and the structural design shall be such that no item shall interfere with maintenance and removal of instrument, equipment and their accessories.

5. Construction of same shall be typically as per enclosed drawing **CE/416/LIE/LIR/OGA2**

6. Service Power and Lighting

a. Each rack shall be provided with one receptacle, one light fixture with wire guard and one lighting switch. Light fixtures shall be installed on the canopy of the rack.

b. Power supplies for miscellaneous devices shall be provided with fuses located within the rack JB. Fuses shall be mounted in fuse blocks. Fuse ratings will be given on electrical schematic diagrams. Power supply shall be 240 V AC.

7. Equipment Installation

Vendor shall prepare rack fabrication and piping drawings indicating the layout of each Rack. Transmitter/Instruments shall be installed using custom fabricated supports which are attached to the vertical members provided for this purpose. Drawings shall indicate the arrangement of all equipment, piping, valves and fittings within the rack and shall be subject to approval.

8. Impulse Piping / Tubing

a. Transmitter racks shall be complete with impulse tubing piping, valves from enclosure bulkhead connection to all instruments and necessary drain / blow down connections. The

type, sizes, material and pressure class of pipes/tubes, fittings, valves etc. shall be suitable for the intended applications as per the Schemes / Tagging list of Instrument, provided by BHEL.

b. Bulkhead connection shall be used when instrument piping/ tubing enters the enclosure through Bulkhead plate. Typically through Bulk heads, Impulse pipe entry shall be through top side of the Enclosure for Steam and Liquid services.

c. All Instrument Blow down lines, except those measuring vacuum shall be connected to a two-inch header, which is extended through one end of the enclosure and turned downward for directing the blow down into drain.

d. Instrument piping and tubing shall be hydrostatically tested at one and one-half times the maximum Design Pressure(As per Instrument schedule ref:**CE/416/ NTPC TELA /INS**) for that instrument except for low pressure(Design Pressure below 5.34Kg/Cm2) and vacuum measurement the test pressure will be 8 Kg / Cm2.

9. Wiring of the Racks

a. A fully enclosed IP 55 type junction box shall be provided in each rack for housing the terminal blocks, power supply fuses and other electrical accessories, as required.

b. All electrical connections between instrument and the Terminals in Junction box shall be made. In addition all utility wiring for lighting and service power shall be installed.

c. Vendor shall furnish general arrangement and wiring diagrams for each transmitter rack for approval.

d. Junction boxes for the racks shall be mounted on one end of each assembly & should be inside the Rack to accept field wiring through the bottom of the junction box. The junction box shall be 800 x 200 x 200 mm minimum size. A removable bolted door shall give access to the interior of the junction box. All junction boxes shall accept same key. JB to be of CRCA sheet with IP 55 protection class. Door handle shall be of SS. Self locking type with common key. Door gasket shall be of synthetic rubber. Tb shall be in multiple of 12 nos.

III. General Requirement applicable to Transmitter Enclosures & Racks :

1. Surface preparation And Painting

a. All sheet metal / exterior steel surfaces shall rust free and scale free and all other residue during fabrication operation such as Oil, grease and salts etc. shall be removed by one or more solvent cleaning methods. Epoxy primer surface shall be applied to all exterior and interior surfaces. Epoxy paint shall be applied to all surfaces and the paint thickness shall be 100 to150 microns. The finish colours for exterior and interior surfaces shall conform to the shades mentioned in scope of supply.

1. Grounding

a. Enclosures and Racks shall be provided with a continuous tinned copper ground bus of minimum 25 mm X 6 mm cross section, extended along the entire length. The ground bus shall have two (2) bolts drilling with GI bolts and nuts at each end.

2. Name plate / Label.

a. Service details and Tag no. shall be engraved on a nameplate or label for each of the Transmitter. These Nameplates or Labels shall be of white non-hygroscopic material with engraved black lettering. This shall be fixed on to the Impulse Pipe closer to the Transimitter inside the Enclosure / Rack.

3. Wiring Details

a. Interconnecting wiring shall be provided between all electrical devices mounted in the panels and between the devices and terminal blocks if the devices are to be connected to equipment outside the panels by cabling. All interior wiring shall be installed neatly and carefully and shall be terminated at suitable terminal blocks in the Junction box. Sufficient clearance shall be provided for all control and instrumentation leads.

b. Each wire shall be identified at both ends with wire designations as per approved wiring diagram. Interlocking type ferrules shall be used for identification.

c. All wire termination shall be made with insulated sleeve and cage clamp type terminals.

d. All signal wiring shall be done with 2 pair, 0.5 sq. mm annealed tinned copper ,pair twisted overall & shielded , voltage grade 225 V , unarmored FRLS PVC sheathed cable and 4 pair, 0.5 sq. mm for PS/DPS. Power wiring shall be with 1.5 sq mm, 1100V.

e. Wires shall be dressed and run in trays or troughs with clamp-on type covers. Wiring may be neatly bunched in-groups by non-metallic cleats or bands. Shield wires shall be terminated on separate terminal blocks.

f. Internal wiring shall follow distinct color coding to segregate different voltage levels viz. 24V DC & 230V AC

g. Junction Box of enclosures will be provided with removable, gasketted cable gland for cable entrance.

4. Fuse Blocks

a. Fuse blocks shall be modular type with bakelite frame and reinforced retaining clips.

5. Terminal Blocks

a. Terminal blocks shall be DIN rail mounted and shall have Cage clamp type connection which shall be maintained for all panels uniformly.

b. The rated cross section of the terminal blocks shall be suitable for connecting 0.5-mm²/2.5 mm². Conductor of suitable voltage grade as specified.

c. Terminal blocks shall be mounted vertically with adequate spacing between rows for routing the cable troughs and to allow adequate free workspace for termination and removal of wires.
d. Terminal blocks shall be provided with white marking strips/self adhesive marker cards.

e. For all instruments one set of spare terminals to be provided below the main terminals.

f. Terminal blocks for termination of electrical power supply shall be type WAGO / PHOENIX make of suitable size with marking strips.

g. The last terminal in a rail-mounted assembly shall be closed with an end plate and end bracket.

h. Terminal blocks shall be provided with multiples of 12 for each Enclosure/Rack.

IV. Documents to be Submitted by Vendor for Approval :

1. OGA for Transmitter Enclosure and Racks.

2. Layout of Components in each of Transmitter Enclosure and Rack.

3. Electrical diagrams for each Transmitter Enclosure and Rack.

4. Component datasheets

5. Quality plan including Welding Procedure specification and Welder Procedure qualification Record. This will be approved by BHEL / (END USER)

6. The quality plan shall include Visual inspection, GA BOM/Layout features verification, Dimensions, Paint shade, thickness measurement, Alignment of sections, component ratings, Wiring, IR, HV, review of TC for instruments / Devices, Accessibility of TBs / Devices, Illumination, Tubing and Degree of protection (Review of type test certificate)

V. Specific requirements

1. Where grouping is not provided for instruments, same shall be indicated during detailed engineering.
2. For services which are Design pressure Equal or higher than 40 Kg/Cm2 or design Temp is > 280 deg C(As per Instrument schedule Ref:**CE/416/ NTPC TELA /INS**), two drain valves shall be provided per line.
3. **SS tubing between valve manifold and transmitter for each service shall be done as per Transmitter model Nos with mounting details will be provided by BHEL EDN.In Case If Transmitter model Nos with mounting details are not received before dispatch, Vendor has to supply tube and tube connectors and Erect the transmitters and valve manifold during commissioning time as per BHEL EDN Instruction.**

TECHNICAL REQUIREMENTS FOR TEMPERATURE TRANSMITTER JUNCTION BOX:

1. The Junction Box is provided for mounting Pipe Mounted Temperature Transmitters. This shall be constructed of 3.0 mm thick steel sheet material. These shall confirm to IP 55 protection class.

2. The Junction Box shall be of following sizes (in millimeters).

   Type A – 800(W) x 500(D) x 1100(H) (Shall have Four rows of 2" pipe & 180 terminals)
   Type B - 800(W) x 500(D) x 900(H) (Shall have Three rows of 2" pipe & 150 terminals)
   Type C - 800(W) x 500(D) x 600(H) (Shall have Two rows of 2" pipe & 60 terminals)

3. These shall be reinforced as required to ensure true surfaces and to provide adequate support for instruments and other equipment mounted therein.Doors shall be provided and shall be arranged for maximum possible access to the module interior. Center posts or any member which would reduce access shall not be provided.

4. The doors shall be the three-point locking type constructed of not less than 1.6 mm steel sheet. Doors shall have concealed quick removal type pinned hinges and locking handles. Junction Box door locks shall accept the same / common key all over the plant. Gaskets shall be used between all mating sections to achieve dust proof enclosure rating. All Junction Box shall have access doors on Front side.

5. All the junction boxes shall be suitable for mounting on walls, columns, structures etc. The brackets, nuts, bolts, screws, gland and lugs required for erection are in supplier's scope.

6. Vendor shall furnish general arrangement diagrams for each type of transmitter Junction Box for approval.

7. Surface preparation And Painting

   a. All sheet metal / exterior steel surfaces shall rust free and scale free and all other residue during fabrication operation such as Oil, grease and salts etc. shall be removed by one or more solvent cleaning methods. Epoxy primer surface shall be applied to all exterior and interior surfaces. Epoxy paint shall be applied to all surfaces and the paint thickness shall be 100 to150 microns. The finish colours for exterior and interior surfaces shall conform to the shades mentioned in scope of supply.

8. Terminal Blocks

   a. Terminal blocks shall be DIN rail mounted and shall have Cage clamp type connection which shall be maintained for all panels uniformly.

   b. The rated cross section of the terminal blocks shall be suitable for connecting 0.5-mm^2/2.5 mm^2. Conductor of suitable voltage grade as specified.

c. Terminal blocks shall be mounted vertically with adequate spacing between rows for routing the cable troughs and to allow adequate free workspace for termination and removal of wires.

d. Terminal blocks shall be provided with white marking strips/self adhesive marker cards.

e. Terminal blocks for termination of electrical power supply shall be type WAGO / PHOENIX make of suitable size with marking strips.

f. The last terminal in a rail-mounted assembly shall be closed with an end plate and end bracket.

9. <u>Documents to be Submitted by Vendor for Approval :</u>

a. OGA for Junction Box.

b. Layout of Transmitter in each Type of Junction Box.

c. Quality plan. This will be approved by BHEL / (END USER)

d. The quality plan shall include Visual inspection, GA BOM/Layout features verification, Dimensions, Paint shade, thickness measurement, IR, HV, Accessibility of TBs / Devices, Degree of protection (Review of type test certificate)

PROJECT : NTPC TELANGANA SG ISLAND PACKAGE 2 X 800MW STPP

CUSTOMER : M/s NTPC

INSTRUMENT SCHEDULE

REVISIONS :	APPROVED BY ASHISH MANJHI		
	PREPARED BY	ISSUED	DATE
	RAJESH LINGUTLA	416	06/01/18

KKS TAG NO	Descritption	Instrument Type	Medium	Operating Pressure	Maximum Pressure	Units of Pressure	Operating Temp(Deg C)	Maximum Temp (Deg C)	Scheme No	Purg	JB/LIE/LIR
10HFW01CT001	SEAL AIR FAN "A" DE	TT-D	METAL								FSSS-TT-JB-01
10HFW01CT002	SEAL AIR FAN "A" NDE	TT-D	METAL								FSSS-TT-JB-01
10HFW02CT001	SEAL AIR FAN "B" DE	TT-D	METAL								FSSS-TT-JB-01
10HFW02CT002	SEAL AIR FAN "B"NDE	TT-D	METAL								FSSS-TT-JB-01
10HFC10CT021	PULV "A" MOTOR BEARING	TT-D	METAL								FSSS-TT-JB-4A
10HFC10CT022	PULV "A" MOTOR BEARING	TT-D	METAL								FSSS-TT-JB-4A
10HFC10CT023/030	PULV "A" MOTOR WINDING	TT-D	METAL								FSSS-TT-JB-4A
10HFC10CT025/032	PULV "A" MOTOR WINDING	TT-D	METAL								FSSS-TT-JB-4A
10HFC10CT027/034	PULV "A" MOTOR WINDING	TT-D	METAL								FSSS-TT-JB-4A
10HFC10CT035	PULV "A" MOTOR BEARING	TT-D	METAL								FSSS-TT-JB-4A
10HFC10CT036	PULV "A" MOTOR BEARING	TT-D	METAL								FSSS-TT-JB-4A
10HFC20CT021	PULV "B" MOTOR BEARING	TT-D	METAL								FSSS-TT-JB-4B
10HFC20CT022	PULV "B" MOTOR BEARING	TT-D	METAL								FSSS-TT-JB-4B
10HFC20CT023/030	PULV "B" MOTOR WINDING	TT-D	METAL								FSSS-TT-JB-4B
10HFC20CT025/032	PULV "B" MOTOR WINDING	TT-D	METAL								FSSS-TT-JB-4B
10HFC20CT027/034	PULV "B" MOTOR WINDING	TT-D	METAL								FSSS-TT-JB-4B
10HFC20CT035	PULV "B" MOTOR BEARING	TT-D	METAL								FSSS-TT-JB-4B
10HFC20CT036	PULV "B" MOTOR BEARING	TT-D	METAL								FSSS-TT-JB-4B
10HFC30CT021	PULV "C" MOTOR BEARING	TT-D	METAL								FSSS-TT-JB-4C
10HFC30CT022	PULV "C" MOTOR BEARING	TT-D	METAL								FSSS-TT-JB-4C
10HFC30CT023/030	PULV "C" MOTOR WINDING	TT-D	METAL								FSSS-TT-JB-4C
10HFC30CT025/032	PULV "C" MOTOR WINDING	TT-D	METAL								FSSS-TT-JB-4C
10HFC30CT027/034	PULV "C" MOTOR WINDING	TT-D	METAL								FSSS-TT-JB-4C
10HFC30CT035	PULV "C" MOTOR BEARING	TT-D	METAL								FSSS-TT-JB-4C
10HFC30CT036	PULV "C" MOTOR BEARING	TT-D	METAL								FSSS-TT-JB-4C
10HFC40CT021	PULV "D" MOTOR BEARING	TT-D	METAL								FSSS-TT-JB-4D
10HFC40CT022	PULV "D" MOTOR BEARING	TT-D	METAL								FSSS-TT-JB-4D
10HFC40CT023/030	PULV "D" MOTOR WINDING	TT-D	METAL								FSSS-TT-JB-4D
10HFC40CT025/032	PULV "D" MOTOR WINDING	TT-D	METAL								FSSS-TT-JB-4D
10HFC40CT027/034	PULV "D" MOTOR WINDING	TT-D	METAL								FSSS-TT-JB-4D
10HFC40CT035	PULV "D" MOTOR BEARING	TT-D	METAL								FSSS-TT-JB-4D
10HFC40CT036	PULV "D" MOTOR BEARING	TT-D	METAL								FSSS-TT-JB-4D
10HFC50CT021	PULV "E" MOTOR BEARING	TT-D	METAL								FSSS-TT-JB-4E
10HFC50CT022	PULV "E" MOTOR BEARING	TT-D	METAL								FSSS-TT-JB-4E
10HFC50CT023/030	PULV "E" MOTOR WINDING	TT-D	METAL								FSSS-TT-JB-4E
10HFC50CT025/032	PULV "E" MOTOR WINDING	TT-D	METAL								FSSS-TT-JB-4E
10HFC50CT027/034	PULV "E" MOTOR WINDING	TT-D	METAL								FSSS-TT-JB-4E
10HFC50CT035	PULV "E" MOTOR BEARING	TT-D	METAL								FSSS-TT-JB-4E

NOTE:FOR SHCEME NO 16 AND 18 -WHERE EVER DESIGN PRESSURE >=40KG/CM2 OR >=280 Deg C -TWO DRAIN VALVES SHALL BE PROVIDED PER LINE.

TECHNICAL SPECIFICATION FOR LIE/LIR

INSTRUMENT SCHEDULE

KKS TAG NO	Descritption	Instrument Type	Medium	Operating Pressure	Maximum Pressure	Units of Pressure	Operating Temp(Deg C)	Maximum Temp (Deg C)	Scheme No	Purg	JB/LIE/LIR
10HFC50CT036	PULV "E" MOTOR BEARING	TT-D	METAL								FSSS-TT-JB-4E
10HFC60CT021	PULV "F" MOTOR BEARING	TT-D	METAL								FSSS-TT-JB-4F
10HFC60CT022	PULV "F" MOTOR BEARING	TT-D	METAL								FSSS-TT-JB-4F
10HFC60CT023/030	PULV "F" MOTOR WINDING	TT-D	METAL								FSSS-TT-JB-4F
10HFC60CT025/032	PULV "F" MOTOR WINDING	TT-D	METAL								FSSS-TT-JB-4F
10HFC60CT027/034	PULV "F" MOTOR WINDING	TT-D	METAL								FSSS-TT-JB-4F
10HFC60CT035	PULV "F" MOTOR BEARING	TT-D	METAL								FSSS-TT-JB-4F
10HFC60CT036	PULV "F" MOTOR BEARING	TT-D	METAL								FSSS-TT-JB-4F
10HFC70CT021	PULV "G" MOTOR BEARING	TT-D	METAL								FSSS-TT-JB-4G
10HFC70CT022	PULV "G" MOTOR BEARING	TT-D	METAL								FSSS-TT-JB-4G
10HFC70CT023/030	PULV "G" MOTOR WINDING	TT-D	METAL								FSSS-TT-JB-4G
10HFC70CT025/032	PULV "G" MOTOR WINDING	TT-D	METAL								FSSS-TT-JB-4G
10HFC70CT027/034	PULV "G" MOTOR WINDING	TT-D	METAL								FSSS-TT-JB-4G
10HFC70CT035	PULV "G" MOTOR BEARING	TT-D	METAL								FSSS-TT-JB-4G
10HFC70CT036	PULV "G" MOTOR BEARING	TT-D	METAL								FSSS-TT-JB-4G
10HFC80CT021	PULV "H" MOTOR BEARING	TT-D	METAL								FSSS-TT-JB-4H
10HFC80CT022	PULV "H" MOTOR BEARING	TT-D	METAL								FSSS-TT-JB-4H
10HFC80CT023/030	PULV "H" MOTOR WINDING	TT-D	METAL								FSSS-TT-JB-4H
10HFC80CT025/032	PULV "H" MOTOR WINDING	TT-D	METAL								FSSS-TT-JB-4H
10HFC80CT027/034	PULV "H" MOTOR WINDING	TT-D	METAL								FSSS-TT-JB-4H
10HFC80CT035	PULV "H" MOTOR BEARING	TT-D	METAL								FSSS-TT-JB-4H
10HFC80CT036	PULV "H" MOTOR BEARING	TT-D	METAL								FSSS-TT-JB-4H
10HFC90CT021	PULV "J" MOTOR BEARING	TT-D	METAL								FSSS-TT-JB-4J
10HFC90CT022	PULV "J" MOTOR BEARING	TT-D	METAL								FSSS-TT-JB-4J
10HFC90CT023/030	PULV "J" MOTOR WINDING	TT-D	METAL								FSSS-TT-JB-4J
10HFC90CT025/032	PULV "J" MOTOR WINDING	TT-D	METAL								FSSS-TT-JB-4J
10HFC90CT027/034	PULV "J" MOTOR WINDING	TT-D	METAL								FSSS-TT-JB-4J
10HFC90CT035	PULV "J" MOTOR BEARING	TT-D	METAL								FSSS-TT-JB-4J
10HFC90CT036	PULV "J" MOTOR BEARING	TT-D	METAL								FSSS-TT-JB-4J
10HAD10CT001	LEFT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-01
10HAD10CT002	LEFT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-01
10HAD10CT003	LEFT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-01
10HAD10CT004	LEFT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-01
10HAD10CT005	LEFT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-01
10HAD10CT006	LEFT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-01
10HAD10CT007	LEFT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-01
10HAD10CT008	LEFT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-01
10HAD10CT009	LEFT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-01

NOTE:FOR SHCEME NO 16 AND 18 -WHERE EVER DESIGN PRESSURE >=40KG/CM2 OR >=280 Deg C -TWO DRAIN VALVES SHALL BE PROVIDED PER LINE.

TECHNICAL SPECIFICATION FOR LIE/LIR

INSTRUMENT SCHEDULE

KKS TAG NO	Descritption	Instrument Type	Medium	Operating Pressure	Maximum Pressure	Units of Pressure	Operating Temp(Deg C)	Maximum Temp (Deg C)	Scheme No	Purg	JB/LIE/LIR
10HAD10CT010	LEFT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-01
10HAD10CT011	LEFT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-02
10HAD10CT012	LEFT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-02
10HAD10CT013	LEFT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-02
10HAD10CT014	LEFT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-02
10HAD10CT015	LEFT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-02
10HAD10CT016	LEFT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-02
10HAD10CT017	LEFT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-02
10HAD10CT018	LEFT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-02
10HAD10CT019	LEFT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-02
10HAD10CT020	LEFT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-02
10HAD40CT001	RIGHT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-03
10HAD40CT002	RIGHT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-03
10HAD40CT003	RIGHT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-03
10HAD40CT004	RIGHT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-03
10HAD40CT005	RIGHT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-03
10HAD40CT006	RIGHT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-03
10HAD40CT007	RIGHT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-03
10HAD40CT008	RIGHT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-03
10HAD40CT009	RIGHT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-03
10HAD40CT010	RIGHT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-03
10HAD40CT011	RIGHT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-04
10HAD40CT012	RIGHT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-04
10HAD40CT013	RIGHT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-04
10HAD40CT014	RIGHT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-04
10HAD40CT015	RIGHT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-04
10HAD40CT016	RIGHT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-04
10HAD40CT017	RIGHT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-04
10HAD40CT018	RIGHT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-04
10HAD40CT019	RIGHT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-04
10HAD40CT020	RIGHT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-04
10HAD20CT001	FRONT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-05
10HAD20CT002	FRONT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-05
10HAD20CT003	FRONT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-05
10HAD20CT004	FRONT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-05
10HAD20CT005	FRONT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-05
10HAD20CT006	FRONT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-05
10HAD20CT007	FRONT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-05

NOTE:FOR SHCEME NO 16 AND 18 -WHERE EVER DESIGN PRESSURE >=40KG/CM2 OR >=280 Deg C -TWO DRAIN VALVES SHALL BE PROVIDED PER LINE.

KKS TAG NO	Descritption	Instrument Type	Medium	Operating Pressure	Maximum Pressure	Units of Pressure	Operating Temp(Deg C)	Maximum Temp (Deg C)	Scheme No	Purg	JB/LIE/LIR
10HAD20CT008	FRONT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-05
10HAD20CT009	FRONT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-05
10HAD20CT010	FRONT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-05
10HAD20CT011	FRONT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-06
10HAD20CT012	FRONT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-06
10HAD20CT013	FRONT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-06
10HAD20CT014	FRONT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-06
10HAD20CT015	FRONT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-06
10HAD20CT016	FRONT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-06
10HAD20CT017	FRONT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-06
10HAD20CT018	FRONT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-06
10HAD20CT019	FRONT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-06
10HAD20CT020	FRONT SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-06
10HAD30CT001	REAR SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-07
10HAD30CT002	REAR SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-07
10HAD30CT003	REAR SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-07
10HAD30CT004	REAR SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-07
10HAD30CT005	REAR SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-07
10HAD30CT006	REAR SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-07
10HAD30CT007	REAR SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-07
10HAD30CT008	REAR SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-07
10HAD30CT009	REAR SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-07
10HAD30CT010	REAR SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-07
10HAD30CT011	REAR SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-08
10HAD30CT012	REAR SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-08
10HAD30CT013	REAR SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-08
10HAD30CT014	REAR SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-08
10HAD30CT015	REAR SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-08
10HAD30CT016	REAR SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-08
10HAD30CT017	REAR SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-08
10HAD30CT018	REAR SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-08
10HAD30CT019	REAR SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-08
10HAD30CT020	REAR SPIRAL WALL TUBE	TT-D	METAL								FSSS-TT-JB-MTM-08
10HBK10CP002	FURNACE PRESS-L	PT	FLUE GAS/HOT	-5	-10	mmWC	1188	1300	32	1	LIE-01
10HBK10CP004	FURNACE PRESS-L	PT	FLUE GAS/HOT	-5	-10	mmWC	1188	1300	32	1	LIE-01
10HBK30CP002	FURNACE PRESS-R	PT	FLUE GAS/HOT	-5	-10	mmWC	1188	1300	32	1	LIE-02
10HBK30CP003	FURNACE PRESS-R	PT	FLUE GAS/HOT	-5	-10	mmWC	1188	1300	32	1	LIE-02
10HBK30CP004	FURNACE PRESS-R	PT	FLUE GAS/HOT	-5	-10	mmWC	1188	1300	32	1	LIE-02

NOTE:FOR SHCEME NO 16 AND 18 -WHERE EVER DESIGN PRESSURE >=40KG/CM2 OR >=280 Deg C -TWO DRAIN VALVES SHALL BE PROVIDED PER LINE.

TECHNICAL SPECIFICATION FOR LIE/LIR
INSTRUMENT SCHEDULE

KKS TAG NO	Descritption	Instrument Type	Medium	Operating Pressure	Maximum Pressure	Units of Pressure	Operating Temp(Deg C)	Maximum Temp (Deg C)	Scheme No	Purg	JB/LIE/LIR
10HBK10CP006	BACKPASS FLUE GAS PRESS-L	PT	FLUE GAS	-5	-10	mmWC	1188	1300	32	1	LIE-03
10HBK10CP007	FINISH RH GAS I/L PRESS-L	PT	FLUE GAS	-7	-15	mmWC	946	1200	32	1	LIE-03
10HBK10CP008	FINISH SH I/L FLUE GAS PRESS-L	PT	FLUE GAS	-8	-21	mmWC	856	1100	32	1	LIE-03
10HBK10CP009	LTRH I/L FLUE GAS PRESS-L	PT	FLUE GAS	-13	-34	mmWC	622	900	32	1	LIE-03
10HBK30CP006	BACKPASS FLUE GAS PRESS-R	PT	FLUE GAS	-5	-10	mmWC	1188	1300	32	1	LIE-04
10HBK30CP007	FINISH RH GAS I/L PRESS-R	PT	FLUE GAS	-7	-15	mmWC	946	1200	32	1	LIE-04
10HBK30CP008	FINISH SH I/L FLUE GAS PRESS-R	PT	FLUE GAS	-8	-21	mmWC	856	1100	32	1	LIE-04
10HBK30CP009	LTRH I/L FLUE GAS PRESS-R	PT	FLUE GAS	-13	-34	mmWC	622	900	32	1	LIE-04
10HBK10CP010	ECON I/L FLUE GAS PRESS-L	PT	FLUE GAS	-47	-59	mmWC	485	700	32	1	LIE-05
10HBK10CP011	ECON O/L FLUE GAS PRESS-L	PT	FLUE GAS	-84	-116	mmWC	351	400	28	1	LIE-05
10HBK30CP010	ECON I/L FLUE GAS PRESS-R	PT	FLUE GAS	-47	-59	mmWC	485	700	32	1	LIE-06
10HBK30CP011	ECON O/L FLUE GAS PRESS-R	PT	FLUE GAS	-84	-116	mmWC	351	400	28	1	LIE-06
10HFE01CF001	PA FAN "A" AIR FLOW	FT	PA	-15	-25	mmWC	27	50	30	2	LIE-07
10HFE01CP001	PA FAN "A" O/L AIR PRESS	PT	PA	1028	1345	mmWC	35	58	28	1	LIE-07
10HFE01CP003	PA FAN "A" I/L AIR PRESS	PT	PA	-15	-25	mmWC	27	50	28	1	LIE-07
10HFE05CF001	PA FAN "B" AIR FLOW	FT	PA	-15	-25	mmWC	27	50	30	2	LIE-08
10HFE05CP001	PA FAN "B" O/L AIR PRESS	PT	PA	1028	1345	mmWC	35	58	28	1	LIE-08
10HFE05CP003	PA FAN "B" I/L AIR PRESS	PT	PA	-15	-25	mmWC	27	50	28	1	LIE-08
10HFE02CP001	APH "A" I/L COLD PA PRESS	PT	PA	1028	1345	mmWC	35	58	28	1	LIE-09
10HFE02CP002	DP ACRS HOT PRIMARY APH-A I/L & O/L	DPT	PA	1008	1322	mmWC	35	58	30	2	LIE-09
10HFE03CP001	APH "A" HOT PA PRESS	PT	PA	950	1257	mmWC	319	330	28	1	LIE-09
10HFE06CP001	APH "B" I/L COLD PA PRESS	PT	PA	1028	1345	mmWC	35	58	28	1	LIE-10
10HFE06CP002	DP ACRS HOT PRIMARY APH-B I/L & O/L	DPT	PA	1008	1322	mmWC	35	58	30	2	LIE-10
10HFE07CP001	APH "B" HOT PA PRESS	PT	PA	950	1257	mmWC	319	330	28	1	LIE-10
10HFE10CP001	DP ACRS FURN TO HOT PA DUCT	DPT	FLUE GAS/HOT	950	1257	mmWC	319	330	34	2	LIE-11
10HFE10CP002	DP ACRS FURN TO HOT PA DUCT	DPT	FLUE GAS/HOT	950	1257	mmWC	319	330	34	2	LIE-11
10HFE10CP006	DP ACRS FURN TO HOT PA DUCT	DPT	FLUE GAS/HOT	950	1257	mmWC	319	330	30	2	LIE-11
10HLA11CP002	FD FAN "A" I/L AIR PRESS	PT	SA	-13	-25	mmWC	27	50	28	1	LIE-12
10HLA12CP001	FD FAN "A" O/L AIR PRESS	PT	SA	301	460	mmWC	30	53	28	1	LIE-12
10HLB10CF001	FD FAN "A" AIR FLOW	FT	SA	-13	-25	mmWC	27	50	30	2	LIE-12
10HLA21CP001	FD FAN "B" I/L AIR PRESS	PT	SA	-13	-25	mmWC	27	50	28	1	LIE-13
10HLA22CP001	FD FAN "B" O/L AIR PRESS	PT	SA	301	460	mmWC	30	53	28	1	LIE-13
10HLB20CF001	FD FAN "B" AIR FLOW	FT	SA	-13	-25	mmWC	27	50	30	2	LIE-13
10HLA13CP001	DP ACRS APH "A" COLD TO HOT AIR	DPT	SA	278	424	mmWC	30	53	30	2	LIE-14
10HLA13CP005	APH "A" I/L COLD SA PRESS	PT	SA	301	460	mmWC	30	53	28	1	LIE-14
10HLA14CP001	APH "A" O/L HOT SA PRESS	PT	SA	181	327	mmWC	326	331	28	1	LIE-14
10HLA15CF001	HOT SA "A" AIR FLOW	FT	SA	133	277	mmWC	326	331	30	2	LIE-14
10HLA15CF002	HOT SA "A" AIR FLOW	FT	SA	133	277	mmWC	326	331	30	2	LIE-14

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SECTION –C
TECHNICAL SPECIFICATION FOR LIE/LIR
INSTRUMENT SCHEDULE

KKS TAG NO	Descritption	Instrument Type	Medium	Operating Pressure	Maximum Pressure	Units of Pressure	Operating Temp(Deg C)	Maximum Temp (Deg C)	Scheme No	Purg	JB/LIE/LIR
10HLA23CP001	DP ACRS APH "B" COLD TO HOT AIR	DPT	SA	278	424	mmWC	30	53	30	2	LIE-15
10HLA23CP005	APH "B" I/L COLD SA PRESS	PT	SA	301	460	mmWC	30	53	28	1	LIE-15
10HLA24CP001	APH "B" O/L HOT SA PRESS	PT	SA	181	327	mmWC	326	331	28	1	LIE-15
10HLA25CF001	HOT SA "B" AIR FLOW	FT	SA	133	277	mmWC	326	331	30	2	LIE-15
10HLA25CF002	HOT SA "B" AIR FLOW	FT	SA	133	277	mmWC	326	331	30	2	LIE-15
10HNA31CP001	APH "A" FLUE GAS I/L PRESS	PT	FLUE GAS	-294	-670	mmWC	351	400	28	1	LIE-16
10HNA31CP002	DP ACRS APH "A" COLD TO HOT AIR	DPT	SA	278	424	mmWC	30	53	30	2	LIE-16
10HNA32CP001	APH "A" FLUE GAS O/L PRESS	PT	FLUE GAS	-406	-786	mmWC	126	150	28	1	LIE-16
10HNA41CP001	APH "B" FLUE GAS I/L PRESS	PT	FLUE GAS	-294	-670	mmWC	351	400	28	1	LIE-17
10HNA41CP002	DP ACRS APH "B" COLD TO HOT AIR	DPT	SA	278	424	mmWC	30	53	30	2	LIE-17
10HNA42CP001	APH "B" FLUE GAS O/L PRESS	PT	FLUE GAS	-406	-786	mmWC	126	150	28	1	LIE-17
10HLA18CP002	WINDBOX PRESS-L	PT	SA	100	100	mmWC	326	331	28	1	LIE-18
10HLA28CP002	WINDBOX PRESS-R	PT	SA	100	100	mmWC	326	331	28	1	LIE-19
10HLA20CP001	HOT SA CROSSOVER DUCT	PT	SA	181	327	mmWC	326	331	28	1	LIE-20
10HFE05CP002	COLD PA TO PULVS(A-D)PRESS	PT	PA	1028	1345	mmWC	35	58	28	1	LIE-21
10HFE17CF001	PULV "A" PA I/L FLOW	FT	HOT PA	742	1094	mmWC	288	300	30	2	LIE-21
10HFE17CF002	PULV "A" PA I/L FLOW	FT	HOT PA	742	1094	mmWC	288	300	30	2	LIE-21
10HFE17CP001	PULV "A" PRIMARY AIR I/L PRESS	PT	HOT PA	742	1094	mmWC	288	300	28	1	LIE-21
10HFE27CF001	PULV "B" PA I/L FLOW	FT	HOT PA	742	1094	mmWC	288	300	30	2	LIE-21A
10HFE27CF002	PULV "B" PA I/L FLOW	FT	HOT PA	742	1094	mmWC	288	300	30	2	LIE-21A
10HFE27CP001	PULV "B" PRIMARY AIR I/L PRESS	PT	HOT PA	742	1094	mmWC	288	300	28	1	LIE-21A
10HFE37CF001	PULV "C" PA I/L FLOW	FT	HOT PA	742	1094	mmWC	288	300	30	2	LIE-22
10HFE37CF002	PULV "C" PA I/L FLOW	FT	HOT PA	742	1094	mmWC	288	300	30	2	LIE-22
10HFE37CP001	PULV "C" PRIMARY AIR I/L PRESS	PT	HOT PA	742	1094	mmWC	288	300	28	1	LIE-22
10HFE47CF001	PULV "D" PA I/L FLOW	FT	HOT PA	742	1094	mmWC	288	300	30	2	LIE-22
10HFE47CF002	PULV "D" PA I/L FLOW	FT	HOT PA	742	1094	mmWC	288	300	30	2	LIE-22
10HFE47CP001	PULV "D" PRIMARY AIR I/L PRESS	PT	HOT PA	742	1094	mmWC	288	300	28	1	LIE-22
10HFE57CF001	PULV "E" PA I/L FLOW	FT	HOT PA	742	1094	mmWC	288	300	30	2	LIE-23
10HFE57CF002	PULV "E" PA I/L FLOW	FT	HOT PA	742	1094	mmWC	288	300	30	2	LIE-23
10HFE57CP001	PULV "E" PRIMARY AIR I/L PRESS	PT	HOT PA	742	1094	mmWC	288	300	28	1	LIE-23
10HFE67CF001	PULV "F" PA I/L FLOW	FT	HOT PA	742	1094	mmWC	288	300	30	2	LIE-23
10HFE67CF002	PULV "F" PA I/L FLOW	FT	HOT PA	742	1094	mmWC	288	300	30	2	LIE-23
10HFE67CP001	PULV "F" PRIMARY AIR I/L PRESS	PT	HOT PA	742	1094	mmWC	288	300	28	1	LIE-23
10HFE77CF001	PULV "G" PA I/L FLOW	FT	HOT PA	742	1094	mmWC	288	300	30	2	LIE-24
10HFE77CF002	PULV "G" PA I/L FLOW	FT	HOT PA	742	1094	mmWC	288	300	30	2	LIE-24
10HFE77CP001	PULV "G" PRIMARY AIR I/L PRESS	PT	HOT PA	742	1094	mmWC	288	300	28	1	LIE-24
10HFE87CF001	PULV "H" PA I/L FLOW	FT	HOT PA	742	1094	mmWC	288	300	30	2	LIE-24
10HFE87CF002	PULV "H" PA I/L FLOW	FT	HOT PA	742	1094	mmWC	288	300	30	2	LIE-24

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TECHNICAL SPECIFICATION FOR LIE/LIR
INSTRUMENT SCHEDULE

KKS TAG NO	Descritption	Instrument Type	Medium	Operating Pressure	Maximum Pressure	Units of Pressure	Operating Temp(Deg C)	Maximum Temp (Deg C)	Scheme No	Purg	JB/LIE/LIR
10HFE87CP001	PULV "H" PRIMARY AIR I/L PRESS	PT	HOT PA	742	1094	mmWC	288	300	28	1	LIE-24
10HFE01CP002	COLD PA TO PULVS (E-J) PRESS	PT	PA	1028	1345	mmWC	35	58	28	1	LIE-25
10HFE97CF001	PULV "J" PA I/L FLOW	FT	HOT PA	742	1094	mmWC	288	300	30	2	LIE-25
10HFE97CF002	PULV "J" PA I/L FLOW	FT	HOT PA	742	1094	mmWC	288	300	30	2	LIE-25
10HFE97CP001	PULV "J" PRIMARY AIR I/L PRESS	PT	HOT PA	742	1094	mmWC	288	300	28	1	LIE-25
10HAH71CP001	SH / DSH STAGE-I "A" O/L PRESS	PT	STEAM	295.5	317.6	kg/cm2	494	494	6		LIE-26
10HAH91CP001	SH / DSH STAGE-II"A" O/L PRESS	PT	STEAM	288.8	306.5	kg/cm2	546	546	6		LIE-26
10HAH72CP001	SH / DSH STAGE-I "B" O/L PRESS	PT	STEAM	295.5	317.6	kg/cm2	494	494	6		LIE-27
10HAH92CP001	SH / DSH STAGE-II"B" O/L PRESS	PT	STEAM	288.8	306.5	kg/cm2	546	546	6		LIE-27
10HAG15CP001	DP ACROSS STARTUP SYSTEM MIXING PIECE	DPT	WATER	337.7	337.7	kg/cm2	348	348	14		LIE-28
10HAG25CP001	DP ACROS BOILER WATER CIRC PUMP	DPT	WATER	338.6	338.6	kg/cm2	348		14		LIE-28
10HAG25CP002	DP ACROS BOILER WATER CIRC PUMP	DPT	WATER	336.1	336.1	kg/cm2	348		14		LIE-28
10HAG25CP003	DP ACROS BOILER WATER CIRC PUMP	DPT	WATER	336.1	336.1	kg/cm2	348		14		LIE-28
10HAG11CL001	SEPARATOR STRG TANK "A" DNCOMER LVL	LT	WATER	305	332	kg/cm2	435	475	10		LIE-29
10HAG12CL001	SEPARATOR STRG TANK "B" DNCOMER LVL	LT	WATER	305	332	kg/cm2	435	475	10		LIE-29
10HAG15CP002	SEPA STORAGE TANK DRAIN PRESS	PT	WATER	325.8	332	kg/cm2	352	375	12		LIE-29
10HAD81CL001	SEPARATOR STRG TANK "A" LVL	LT	WATER	305	332	kg/cm2	435	475	10		LIE-30
10HAD81CL002	SEPARATOR STRG TANK "A" LVL	LT	WATER	305	332	kg/cm2	435	475	10		LIE-30
10HAD81CL003	SEPARATOR STRG TANK "A" LVL	LT	WATER	305	332	kg/cm2	435	475	10		LIE-30
10HAD81CP001	SEPARATOR STRG TANK "A" PRESS	PT	WATER	305	332	kg/cm2	435	475	8		LIE-30
10HAD81CP002	SEPARATOR STRG TANK "A" PRESS	PT	WATER	305	332	kg/cm2	435	475	8		LIE-30
10HAD82CL001	SEPARATOR STRG TANK "B" LVL	LT	WATER	305	332	kg/cm2	435	475	10		LIE-31
10HAD82CL002	SEPARATOR STRG TANK "B" LVL	LT	WATER	305	332	kg/cm2	435	475	10		LIE-31
10HAD82CL003	SEPARATOR STRG TANK "B" LVL	LT	WATER	305	332	kg/cm2	435	475	10		LIE-31
10HAD82CP001	SEPARATOR STRG TANK "B" PRESS	PT	WATER	305	332	kg/cm2	435	475	8		LIE-31
10HAD82CP002	SEPARATOR STRG TANK "B" PRESS	PT	WATER	305	332	kg/cm2	435	475	8		LIE-31
10HAH01CP001	WATER SEPARATOR "A" O/L PRESS	PT	STEAM	308	330	kg/cm2	439	479	8		LIE-32
10HAH01CP002	WATER SEPARATOR "A" O/L PRESS	PT	STEAM	308	330	kg/cm2	439	479	8		LIE-32
10HAH02CP001	WATER SEPARATOR "B" O/L PRESS	PT	STEAM	308	330	kg/cm2	439	479	8		LIE-32
10HAH02CP002	WATER SEPARATOR "B" O/L PRESS	PT	STEAM	308	330	kg/cm2	439	479	8		LIE-32
10HAH03CP001	WATER SEPARATOR "C" O/L PRESS	PT	STEAM	308	330	kg/cm2	439	479	8		LIE-33
10HAH03CP002	WATER SEPARATOR "C" O/L PRESS	PT	STEAM	308	330	kg/cm2	439	479	8		LIE-33
10HAH04CP001	WATER SEPARATOR "D" O/L PRESS	PT	STEAM	308	330	kg/cm2	439	479	8		LIE-33
10HAH04CP002	WATER SEPARATOR "D" O/L PRESS	PT	STEAM	308	330	kg/cm2	439	479	8		LIE-33
LBG12CP001	AUX STEAM PRESSURE FOR MILL INERTING (MILLS - E, F, G, H & J)	PT	STEAM	16	20	Kg/Cm2	310	350	16		LIE-34
LBG12CP002	AUX STEAM PRESSURE FOR MILL INERTING (MILLS - A, B, C & D)	PT	STEAM	16	20	Kg/Cm2	310	350	16		LIE-35
QHX20 CL001	ECW TANK LEVEL	LT	WATER	6	7	kg/cm2	38	60	18		LIE-36
QHX20 CP001	ECW TANK FILL PUMP DISCHARGE PRESSURE	PT	WATER	8	12	kg/cm2	38	60	16		LIE-36

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SECTION –C
TECHNICAL SPECIFICATION FOR LIE/LIR
INSTRUMENT SCHEDULE

KKS TAG NO	Descritption	Instrument Type	Medium	Operating Pressure	Maximum Pressure	Units of Pressure	Operating Temp(Deg C)	Maximum Temp (Deg C)	Scheme No	Purg	JB/LIE/LIR
QFB10 CP001	SERVICE AIR PRESSAT T.P	PT	SER AIR	8	10	kg/cm2	40	50	16		LIE-37
LBG70 CP001	AUX STEAM PRESSAT SCAPH INLET	PT	STEAM	16	20	kg/cm2	310	350	16		LIE-38
SGA51 CP001	FIRE WATER FOR MILL FIRE FIGHTING (MILLS -E,F,G,H &J)	PT	WATER	7	16	kg/cm2	40	60	16		LIE-39
SGA51 CP002	FIRE WATER FOR MILLFIRE FIGHTING (MILLS - A,B,C&D)	PT	WATER	7	16	kg/cm2	40	60	16		LIE-39
10HAC10CF001	ECON I/L BOILER FW FLOW	FT	WATER	337	359.4	kg/cm2	308	348	14		LIE-40
10HAC10CF002	ECON I/L BOILER FW FLOW	FT	WATER	337	359.4	kg/cm2	308	348	14		LIE-40
10HAC10CF003	ECON I/L BOILER FW FLOW	FT	WATER	337	359.4	kg/cm2	308	348	14		LIE-40
10HAC10CP001	ECON I/L BOILER FW PRESS	PT	WATER	337	359.4	kg/cm2	308	348	12		LIE-40
10LAE71CF001	SEPARATOR DSH "A" SPRAY WATER FLOW	FT	WATER	338.53	359.4	kg/cm2	308	308	14		LIE-41
10LAE71CF002	SEPARATOR DSH "A" SPRAY WATER FLOW	FT	WATER	338.53	359.4	kg/cm2	308	308	14		LIE-41
10LAE72CF001	SEPARATOR DSH "B" SPRAY WATER FLOW	FT	WATER	338.53	359.4	kg/cm2	308	308	14		LIE-41
10LAE72CF002	SEPARATOR DSH "B" SPRAY WATER FLOW	FT	WATER	338.53	359.4	kg/cm2	308	308	14		LIE-41
10LAE91CF001	SEPARATOR DSH "A" SPRAY WATER FLOW	FT	WATER	338.53	359.4	kg/cm2	308	308	14		LIE-41
10LAE91CF002	SEPARATOR DSH "A" SPRAY WATER FLOW	FT	WATER	338.53	359.4	kg/cm2	308	308	14		LIE-41
10LAE92CF001	SEPARATOR DSH "B" SPRAY WATER FLOW	FT	WATER	338.53	359.4	kg/cm2	308	308	14		LIE-41
10LAE92CF002	SEPARATOR DSH "B" SPRAY WATER FLOW	FT	WATER	338.53	359.4	kg/cm2	308	308	14		LIE-41
10LAE51CF001	SEPARATOR DSH "A" SPRAY WATER FLOW	FT	WATER	338.53	359.4	kg/cm2	308	308	14		LIE-42
10LAE51CF002	SEPARATOR DSH "A" SPRAY WATER FLOW	FT	WATER	338.53	359.4	kg/cm2	308	308	14		LIE-42
10LAE52CF001	SEPARATOR DSH "B" SPRAY WATER FLOW	FT	WATER	338.53	359.4	kg/cm2	308	308	14		LIE-42
10LAE52CF002	SEPARATOR DSH "B" SPRAY WATER FLOW	FT	WATER	338.53	359.4	kg/cm2	308	308	14		LIE-42
10LAE21CF001	RH / DSH "A" SPRAY WATER FLOW	FT	WATER	130	250	kg/cm2	177	215	14		LIE-43
10LAE21CF002	RH / DSH "A" SPRAY WATER FLOW	FT	WATER	130	250	kg/cm2	177	215	14		LIE-43
10LAE22CF001	RH / DSH "A" SPRAY WATER FLOW	FT	WATER	130	250	kg/cm2	177	215	14		LIE-43
10LAE22CF002	RH / DSH "A" SPRAY WATER FLOW	FT	WATER	130	250	kg/cm2	177	215	14		LIE-43
10HAJ21CP001	RH / DSH "A" O/L PRESS	PT	STEAM	65.2	75	kg/cm2	543	550	8		LIE-44
10HAJ22CP001	RH / DSH "B" O/L PRESS	PT	STEAM	65.2	75	kg/cm2	543	550	8		LIE-44
QHX10 CP001	CW SUPPLY PRESSURE	PT	WATER	6	12	kg/cm2	38	60	20		LIE-45
QFA10 CP101	INSTRUMENT AIR HEADER PRESSURE	PT	AIR	8	9.6	kg/cm2	40	60	16		LIE-46
QFA10 CP102	INSTRUMENT AIR HEADER PRESSURE	PT	AIR	8	9.6	kg/cm2	40	60	16		LIE-46
QFA10 CP103	INSTRUMENT AIR HEADER PRESSURE	PT	AIR	8	9.6	kg/cm2	40	60	16		LIE-46
10HLA51CF002	LSOFA CNR 1	FT	SA	120		mmWC	326	331	30	2	LIE-SADC-01
10HLA61CF002	LSOFA CNR 2	FT	SA	120		mmWC	326	331	30	2	LIE-SADC-01
10HLA71CF002	LSOFA CNR 3	FT	SA	120		mmWC	326	331	30	2	LIE-SADC-02
10HLA81CF002	LSOFA CNR 4	FT	SA	120		mmWC	326	331	30	2	LIE-SADC-02
10HLA52CF002	HSOFA CNR 1	FT	SA	120		mmWC	326	331	30	2	LIE-SADC-03
10HLA62CF002	HSOFA CNR 2	FT	SA	120		mmWC	326	331	30	2	LIE-SADC-03
10HLA72CF002	HSOFA CNR 3	FT	SA	120		mmWC	326	331	30	2	LIE-SADC-04
10HLA82CF002	HSOFA CNR 4	FT	SA	120		mmWC	326	331	30	2	LIE-SADC-04

NOTE:FOR SHCEME NO 16 AND 18 -WHERE EVER DESIGN PRESSURE >=40KG/CM2 OR >=280 Deg C -TWO DRAIN VALVES SHALL BE PROVIDED PER LINE.

TECHNICAL SPECIFICATION FOR LIE/LIR
INSTRUMENT SCHEDULE

KKS TAG NO	Descritption	Instrument Type	Medium	Operating Pressure	Maximum Pressure	Units of Pressure	Operating Temp(Deg C)	Maximum Temp (Deg C)	Scheme No	Purg	JB/LIE/LIR
LCL20 CL001	FLASH TANK DRAIN TANK LEVEL	LT	STEAM+WATER	1.1	7	kg/cm2	100	177	18		LIR-01
LCL20 CL002	FLASH TANK DRAIN TANK LEVEL	LT	STEAM+WATER	1.1	7	kg/cm2	100	177	18		LIR-01
LCL20 CL003	FLASH TANK DRAIN TANK LEVEL	LT	STEAM+WATER	1.1	7	kg/cm2	100	177	18		LIR-01
PCB34CP011	ACW DP ACROS PHE-A	DPT	ACW	3.2	7	kg/cm2	43	60	22		LIR-02
PCB35CP011	ACW DP ACROS PHE-B	DPT	ACW	3.2	7	kg/cm2	43	60	22		LIR-02
PCB36CP011	ACW DP ACROS PHE-C	DPT	ACW	3.2	7	kg/cm2	43	60	22		LIR-02
PGC30CP011	DMCW PUMP SUC HDR PRESS	PT	DMCW	3.2	10	kg/cm2	46	60	16		LIR-03
PGC30CP012	DMCW PUMP SUC HDR PRESS	PT	DMCW	6	12	Kg/Cm2	40	60	16		LIR-03
PGC30CP013	DMCW PUMP SUC HDR PRESS	PT	DMCW	3.2	10	kg/cm2	46	60	16		LIR-03
PGC31CP011	DMCW PRESS AFT PUMP-A	PT	DMCW	7.6	10	kg/cm2	46	60	16		LIR-03
PGC32CP011	DMCW PRESS AFT PUMP-B	PT	DMCW	7.6	10	kg/cm2	46	60	16		LIR-03
PGC40CF011	DMCW PUMP DISCH FLOW	FT	DMCW	7.5	10	kg/cm2	46	60	18		LIR-04
PGC40CP011	DMCW PMP DISCH HDR PRESS	PT	DMCW	7.5	10	kg/cm2	46	60	16		LIR-04
PGC40CP012	DMCW PMP DISCH HDR PRESS	PT	DMCW	7.5	10	kg/cm2	46	60	16		LIR-04
PGC40CP013	DMCW PMP DISCH HDR PRESS	PT	DMCW	7.5	10	kg/cm2	46	60	16		LIR-04
PGC41CP011	DP ACR DMCW(SG)PMPS & PHE	DPT	DMCW	3.2	10	kg/cm2	46	60	18		LIR-04
PGC42CP011	DP ACR DMCW(SG)PMPS & PHE	DPT	DMCW	3.2	10	kg/cm2	46	60	18		LIR-04
PGC50CP011	DMCW PRESS AFT PHEs	PT	DMCW	6.4	10	kg/cm2	38	60	16		LIR-04
PGB02CL011	DMCW OH TANK LVL	LT	DMCW	1		kg/cm2	36	60	18		LIR-05
PGB02CL012	DMCW OH TANK LVL	LT	DMCW	1		kg/cm2	36	60	18		LIR-05
LCL30CF001	CONDENSATE PUMP-A OUTLET FLOW	FT	COND	2.5	10	Kg/Cm2	99	177	18		LIR-06
LCL30CF002	CONDENSATE PUMP-B OUTLET FLOW	FT	COND	2.5	10	Kg/Cm2	99	177	18		LIR-06
10HBK10CT001	FURNACE PROBE (LEFT SIDE)	TT-D	FLUE GAS								MISC-SG-TTJBDU-01
10HBK30CT001	FURNACE PROBE (RIGHT SIDE)	TT-D	FLUE GAS								MISC-SG-TTJBDU-01
10HCB03CP001	APH "A" SB STM	PT	STEAM	30	40	kg/cm2	340	400	16		SBC-LIE-01
10HCB03CP003	APH "B" SB STM	PT	STEAM	30	40	kg/cm2	340	400	16		SBC-LIE-01
10HCB03CP005	APH "A" SB STM	PT	STEAM	30	40	kg/cm2	340	400	16		SBC-LIE-01
10HCB03CP007	APH "B" SB STM	PT	STEAM	30	40	kg/cm2	340	400	16		SBC-LIE-01
10HCB01CF001	SOOTBLOWER STM	FT	STEAM	30	40	kg/cm2	340	400	18		SBC-LIE-03
10HCB01CP001	SB STM	PT	STEAM	30	40	kg/cm2	340	400	16		SBC-LIE-03
10HCB01CP002	SB STM	PT	STEAM	30	40	kg/cm2	340	400	16		SBC-LIE-03
10HCB02CF001	SOOTBLOWER STM	FT	STEAM	30	40	kg/cm2	340	400	18		SBC-LIE-04
10HCB04CF001	SOOTBLOWER STM	FT	STEAM	30	40	kg/cm2	340	400	18		SBC-LIE-04
10HCB05CF001	SOOTBLOWER STM	FT	STEAM	30	40	kg/cm2	340	400	18		SBC-LIE-04
10HCB06CF001	SOOTBLOWER STM	FT	STEAM	30	40	kg/cm2	340	400	18		SBC-LIE-04
10HCB10CT001	SB CNDS	TT-D	WATER								SBC-TTJB-01
10HCB30CT001	SB CNDS	TT-D	WATER								SBC-TTJB-01
10HCB20CT001	SB CNDS	TT-D	WATER								SBC-TTJB-02

NOTE:FOR SHCEME NO 16 AND 18 -WHERE EVER DESIGN PRESSURE >=40KG/CM2 OR >=280 Deg C -TWO DRAIN VALVES SHALL BE PROVIDED PER LINE.

KKS TAG NO	Descritption	Instrument Type	Medium	Operating Pressure	Maximum Pressure	Units of Pressure	Operating Temp(Deg C)	Maximum Temp (Deg C)	Scheme No	Purg	JB/LIE/LIR
10HCB40CT001	SB CNDS	TT-D	WATER								SBC-TTJB-02
10HCB03CT001	SB CNDS	TT-D	WATER								SBC-TTJB-03
10HCB03CT003	SB CNDS	TT-D	WATER								SBC-TTJB-03
10HLB10CT010	FD FAN "A" MTR DE BEARING	TT-D	METAL								SG-FDA-TTJBDU-001
10HLB10CT011	FD FAN "A" MTR DE BEARING	TT-D	METAL								SG-FDA-TTJBDU-001
10HLB10CT012	FD FAN "A" MTR DE BEARING	TT-D	METAL								SG-FDA-TTJBDU-001
10HLB10CT025	FD FAN "A" MTR NDE BEARING	TT-D	METAL								SG-FDA-TTJBDU-001
10HLB10CT026	FD FAN "A" MTR NDE BEARING	TT-D	METAL								SG-FDA-TTJBDU-001
10HLB10CT027	FD FAN "A" MTR NDE BEARING	TT-D	METAL								SG-FDA-TTJBDU-001
10HLB10CT001	FD FAN "A" BEARING	TT-D	METAL								SG-FDA-TTJBDU-002
10HLB10CT002	FD FAN "A" BEARING	TT-D	METAL								SG-FDA-TTJBDU-002
10HLB10CT003	FD FAN "A" BEARING	TT-D	METAL								SG-FDA-TTJBDU-002
10HLB10CT004	FD FAN "A" BEARING	TT-D	METAL								SG-FDA-TTJBDU-002
10HLB10CT005	FD FAN "A" BEARING	TT-D	METAL								SG-FDA-TTJBDU-002
10HLB10CT006	FD FAN "A" BEARING	TT-D	METAL								SG-FDA-TTJBDU-002
10HLB10CT007	FD FAN "A" BEARING	TT-D	METAL								SG-FDA-TTJBDU-002
10HLB10CT008	FD FAN "A" BEARING	TT-D	METAL								SG-FDA-TTJBDU-002
10HLB10CT009	FD FAN "A" BEARING	TT-D	METAL								SG-FDA-TTJBDU-002
10HLB20CT010	FD FAN "B" MTR DE BEARING	TT-D	METAL								SG-FDB-TTJBDU-001
10HLB20CT011	FD FAN "B" MTR DE BEARING	TT-D	METAL								SG-FDB-TTJBDU-001
10HLB20CT012	FD FAN "B" MTR DE BEARING	TT-D	METAL								SG-FDB-TTJBDU-001
10HLB20CT025	FD FAN "B" MTR NDE BEARING	TT-D	METAL								SG-FDB-TTJBDU-001
10HLB20CT026	FD FAN "B" MTR NDE BEARING	TT-D	METAL								SG-FDB-TTJBDU-001
10HLB20CT027	FD FAN "B" MTR NDE BEARING	TT-D	METAL								SG-FDB-TTJBDU-001
10HLB20CT001	FD FAN "B" BEARING	TT-D	METAL								SG-FDB-TTJBDU-002
10HLB20CT002	FD FAN "B" BEARING	TT-D	METAL								SG-FDB-TTJBDU-002
10HLB20CT003	FD FAN "B" BEARING	TT-D	METAL								SG-FDB-TTJBDU-002
10HLB20CT004	FD FAN "B" BEARING	TT-D	METAL								SG-FDB-TTJBDU-002
10HLB20CT005	FD FAN "B" BEARING	TT-D	METAL								SG-FDB-TTJBDU-002
10HLB20CT006	FD FAN "B" BEARING	TT-D	METAL								SG-FDB-TTJBDU-002
10HLB20CT007	FD FAN "B" BEARING	TT-D	METAL								SG-FDB-TTJBDU-002
10HLB20CT008	FD FAN "B" BEARING	TT-D	METAL								SG-FDB-TTJBDU-002
10HLB20CT009	FD FAN "B" BEARING	TT-D	METAL								SG-FDB-TTJBDU-002
10HNC10CT010	ID FAN "A" MTR DE BEARING	TT-D	METAL								SG-IDA-TTJBDU-001
10HNC10CT011	ID FAN "A" MTR DE BEARING	TT-D	METAL								SG-IDA-TTJBDU-001
10HNC10CT012	ID FAN "A" MTR DE BEARING	TT-D	METAL								SG-IDA-TTJBDU-001
10HNC10CT025	ID FAN "A" MTR NDE BEARING	TT-D	METAL								SG-IDA-TTJBDU-001
10HNC10CT026	ID FAN "A" MTR NDE BEARING	TT-D	METAL								SG-IDA-TTJBDU-001

NOTE:FOR SHCEME NO 16 AND 18 -WHERE EVER DESIGN PRESSURE >=40KG/CM2 OR >=280 Deg C -TWO DRAIN VALVES SHALL BE PROVIDED PER LINE.

KKS TAG NO	Descritption	Instrument Type	Medium	Operating Pressure	Maximum Pressure	Units of Pressure	Operating Temp(Deg C)	Maximum Temp (Deg C)	Scheme No	Purg	JB/LIE/LIR
10HNC10CT027	ID FAN "A" MTR NDE BEARING	TT-D	METAL								SG-IDA-TTJBDU-001
10HNC10CT001	ID FAN "A" BEARING	TT-D	METAL								SG-IDA-TTJBDU-002
10HNC10CT002	ID FAN "A" BEARING	TT-D	METAL								SG-IDA-TTJBDU-002
10HNC10CT003	ID FAN "A" BEARING	TT-D	METAL								SG-IDA-TTJBDU-002
10HNC10CT004	ID FAN "A" BEARING	TT-D	METAL								SG-IDA-TTJBDU-002
10HNC10CT005	ID FAN "A" BEARING	TT-D	METAL								SG-IDA-TTJBDU-002
10HNC10CT006	ID FAN "A" BEARING	TT-D	METAL								SG-IDA-TTJBDU-002
10HNC10CT007	ID FAN "A" BEARING	TT-D	METAL								SG-IDA-TTJBDU-002
10HNC10CT008	ID FAN "A" BEARING	TT-D	METAL								SG-IDA-TTJBDU-002
10HNC10CT009	ID FAN "A" BEARING	TT-D	METAL								SG-IDA-TTJBDU-002
10HNC20CT010	ID FAN "B" MTR DE BEARING	TT-D	METAL								SG-IDB-TTJBDU-001
10HNC20CT011	ID FAN "B" MTR DE BEARING	TT-D	METAL								SG-IDB-TTJBDU-001
10HNC20CT012	ID FAN "B" MTR DE BEARING	TT-D	METAL								SG-IDB-TTJBDU-001
10HNC20CT025	ID FAN "B" MTR NDE BEARING	TT-D	METAL								SG-IDB-TTJBDU-001
10HNC20CT026	ID FAN "B" MTR NDE BEARING	TT-D	METAL								SG-IDB-TTJBDU-001
10HNC20CT027	ID FAN "B" MTR NDE BEARING	TT-D	METAL								SG-IDB-TTJBDU-001
10HNC20CT001	ID FAN "B" BEARING	TT-D	METAL								SG-IDB-TTJBDU-002
10HNC20CT002	ID FAN "B" BEARING	TT-D	METAL								SG-IDB-TTJBDU-002
10HNC20CT003	ID FAN "B" BEARING	TT-D	METAL								SG-IDB-TTJBDU-002
10HNC20CT004	ID FAN "B" BEARING	TT-D	METAL								SG-IDB-TTJBDU-002
10HNC20CT005	ID FAN "B" BEARING	TT-D	METAL								SG-IDB-TTJBDU-002
10HNC20CT006	ID FAN "B" BEARING	TT-D	METAL								SG-IDB-TTJBDU-002
10HNC20CT007	ID FAN "B" BEARING	TT-D	METAL								SG-IDB-TTJBDU-002
10HNC20CT008	ID FAN "B" BEARING	TT-D	METAL								SG-IDB-TTJBDU-002
10HNC20CT009	ID FAN "B" BEARING	TT-D	METAL								SG-IDB-TTJBDU-002
10HBK10CP001	FURNACE PRESS-L	PT	FLUE GAS/HOT	-5	-10	mmWC	1188	1300	32	1	SG-LIE-01
10HBK10CP003	FURNACE PRESS-L	PT	FLUE GAS/HOT	-5	-10	mmWC	1188	1300	32	1	SG-LIE-01
10HFE10CP003	FURN TO HOT PA DUCT	PDT	FLUE GAS/HOT	950	1257	mmWC	319	330	34	2	SG-LIE-01
10HBK30CP001	FURNACE PRESS-R	PT	FLUE GAS/HOT	-5	-10	mmWC	1188	1300	32	1	SG-LIE-02
10HFE10CP004	FURN TO HOT PA DUCT	PDT	FLUE GAS/HOT	950	1257	mmWC	319	330	34	2	SG-LIE-02
10HFE10CP005	FURN TO HOT PA DUCT	PDT	FLUE GAS/HOT	950	1257	mmWC	319	330	34	2	SG-LIE-02
10HHS01CP001	SCANNER AIR FAN OUTLET PRESS	PT	SCA. AIR/FLUE	528	700	mmWC	35	50	28	1	SG-LIE-03
10HHS10CP001	SCANNER COOLING AIR/FURN	PDT	SCA. AIR/FLUE			mmWC		1200	34	2	SG-LIE-03
10HHS10CP002	SCANNER COOLING AIR/FURN	PDT	SCA. AIR/FLUE			mmWC		1200	34	2	SG-LIE-03
10HLA30CP001	SCANNER AIR FILTER	PDT	SA	278		mmWC	35		30	2	SG-LIE-03
10HFW10CP001	PULV SEAL AIR / COLD PRI AIR	PDT	SEAL AIR	1028	1345	mmWC	35	58	30	2	SG-LIE-04
10HFW10CP002	PULV SEAL AIR / COLD PRI AIR	PDT	SEAL AIR	1028	1345	mmWC	35	58	30	2	SG-LIE-04
10HFW10CP003	PULV SEAL AIR DISCHARGE	PT	SEAL AIR	1005	1394	mmWC	35	50	28	1	SG-LIE-04

NOTE:FOR SHCEME NO 16 AND 18 -WHERE EVER DESIGN PRESSURE >=40KG/CM2 OR >=280 Deg C -TWO DRAIN VALVES SHALL BE PROVIDED PER LINE.

TECHNICAL SPECIFICATION FOR LIE/LIR
INSTRUMENT SCHEDULE

KKS TAG NO	Descritption	Instrument Type	Medium	Operating Pressure	Maximum Pressure	Units of Pressure	Operating Temp(Deg C)	Maximum Temp (Deg C)	Scheme No	Purg	JB/LIE/LIR
10HFC10CP001	PULV "A" BOWL	PDT	AIR + COAL	742	1094	mmWC	288	300	30	2	SG-LIE-05
10HFC10CP002	PULV "A" BOWL	PDT	AIR + COAL	742	1094	mmWC	288	300	30	2	SG-LIE-05
10HFW11CP001	PULV "A" SEAL AIR/UNDER BOWL	PDT	SEAL AIR	1028	1345	mmWC	35	58	30	2	SG-LIE-05
10HFW11CP002	PULV "A" SEAL AIR/UNDER BOWL	PDT	SEAL AIR	1028	1345	mmWC	35	58	30	2	SG-LIE-05
10HFW11CP003	PULV "A" SEAL AIR/UNDER BOWL	PDT	SEAL AIR	1028	1345	mmWC	35	58	30	2	SG-LIE-05
10HFC20CP001	PULV "B" BOWL	PDT	AIR + COAL	742	1094	mmWC	288	300	30	2	SG-LIE-06
10HFC20CP002	PULV "B" BOWL	PDT	AIR + COAL	742	1094	mmWC	288	300	30	2	SG-LIE-06
10HFW21CP001	PULV "B" SEAL AIR/UNDER BOWL	PDT	SEAL AIR	1028	1345	mmWC	35	58	30	2	SG-LIE-06
10HFW21CP002	PULV "B" SEAL AIR/UNDER BOWL	PDT	SEAL AIR	1028	1345	mmWC	35	58	30	2	SG-LIE-06
10HFW21CP003	PULV "B" SEAL AIR/UNDER BOWL	PDT	SEAL AIR	1028	1345	mmWC	35	58	30	2	SG-LIE-06
10HFC30CP001	PULV "C" BOWL	PDT	AIR + COAL	742	1094	mmWC	288	300	30	2	SG-LIE-07
10HFC30CP002	PULV "C" BOWL	PDT	AIR + COAL	742	1094	mmWC	288	300	30	2	SG-LIE-07
10HFW31CP001	PULV "C" SEAL AIR/UNDER BOWL	PDT	SEAL AIR	1028	1345	mmWC	35	58	30	2	SG-LIE-07
10HFW31CP002	PULV "C" SEAL AIR/UNDER BOWL	PDT	SEAL AIR	1028	1345	mmWC	35	58	30	2	SG-LIE-07
10HFW31CP003	PULV "C" SEAL AIR/UNDER BOWL	PDT	SEAL AIR	1028	1345	mmWC	35	58	30	2	SG-LIE-07
10HFC40CP001	PULV "D" BOWL	PDT	AIR + COAL	742	1094	mmWC	288	300	30	2	SG-LIE-08
10HFC40CP002	PULV "D" BOWL	PDT	AIR + COAL	742	1094	mmWC	288	300	30	2	SG-LIE-08
10HFW41CP001	PULV "D" SEAL AIR/UNDER BOWL	PDT	SEAL AIR	1028	1345	mmWC	35	58	30	2	SG-LIE-08
10HFW41CP002	PULV "D" SEAL AIR/UNDER BOWL	PDT	SEAL AIR	1028	1345	mmWC	35	58	30	2	SG-LIE-08
10HFW41CP003	PULV "D" SEAL AIR/UNDER BOWL	PDT	SEAL AIR	1028	1345	mmWC	35	58	30	2	SG-LIE-08
10HFC50CP001	PULV "E" BOWL	PDT	AIR + COAL	742	1094	mmWC	288	300	30	2	SG-LIE-09
10HFC50CP002	PULV "E" BOWL	PDT	AIR + COAL	742	1094	mmWC	288	300	30	2	SG-LIE-09
10HFW51CP001	PULV "E" SEAL AIR/UNDER BOWL	PDT	SEAL AIR	1028	1345	mmWC	35	58	30	2	SG-LIE-09
10HFW51CP002	PULV "E" SEAL AIR/UNDER BOWL	PDT	SEAL AIR	1028	1345	mmWC	35	58	30	2	SG-LIE-09
10HFW51CP003	PULV "E" SEAL AIR/UNDER BOWL	PDT	SEAL AIR	1028	1345	mmWC	35	58	30	2	SG-LIE-09
10HFC60CP001	PULV "F" BOWL	PDT	AIR + COAL	742	1094	mmWC	288	300	30	2	SG-LIE-10
10HFC60CP002	PULV "F" BOWL	PDT	AIR + COAL	742	1094	mmWC	288	300	30	2	SG-LIE-10
10HFW61CP001	PULV "F" SEAL AIR/UNDER BOWL	PDT	SEAL AIR	1028	1345	mmWC	35	58	30	2	SG-LIE-10
10HFW61CP002	PULV "F" SEAL AIR/UNDER BOWL	PDT	SEAL AIR	1028	1345	mmWC	35	58	30	2	SG-LIE-10
10HFW61CP003	PULV "F" SEAL AIR/UNDER BOWL	PDT	SEAL AIR	1028	1345	mmWC	35	58	30	2	SG-LIE-10
10HFC70CP001	PULV "G" BOWL	PDT	AIR + COAL	742	1094	mmWC	288	300	30	2	SG-LIE-11
10HFC70CP002	PULV "G" BOWL	PDT	AIR + COAL	742	1094	mmWC	288	300	30	2	SG-LIE-11
10HFW71CP001	PULV "G" SEAL AIR/UNDER BOWL	PDT	SEAL AIR	1028	1345	mmWC	35	58	30	2	SG-LIE-11
10HFW71CP002	PULV "G" SEAL AIR/UNDER BOWL	PDT	SEAL AIR	1028	1345	mmWC	35	58	30	2	SG-LIE-11
10HFW71CP003	PULV "G" SEAL AIR/UNDER BOWL	PDT	SEAL AIR	1028	1345	mmWC	35	58	30	2	SG-LIE-11
10HFC80CP001	PULV "H" BOWL	PDT	AIR + COAL	742	1094	mmWC	288	300	30	2	SG-LIE-12
10HFC80CP002	PULV "H" BOWL	PDT	AIR + COAL	742	1094	mmWC	288	300	30	2	SG-LIE-12
10HFW81CP001	PULV "H" SEAL AIR/UNDER BOWL	PDT	SEAL AIR	1028	1345	mmWC	35	58	30	2	SG-LIE-12

NOTE:FOR SHCEME NO 16 AND 18 -WHERE EVER DESIGN PRESSURE >=40KG/CM2 OR >=280 Deg C -TWO DRAIN VALVES SHALL BE PROVIDED PER LINE.

TECHNICAL SPECIFICATION FOR LIE/LIR
INSTRUMENT SCHEDULE

KKS TAG NO	Descritption	Instrument Type	Medium	Operating Pressure	Maximum Pressure	Units of Pressure	Operating Temp(Deg C)	Maximum Temp (Deg C)	Scheme No	Purg	JB/LIE/LIR
10HFW81CP002	PULV "H" SEAL AIR/UNDER BOWL	PDT	SEAL AIR	1028	1345	mmWC	35	58	30	2	SG-LIE-12
10HFW81CP003	PULV "H" SEAL AIR/UNDER BOWL	PDT	SEAL AIR	1028	1345	mmWC	35	58	30	2	SG-LIE-12
10HFC90CP001	PULV "J" BOWL	PDT	AIR + COAL	742	1094	mmWC	288	300	30	2	SG-LIE-13
10HFC90CP002	PULV "J" BOWL	PDT	AIR + COAL	742	1094	mmWC	288	300	30	2	SG-LIE-13
10HFW91CP001	PULV "J" SEAL AIR/UNDER BOWL	PDT	SEAL AIR	1028	1345	mmWC	35	58	30	2	SG-LIE-13
10HFW91CP002	PULV "J" SEAL AIR/UNDER BOWL	PDT	SEAL AIR	1028	1345	mmWC	35	58	30	2	SG-LIE-13
10HFW91CP003	PULV "J" SEAL AIR/UNDER BOWL	PDT	SEAL AIR	1028	1345	mmWC	35	58	30	2	SG-LIE-13
10HLA18CP001	FURN TO WINDBOX	PDT	FLUE GAS	-5	-10	mmWC	1291	1400	34	2	SG-LIE-14
10HLA28CP001	FURN TO WINDBOX	PDT	FLUE GAS	-5	-10	mmWC	1291	1400	34	2	SG-LIE-14
10HFE04CP001	DYANAVEN FILTER "A" DIFF PRESS	PDT	SEAL AIR	1028	1345	mmWC			30	2	SG-LIE-15
10HFE08CP001	DYANAVEN FILTER "B" DIFF PRESS	PDT	SEAL AIR	1028	1345	mmWC			30	2	SG-LIE-15
10HFE01CT010	PA FAN "A" MTR DE BEARING	TT-D	METAL								SG-PAA-TTJBDU-001
10HFE01CT011	PA FAN "A" MTR DE BEARING	TT-D	METAL								SG-PAA-TTJBDU-001
10HFE01CT012	PA FAN "A" MTR DE BEARING	TT-D	METAL								SG-PAA-TTJBDU-001
10HFE01CT025	PA FAN "A" MTR NDE BEARING	TT-D	METAL								SG-PAA-TTJBDU-001
10HFE01CT026	PA FAN "A" MTR NDE BEARING	TT-D	METAL								SG-PAA-TTJBDU-001
10HFE01CT027	PA FAN "A" MTR NDE BEARING	TT-D	METAL								SG-PAA-TTJBDU-001
10HFE01CT001	PA FAN "A" BEARING	TT-D	METAL								SG-PAA-TTJBDU-002
10HFE01CT002	PA FAN "A" BEARING	TT-D	METAL								SG-PAA-TTJBDU-002
10HFE01CT003	PA FAN "A" BEARING	TT-D	METAL								SG-PAA-TTJBDU-002
10HFE01CT004	PA FAN "A" BEARING	TT-D	METAL								SG-PAA-TTJBDU-002
10HFE01CT005	PA FAN "A" BEARING	TT-D	METAL								SG-PAA-TTJBDU-002
10HFE01CT006	PA FAN "A" BEARING	TT-D	METAL								SG-PAA-TTJBDU-002
10HFE01CT007	PA FAN "A" BEARING	TT-D	METAL								SG-PAA-TTJBDU-002
10HFE01CT008	PA FAN "A" BEARING	TT-D	METAL								SG-PAA-TTJBDU-002
10HFE01CT009	PA FAN "A" BEARING	TT-D	METAL								SG-PAA-TTJBDU-002
10HFE05CT010	PA FAN "B" MTR DE BEARING	TT-D	METAL								SG-PAB-TTJBDU-001
10HFE05CT011	PA FAN "B" MTR DE BEARING	TT-D	METAL								SG-PAB-TTJBDU-001
10HFE05CT012	PA FAN "B" MTR DE BEARING	TT-D	METAL								SG-PAB-TTJBDU-001
10HFE05CT025	PA FAN "B" MTR NDE BEARING	TT-D	METAL								SG-PAB-TTJBDU-001
10HFE05CT026	PA FAN "B" MTR NDE BEARING	TT-D	METAL								SG-PAB-TTJBDU-001
10HFE05CT027	PA FAN "B" MTR NDE BEARING	TT-D	METAL								SG-PAB-TTJBDU-001
10HFE05CT001	PA FAN "B" BEARING	TT-D	METAL								SG-PAB-TTJBDU-002
10HFE05CT002	PA FAN "B" BEARING	TT-D	METAL								SG-PAB-TTJBDU-002
10HFE05CT003	PA FAN "B" BEARING	TT-D	METAL								SG-PAB-TTJBDU-002
10HFE05CT004	PA FAN "B" BEARING	TT-D	METAL								SG-PAB-TTJBDU-002
10HFE05CT005	PA FAN "B" BEARING	TT-D	METAL								SG-PAB-TTJBDU-002
10HFE05CT006	PA FAN "B" BEARING	TT-D	METAL								SG-PAB-TTJBDU-002

NOTE:FOR SHCEME NO 16 AND 18 -WHERE EVER DESIGN PRESSURE >=40KG/CM2 OR >=280 Deg C -TWO DRAIN VALVES SHALL BE PROVIDED PER LINE.

TECHNICAL SPECIFICATION FOR LIE/LIR
INSTRUMENT SCHEDULE

KKS TAG NO	Descritption	Instrument Type	Medium	Operating Pressure	Maximum Pressure	Units of Pressure	Operating Temp(Deg C)	Maximum Temp (Deg C)	Scheme No	Purg	JB/LIE/LIR
10HFE05CT007	PA FAN "B" BEARING	TT-D	METAL								SG-PAB-TTJBDU-002
10HFE05CT008	PA FAN "B" BEARING	TT-D	METAL								SG-PAB-TTJBDU-002
10HFE05CT009	PA FAN "B" BEARING	TT-D	METAL								SG-PAB-TTJBDU-002
10LAB91CF001	FW FLOW	FT	FEED WATER	331.43	380	Kg/Cm2	309.105	335	14		SG-PC-LIE-001
10LAB91CF002	FW FLOW	FT	FEED WATER	331.43	380	Kg/Cm2	309.105	335	14		SG-PC-LIE-001
10LAB91CF003	FW FLOW	FT	FEED WATER	331.43	380	Kg/Cm2	309.105	335	14		SG-PC-LIE-001
10LBA10CP001	MS PRESSURE TO COMBUSTION CONTROL	PT	STEAM	281	297	Kg/Cm2	603	608	2		SG-PC-LIE-002
10LBA10CP002	MS PRESSURE TO COMBUSTION CONTROL	PT	STEAM	281	297	Kg/Cm2	603	608	2		SG-PC-LIE-002
10LBA10CP003	MS PRESSURE TO COMBUSTION CONTROL	PT	STEAM	281	297	Kg/Cm2	603	608	2		SG-PC-LIE-002
10LBA10CP008	PRESSURE AT HPH TURBINE	PT	STEAM	281	297	Kg/Cm2	603	608	2		SG-PC-LIE-003
10LBA10CP009	PRESSURE AT HPH TURBINE	PT	STEAM	281	297	Kg/Cm2	603	608	2		SG-PC-LIE-003
10LBA10CP010	PRESSURE AT HPH TURBINE	PT	STEAM	281	297	Kg/Cm2	603	608	2		SG-PC-LIE-003
10LBA51CF001	HPBP STEAM FLOW U/S OF VLV-1	FT	STEAM	281	297	Kg/Cm2	603	608	4		SG-PC-LIE-004
10LBA51CF002	HPBP STEAM FLOW U/S OF VLV-1	FT	STEAM	281	297	Kg/Cm2	603	608	4		SG-PC-LIE-004
10LBA52CF001	HPBP STEAM FLOW U/S OF VLV-2	FT	STEAM	281	297	Kg/Cm2	603	608	4		SG-PC-LIE-004
10LBA52CF002	HPBP STEAM FLOW U/S OF VLV-2	FT	STEAM	281	297	Kg/Cm2	603	608	4		SG-PC-LIE-004
10LBB11CP021	DP ACROSS RH IL & OL HEADER (LHS)	DPT	STEAM			Kg/Cm2			10		SG-PC-LIE-005
10LBB11CP022	DP ACROSS RH IL & OL HEADER (LHS)	DPT	STEAM			Kg/Cm2			10		SG-PC-LIE-005
10LBB11CP023	DP ACROSS RH IL & OL HEADER (LHS)	DPT	STEAM			Kg/Cm2			10		SG-PC-LIE-005
10LBB12CP021	DP ACROSS RH IL & OL HEADER (RHS)	DPT	STEAM			Kg/Cm2			10		SG-PC-LIE-006
10LBB12CP022	DP ACROSS RH IL & OL HEADER (RHS)	DPT	STEAM			Kg/Cm2			10		SG-PC-LIE-006
10LBB12CP023	DP ACROSS RH IL & OL HEADER (RHS)	DPT	STEAM			Kg/Cm2			10		SG-PC-LIE-006
10LBC11CP001	CRH PRESSURE	PT	STEAM	64.5	77.3	Kg/Cm2	370	390	16		SG-PC-LIE-007
10LBC11CP002	CRH PRESSURE	PT	STEAM	64.5	77.3	Kg/Cm2	370	390	16		SG-PC-LIE-007
10LBC12CP001	CRH PRESSURE	PT	STEAM	64.5	77.3	Kg/Cm2	370	390	16		SG-PC-LIE-007
10LBC12CP002	CRH PRESSURE	PT	STEAM	64.5	77.3	Kg/Cm2	370	390	16		SG-PC-LIE-007
10LBG10CF101	AUX. STEAM FLOW U/S OF HC-PRV	FT	STEAM	281	297	Kg/Cm2	603	608	4		SG-PC-LIE-008
10LBG10CF102	AUX. STEAM FLOW U/S OF HC-PRV	FT	STEAM	281	297	Kg/Cm2	603	608	4		SG-PC-LIE-008
10LBG10CP001	AUX. STEAM U/S OF HC-PRDS	PT	STEAM	281	297	Kg/Cm2	603	608	2		SG-PC-LIE-008
10LBG30CP001	AUX. STEAM PR.U/S OF HC-PRDS ISOLATION VLV.	PT	STEAM	16	20	Kg/Cm2	310	350	16		SG-PC-LIE-008
10LBG20CF101	AUX. STEAM FLOW U/S OF LC-PRV	FT	STEAM	64.9	77.3	Kg/Cm2	370.4	390	18		SG-PC-LIE-009
10LBG20CF102	AUX. STEAM FLOW U/S OF LC-PRV	FT	STEAM	64.9	77.3	Kg/Cm2	370.4	390	18		SG-PC-LIE-009
10LBG20CP001	AUX. STEAM U/S OF LC-PRDS	PT	STEAM	64.9	77.3	Kg/Cm2	370.4	390	16		SG-PC-LIE-009
10LBG30CP002	AUX. STEAM PR.U/S OF LC-PRDS ISOLATION VLV.	PT	STEAM	16	20	Kg/Cm2	310	350	16		SG-PC-LIE-009
10LBB11CP001	HRH PRESSURE	PT	STEAM	61.11	71.8	Kg/Cm2	603	608	2		SG-PC-LIE-010
10LBB12CP001	HRH PRESSURE	PT	STEAM	61.11	71.8	Kg/Cm2	603	608	2		SG-PC-LIE-010
10LBA11 CP001	MS PRESSURE AT SH O/LHEADER (LHS)- BOP READY	PT	STEAM	279.11	297	Kg/Cm2	602.43	608	2		SG-PC-LIE-011
10LBA12 CP001	MS PRESSURE AT SH O/LHEADER (RHS)- BOP READY	PT	STEAM	279.11	297	Kg/Cm2	602.43	608	2		SG-PC-LIE-011

NOTE:FOR SHCEME NO 16 AND 18 -WHERE EVER DESIGN PRESSURE >=40KG/CM2 OR >=280 Deg C -TWO DRAIN VALVES SHALL BE PROVIDED PER LINE.

TECHNICAL SPECIFICATION FOR LIE/LIR
INSTRUMENT SCHEDULE

KKS TAG NO	Descritption	Instrument Type	Medium	Operating Pressure	Maximum Pressure	Units of Pressure	Operating Temp(Deg C)	Maximum Temp (Deg C)	Scheme No	Purg	JB/LIE/LIR
10HJF50CP001	LIGHT OIL SUPPLY PRESS	PT	LDO	19	19	kg/cm2	40	40	16		Stand Alone
10HJF50CP002	DP ACROS 'LIGHT OIL SUPPLY STRAINER	DPT	LDO	19		kg/cm2	40		18		Stand Alone
10HJF50CP103	LIGHT OIL HDR SUPPLY PRESS	PT	LDO	14	14	kg/cm2	40	40	16		Stand Alone
10HJF50CP104	LIGHT OIL HDR SUPPLY PRESS	PT	LDO	14	14	kg/cm2	40	40	16		Stand Alone
10HJF50CP105	LIGHT OIL HDR SUPPLY PRESS	PT	LDO	14	14	kg/cm2	40	40	16		Stand Alone
10HJF50CP106	LIGHT OIL HDR SUPPLY PRESS	PT	LDO	14	14	kg/cm2	40	40	16		Stand Alone
10HJF50CP107	LIGHT OIL HDR SUPPLY PRESS	PT	LDO	14	14	kg/cm2	40	40	16		Stand Alone
10HJN30CP001	ATOM AIR HDR	PT	ATOM. AIR		6	kg/cm2	40	40	16		Stand Alone
10HJN30CP002	ATOM AIR HDR	PT	ATOM. AIR		6	kg/cm2	40	40	16		Stand Alone
10HJN30CP003	ATOM AIR HDR	PT	ATOM. AIR		6	kg/cm2	40	40	16		Stand Alone
10HNC10CF001	ID FAN "A" AIR FLOW	FT	FLUE GAS	-487	-846	mmWC	126	150	26	2	Stand Alone
10HNC11CP001	ID FAN "A" COLD FLUE GAS I/L PRESS	PT	FLUE GAS	-487	-846	mmWC	126	150	24	1	Stand Alone
10HNC12CP001	ID FAN "A" COLD FLUE GAS O/L PRESS	PT	FLUE GAS	213	250	mmWC	126	150	24	1	Stand Alone
10HNC20CF001	ID FAN "B" AIR FLOW	FT	FLUE GAS	-487	-846	mmWC	126	150	26	2	Stand Alone
10HNC21CP001	ID FAN "B" COLD FLUE GAS I/L PRESS	PT	FLUE GAS	-487	-846	mmWC	126	150	24	1	Stand Alone
10HNC22CP001	ID FAN "B" COLD FLUE GAS O/L PRESS	PT	FLUE GAS	213	250	mmWC	126	150	24	1	Stand Alone
90QFB10 CP001	SERVICE AIR PRESSURE AT TERMINAL POINT	PT	SER AIR	6	10	Kg/ cm2	40	50	16		Stand Alone
90QHB10CP001	FURNACE PRESSURE	PT	FLUE GAS	145	275	mmWC	1277	1300	32		Stand Alone
90QHB10CP002	FURNACE PRESSURE	PT	FLUE GAS	145	275	mmWC	1277	1300	32		Stand Alone
90QHC10CP001	SB MAIN LINE PRESSURE	PT	STEAM	19	25	Kg/ cm2	265	304	16		Stand Alone
90QHH01CP001	PRESSURE AT STRAINER INLET	PT	LDO	0	0	Kg/ cm2			16		Stand Alone
90QHH11CP001	DP ACROSS STRAINER A	PDT	LDO	0	0	Kg/ cm2			18		Stand Alone
90QHH12CP001	DP ACROSS STRAINER B	PDT	LDO	0	0	Kg/ cm2			18		Stand Alone
90QHH20CP001	PRESSURE AT LDO PUMP OUTLET	PT	LDO	20	20	Kg/ cm2			16		Stand Alone
90QHH20CP002	PRESSURE AT LDO PUMP OUTLET	PT	LDO	20	20	Kg/ cm2			16		Stand Alone
90QHH40CF001	FLOW BEFORE LOTV	FT	LDO	15.5	15.5	Kg/ cm2			18		Stand Alone
90QHH40CP001	PRESSURE BEFORE LOTV	PT	LDO	15.5	15.5	Kg/ cm2			16		Stand Alone
90QHH40CP002	PRESSURE AFTER LOTV	PT	LDO	15.5	15.5	Kg/ cm2			16		Stand Alone
90QHH40CP003	PRESSURE AFTER LOTV	PT	LDO	15.5	15.5	Kg/ cm2			16		Stand Alone
90QHH50CP001	ATOMISING AIR HEADER PRESSURE	PT	AIR	6	6	Kg/ cm2			16		Stand Alone
90QHH50CP002	ATOMISING AIR HEADER PRESSURE	PT	AIR	6	6	Kg/ cm2			16		Stand Alone
90QHL10CT001	FD FAN-A BRG DE TEMPERATURE	RTD	METAL								Stand Alone
90QHL10CT002	FD FAN-A BRG NDE TEMPERATURE	RTD	METAL								Stand Alone
90QHL20CT001	FD FAN-B BRG DE TEMPERATURE	RTD	METAL								Stand Alone
90QHL20CT002	FD FAN-B BRG NDE TEMPERATURE	RTD	METAL								Stand Alone
90QHL30CF001	AIR FLOW	FT	SEC AIR	371	504	mmWC	30	53	30		Stand Alone
90QHL30CF002	AIR FLOW	FT	SEC AIR	371	504	mmWC	30	53	30		Stand Alone
90QHL30CP001	FD FAN OUTLET PRESSURE	PT	SEC AIR	400	561	mmWC	30	53	28		Stand Alone

NOTE:FOR SHCEME NO 16 AND 18 -WHERE EVER DESIGN PRESSURE >=40KG/CM2 OR >=280 Deg C -TWO DRAIN VALVES SHALL BE PROVIDED PER LINE.

KKS TAG NO	Descritption	Instrument Type	Medium	Operating Pressure	Maximum Pressure	Units of Pressure	Operating Temp(Deg C)	Maximum Temp (Deg C)	Scheme No	Purg	JB/LIE/LIR
90QHL40CP001	DP ACROSS WINDBOX & FURNACE	PDT	FLUE GAS			mmWC			34		Stand Alone
90QHN10CP001	BOILER BANK OUTLET PRESSURE	PT	FLUE GAS	29	64	mmWC	350	360	28		Stand Alone
90QHX10 CP001	COOLING WATER SYSTEM INLET PRESSURE	PT	WATER	6	10	Kg/ cm2	40	50	16		Stand Alone
90QLB10CL001	DRUM LEVEL	LT	WATER/STEAM	22	25	Kg/ cm2	219	254	18		Stand Alone
90QLB10CL002	DRUM LEVEL	LT	WATER/STEAM	22	25	Kg/ cm2	219	254	18		Stand Alone
90QLB10CP001	DRUM PRESSURE	PT	WATER/STEAM	22	25	Kg/ cm2	219	254	16		Stand Alone
91HJF10CP001	PRESSURE AT SUCTION STRAINER INLET	PT	LDO	-0.1	-0.1	kg/cm2	40	40	16		Stand Alone
91HJF11CP001	PUMP-A DP ACROSS SUCTION STRAINER	PDT	LDO	-0.1	-0.1	kg/cm2	40	40	18		Stand Alone
91HJF11CP002	PRESSURE AT LDO PUMP-A INLET	PT	LDO	-0.1	-0.1	kg/cm2	40	40	16		Stand Alone
91HJF12CP001	PUMP-B DP ACROSS SUCTION STRAINER	PDT	LDO	-0.1	-0.1	kg/cm2	40	40	18		Stand Alone
91HJF12CP002	PRESSURE AT LDO PUMP-B INLET	PT	LDO	-0.1	-0.1	kg/cm2	40	40	16		Stand Alone
91HJF13CP001	PUMP-C DP ACROSS SUCTION STRAINER	PDT	LDO	-0.1	-0.1	kg/cm2	40	40	18		Stand Alone
91HJF13CP002	PRESSURE AT LDO PUMP-C INLET	PT	LDO	-0.1	-0.1	kg/cm2	40	40	16		Stand Alone
91HJF20CP001	PRESSURE AT PUMP HOUSE DISCHARGE	PT	LDO			kg/cm2	40	40	16		Stand Alone
91HJF20CP002	PRESSURE AT PUMP HOUSE DISCHARGE	PT	LDO			kg/cm2	40	40	16		Stand Alone
91HJP95CP001	PUMP O/L PRESSURE	PT	OIL+ WATER	5	7	kg/cm2	40	40	16		Stand Alone
PGC00CP012	DMCW PUMP SUC HDR PRESS	PT	DMCW	3.2	10	kg/cm2	46	60	16		Stand Alone
PGC41CP012	DP ACRS TG AUX PHE-A	DPT	DMCW	7.1	10	kg/cm2	46	60	18		Stand Alone
PGC42CP012	DP ACRS TG AUX PHE-B	DPT	DMCW	7.1	10	kg/cm2	46	60	18		Stand Alone
PGC43CP011	DP ACROSS INLET & OUTLET OF ENTIRE (SG) CW CIRCUIT	DPT	CW	12	12	Kg/Cm2	40	60	22		Stand Alone
PGC43CP012	DP ACRS TG AUX PHE-C	DPT	DMCW	7.1	10	kg/cm2	46	60	18		Stand Alone
QFA10 CP001	INSTRUMENT AIR PRESSURE AT TERMINAL POINT	PT	INS AIR	6	7	Kg/ cm2	40	50	16		Stand Alone
QLA01 CL001	FEED WATER STORAGE TANK LEVEL	LT	FEED WATER	1.23	7	Kg/ cm2	105	135	18		Stand Alone
QLA01 CL002	FEED WATER STORAGE TANK LEVEL	LT	FEED WATER	1.23	7	Kg/ cm2	105	135	18		Stand Alone
QLA01 CP001	FEED STORAGE TANK PR.	PT	FEED WATER	1.23	7	Kg/ cm2	105	135	16		Stand Alone
QLA11 CP001	DIFFERENTIAL PRESSURE ACROSS BFP SUCTION STRAINER	DPT	WATER	1.23	7	Kg/ cm2	105	135	18		Stand Alone
QLA12 CP001	DIFFERENTIAL PRESSURE ACROSS BFP SUCTION STRAINER	DPT	WATER	1.23	7	Kg/ cm2	105	135	18		Stand Alone
QLA20 CF001	BFP DISCHARGE FLOW - COMMON	FT	FEED WATER	36	45	Kg/ cm2	105	135	18		Stand Alone
QLA20 CP001	BFP DISCHARGE PRESSURE	PT	FEED WATER	36	45	Kg/ cm2	105	135	16		Stand Alone
QLA20 CP002	BFP DISCHARGE PRESSURE BEFORE FCV.	PT	FEED WATER	36	45	Kg/ cm2	105	135	16		Stand Alone
QLA20 CP003	BFP DISCHARGE PRESSURE AFT. FCV.	PT	FEED WATER	36	45	Kg/ cm2	105	135	16		Stand Alone
QLA30 CP001	DM WATER PUMP DISCHARGE PRESSURE	PT	DM WATER	19	20	Kg/ cm2	50	50	16		Stand Alone
QLB30 CF001	MAIN STEAM FLOW	FT	STEAM	20	22	Kg/ cm2	220	250	18		Stand Alone
QLB30 CP001	MAIN STEAM PRESSURE	PT	STEAM	20	22	Kg/ cm2	220	250	16		Stand Alone
QLB30 CP002	STEAM TO DEAERATOR PRESSURE	PT	STEAM	1.23	22	Kg/ cm2	207	250	16		Stand Alone
SGA11 CP001	PRESSAT AIR HEATER WATER WASH LINE	PT	WATER	12	16	kg/cm2	40	60	16		Stand Alone
10HHL95CG101	LSOFA A I/P TRANSDUCER	I/P	INSTR. AIR								TRICHY-LIE-001
10HHL95CG102	LSOFA B I/P TRANSDUCER	I/P	INSTR. AIR								TRICHY-LIE-001

NOTE:FOR SHCEME NO 16 AND 18 -WHERE EVER DESIGN PRESSURE >=40KG/CM2 OR >=280 Deg C -TWO DRAIN VALVES SHALL BE PROVIDED PER LINE.

SECTION –C
TECHNICAL SPECIFICATION FOR LIE/LIR
INSTRUMENT SCHEDULE

KKS TAG NO	Descritption	Instrument Type	Medium	Operating Pressure	Maximum Pressure	Units of Pressure	Operating Temp(Deg C)	Maximum Temp (Deg C)	Scheme No	Purg	JB/LIE/LIR
10HHL95CG103	LSOFA C I/P TRANSDUCER	I/P	INSTR. AIR								TRICHY-LIE-001
10HHL95CP101	LSOFA A PRESS SWITCH	PS	INSTR. AIR	8	10	kg/cm2	30	50	16		TRICHY-LIE-001
10HHL95CP102	LSOFA B PRESS SWITCH	PS	INSTR. AIR	8	10	kg/cm2	30	50	16		TRICHY-LIE-001
10HHL95CP103	LSOFA C PRESS SWITCH	PS	INSTR. AIR	8	10	kg/cm2	30	50	16		TRICHY-LIE-001
10HHL95CG104	HSOFA A I/P TRANSDUCER	I/P	INSTR. AIR								TRICHY-LIE-002
10HHL95CG105	HSOFA B I/P TRANSDUCER	I/P	INSTR. AIR								TRICHY-LIE-002
10HHL95CG106	HSOFA C I/P TRANSDUCER	I/P	INSTR. AIR								TRICHY-LIE-002
10HHL95CP104	HSOFA A PRESS SWITCH	PS	INSTR. AIR	8	10	kg/cm2	30	50	16		TRICHY-LIE-002
10HHL95CP105	HSOFA B PRESS SWITCH	PS	INSTR. AIR	8	10	kg/cm2	30	50	16		TRICHY-LIE-002
10HHL95CP106	HSOFA C PRESS SWITCH	PS	INSTR. AIR	8	10	kg/cm2	30	50	16		TRICHY-LIE-002
10HHL11CG101	ELEV AA AUX AIR I/P TRANSDUCER	I/P	INSTR. AIR								TRICHY-LIR-001
10HHL11CG102	ELEV A FUEL AIR I/P TRANSDUCER	I/P	INSTR. AIR								TRICHY-LIR-001
10HHL11CG103	ELEV AB AUX /OIL AIR I/P TRANSDUCER	I/P	INSTR. AIR								TRICHY-LIR-001
10HHL11CG104	ELEV AAA AUX AIR I/P TRANSDUCER	I/P	INSTR. AIR								TRICHY-LIR-001
10HHL11CP101	ELEV AA AUX AIR PRESS SWITCH	PS	INSTR. AIR	8	10	kg/cm2	30	50	16		TRICHY-LIR-001
10HHL11CP102	ELEV A FUEL AIR PRESS SWITCH	PS	INSTR. AIR	8	10	kg/cm2	30	50	16		TRICHY-LIR-001
10HHL11CP103	ELEV AB AUX/OIL AIR PRESS SWITCH	PS	INSTR. AIR	8	10	kg/cm2	30	50	16		TRICHY-LIR-001
10HHL11CP104	ELEV AAA AUX AIR PRESS SWITCH	PS	INSTR. AIR	8	10	kg/cm2	30	50	16		TRICHY-LIR-001
10HHL21CG101	ELEV ABB CFS AIR I/P TRANSDUCER	I/P	INSTR. AIR								TRICHY-LIR-001
10HHL21CG102	ELEV B FUEL AIR I/P TRANSDUCER	I/P	INSTR. AIR								TRICHY-LIR-001
10HHL21CP101	ELEV ABB CFS AIR PRESS SWITCH	PS	INSTR. AIR	8	10	kg/cm2	30	50	16		TRICHY-LIR-001
10HHL21CP102	ELEV B FUEL AIR PRESS SWITCH	PS	INSTR. AIR	8	10	kg/cm2	30	50	16		TRICHY-LIR-001
10HHL21CG103	ELEV BC AUX/OIL AIR I/P TRANSDUCER	I/P	INSTR. AIR								TRICHY-LIR-002
10HHL21CP103	ELEV BC AUX/OIL AIR I/P TRANSDUCER	PS	INSTR. AIR	8	10	kg/cm2	30	50	16		TRICHY-LIR-002
10HHL31CG101	ELEV BCC CFS AIR I/P TRANSDUCER	I/P	INSTR. AIR								TRICHY-LIR-002
10HHL31CG102	ELEV C FUEL AIR I/P TRANSDUCER	I/P	INSTR. AIR								TRICHY-LIR-002
10HHL31CG103	ELEV CD AUX AIR I/P TRANSDUCER	I/P	INSTR. AIR								TRICHY-LIR-002
10HHL31CP101	ELEV BCC CFS AIR PRESS SWITCH	PS	INSTR. AIR	8	10	kg/cm2	30	50	16		TRICHY-LIR-002
10HHL31CP102	ELEV C FUEL AIR PRESS SWITCH	PS	INSTR. AIR	8	10	kg/cm2	30	50	16		TRICHY-LIR-002
10HHL31CP103	ELEV CD AUX AIR PRESS SWITCH	PS	INSTR. AIR	8	10	kg/cm2	30	50	16		TRICHY-LIR-002
10HHL41CG101	ELEV CDD CFS AIR I/P TRANSDUCER	I/P	INSTR. AIR								TRICHY-LIR-002
10HHL41CG102	ELEV D FUEL AIR I/P TRANSDUCER	I/P	INSTR. AIR								TRICHY-LIR-002
10HHL41CP101	ELEV CDD CFS AIR PRESS SWITCH	PS	INSTR. AIR	8	10	kg/cm2	30	50	16		TRICHY-LIR-002
10HHL41CP102	ELEV D FUEL AIR PRESS SWITCH	PS	INSTR. AIR	8	10	kg/cm2	30	50	16		TRICHY-LIR-002
10HHL41CG103	ELEV DE AUX/OIL AIR I/P TRANSDUCER	I/P	INSTR. AIR								TRICHY-LIR-003
10HHL41CP103	ELEV DE AUX/OIL AIR PRESS SWITCH	PS	INSTR. AIR	8	10	kg/cm2	30	50	16		TRICHY-LIR-003
10HHL51CG101	ELEV DEE CFS AIR I/P TRANSDUCER	I/P	INSTR. AIR								TRICHY-LIR-003
10HHL51CG102	ELEV E FUEL AIR I/P TRANSDUCER	I/P	INSTR. AIR								TRICHY-LIR-003

NOTE:FOR SHCEME NO 16 AND 18 -WHERE EVER DESIGN PRESSURE >=40KG/CM2 OR >=280 Deg C -TWO DRAIN VALVES SHALL BE PROVIDED PER LINE.

SECTION –C
TECHNICAL SPECIFICATION FOR LIE/LIR
INSTRUMENT SCHEDULE

KKS TAG NO	Descritption	Instrument Type	Medium	Operating Pressure	Maximum Pressure	Units of Pressure	Operating Temp(Deg C)	Maximum Temp (Deg C)	Scheme No	Purg	JB/LIE/LIR
10HHL51CG103	ELEV EF AUX AIR I/P TRANSDUCER	I/P	INSTR. AIR								TRICHY-LIR-003
10HHL51CP101	ELEV DEE CFS AIR PRESS SWITCH	PS	INSTR. AIR	8	10	kg/cm2	30	50	16		TRICHY-LIR-003
10HHL51CP102	ELEV E FUEL AIR PRESS SWITCH	PS	INSTR. AIR	8	10	kg/cm2	30	50	16		TRICHY-LIR-003
10HHL51CP103	ELEV EF AUX AIR PRESS SWITCH	PS	INSTR. AIR	8	10	kg/cm2	30	50	16		TRICHY-LIR-003
10HHL61CG101	ELEV EFF CFS AIR I/P TRANSDUCER	I/P	INSTR. AIR								TRICHY-LIR-003
10HHL61CG102	ELEV F FUEL AIR I/P TRANSDUCER	I/P	INSTR. AIR								TRICHY-LIR-003
10HHL61CP101	ELEV EFF CFS AIR PRESS SWITCH	PS	INSTR. AIR	8	10	kg/cm2	30	50	16		TRICHY-LIR-003
10HHL61CP102	ELEV F FUEL AIR PRESS SWITCH	PS	INSTR. AIR	8	10	kg/cm2	30	50	16		TRICHY-LIR-003
10HHL61CG103	ELEV FG AUX/OIL AIR I/P TRANSDUCER	I/P	INSTR. AIR								TRICHY-LIR-004
10HHL61CP103	ELEV FG AUX/OIL AIR PRESS SWITCH	PS	INSTR. AIR	8	10	kg/cm2	30	50	16		TRICHY-LIR-004
10HHL71CG101	ELEV FGG CFS AIR I/P TRANSDUCER	I/P	INSTR. AIR								TRICHY-LIR-004
10HHL71CG102	ELEV G FUEL AIR I/P TRANSDUCER	I/P	INSTR. AIR								TRICHY-LIR-004
10HHL71CG103	ELEV GH AUX AIR I/P TRANSDUCER	I/P	INSTR. AIR								TRICHY-LIR-004
10HHL71CP101	ELEV FGG CFS AIR PRESS SWITCH	PS	INSTR. AIR	8	10	kg/cm2	30	50	16		TRICHY-LIR-004
10HHL71CP102	ELEV G FUEL AIR PRESS SWITCH	PS	INSTR. AIR	8	10	kg/cm2	30	50	16		TRICHY-LIR-004
10HHL71CP103	ELEV GH AUX AIR PRESS SWITCH	PS	INSTR. AIR	8	10	kg/cm2	30	50	16		TRICHY-LIR-004
10HHL81CG101	ELEV GHH CFS AIR I/P TRANSDUCER	I/P	INSTR. AIR								TRICHY-LIR-004
10HHL81CG102	ELEV H FUEL AIR I/P TRANSDUCER	I/P	INSTR. AIR								TRICHY-LIR-004
10HHL81CP101	ELEV GHH CFS AIR PRESS SWITCH	PS	INSTR. AIR	8	10	kg/cm2	30	50	16		TRICHY-LIR-004
10HHL81CP102	ELEV H FUEL AIR PRESS SWITCH	PS	INSTR. AIR	8	10	kg/cm2	30	50	16		TRICHY-LIR-004
10HHL81CG103	ELEV HJ AUX/OIL AIR I/P TRANSDUCER	I/P	INSTR. AIR								TRICHY-LIR-005
10HHL81CP103	ELEV HJ AUX/OIL AIR PRESS SWITCH	PS	INSTR. AIR	8	10	kg/cm2	30	50	16		TRICHY-LIR-005
10HHL91CG101	ELEV HJJ CFS AIR I/P TRANSDUCER	I/P	INSTR. AIR								TRICHY-LIR-005
10HHL91CG102	ELEV J FUEL AIR I/P TRANSDUCER	I/P	INSTR. AIR								TRICHY-LIR-005
10HHL91CG103	ELEV JJ AUX AIR I/P TRANSDUCER	I/P	INSTR. AIR								TRICHY-LIR-005
10HHL91CG104	ELEV CCOFA-A I/P TRANSDUCER	I/P	INSTR. AIR								TRICHY-LIR-005
10HHL91CP101	ELEV HJJ CFS AIR PRESS SWITCH	PS	INSTR. AIR	8	10	kg/cm2	30	50	16		TRICHY-LIR-005
10HHL91CP102	ELEV J FUEL AIR PRESS SWITCH	PS	INSTR. AIR	8	10	kg/cm2	30	50	16		TRICHY-LIR-005
10HHL91CP103	ELEV JJ AUX AIR PRESS SWITCH	PS	INSTR. AIR	8	10	kg/cm2	30	50	16		TRICHY-LIR-005
10HHL91CP104	ELEV CCOFA-A PRESS SWITCH	PS	INSTR. AIR	8	10	kg/cm2	30	50	16		TRICHY-LIR-005
10HFE01CT010	PA FAN "A" MTR DE BRG TEMP	TT-D	METAL								TTRACK-01
10HFE01CT011	PA FAN "A" MTR DE BRG TEMP	TT-D	METAL								TTRACK-01
10HFE01CT012	PA FAN "A" MTR DE BRG TEMP	TT-D	METAL								TTRACK-01
10HFE01CT025	PA FAN "A" MTR NDE BRG TEMP	TT-D	METAL								TTRACK-01
10HFE01CT026	PA FAN "A" MTR NDE BRG TEMP	TT-D	METAL								TTRACK-01
10HFE01CT027	PA FAN "A" MTR NDE BRG TEMP	TT-D	METAL								TTRACK-01
10HFE05CT010	PA FAN "B" MTR DE BRG TEMP	TT-D	METAL								TTRACK-02
10HFE05CT011	PA FAN "B" MTR DE BRG TEMP	TT-D	METAL								TTRACK-02

NOTE:FOR SHCEME NO 16 AND 18 -WHERE EVER DESIGN PRESSURE >=40KG/CM2 OR >=280 Deg C -TWO DRAIN VALVES SHALL BE PROVIDED PER LINE.

KKS TAG NO	Descritption	Instrument Type	Medium	Operating Pressure	Maximum Pressure	Units of Pressure	Operating Temp(Deg C)	Maximum Temp (Deg C)	Scheme No	Purg	JB/LIE/LIR
10HFE05CT012	PA FAN "B" MTR DE BRG TEMP	TT-D	METAL								TTRACK-02
10HFE05CT025	PA FAN "B" MTR NDE BRG TEMP	TT-D	METAL								TTRACK-02
10HFE05CT026	PA FAN "B" MTR NDE BRG TEMP	TT-D	METAL								TTRACK-02
10HFE05CT027	PA FAN "B" MTR NDE BRG TEMP	TT-D	METAL								TTRACK-02
10HLB10CT010	FD FAN "A" MTR DE BRG TEMP	TT-D	METAL								TTRACK-03
10HLB10CT011	FD FAN "A" MTR DE BRG TEMP	TT-D	METAL								TTRACK-03
10HLB10CT012	FD FAN "A" MTR DE BRG TEMP	TT-D	METAL								TTRACK-03
10HLB10CT025	FD FAN "A" MTR NDE BRG TEMP	TT-D	METAL								TTRACK-03
10HLB10CT026	FD FAN "A" MTR NDE BRG TEMP	TT-D	METAL								TTRACK-03
10HLB10CT027	FD FAN "A" MTR NDE BRG TEMP	TT-D	METAL								TTRACK-03
10HLB20CT010	FD FAN "B" MTR DE BRG TEMP	TT-D	METAL								TTRACK-04
10HLB20CT011	FD FAN "B" MTR DE BRG TEMP	TT-D	METAL								TTRACK-04
10HLB20CT012	FD FAN "B" MTR DE BRG TEMP	TT-D	METAL								TTRACK-04
10HLB20CT025	FD FAN "B" MTR NDE BRG TEMP	TT-D	METAL								TTRACK-04
10HLB20CT026	FD FAN "B" MTR NDE BRG TEMP	TT-D	METAL								TTRACK-04
10HLB20CT027	FD FAN "B" MTR NDE BRG TEMP	TT-D	METAL								TTRACK-04
10HNC10CT010	ID FAN "A" MTR DE BRG TEMP	TT-D	METAL								TTRACK-05
10HNC10CT011	ID FAN "A" MTR DE BRG TEMP	TT-D	METAL								TTRACK-05
10HNC10CT012	ID FAN "A" MTR DE BRG TEMP	TT-D	METAL								TTRACK-05
10HNC10CT025	ID FAN "A" MTR NDE BRG TEMP	TT-D	METAL								TTRACK-05
10HNC10CT026	ID FAN "A" MTR NDE BRG TEMP	TT-D	METAL								TTRACK-05
10HNC10CT027	ID FAN "A" MTR NDE BRG TEMP	TT-D	METAL								TTRACK-05
10HNC20CT010	ID FAN "B" MTR DE BRG TEMP	TT-D	METAL								TTRACK-06
10HNC20CT011	ID FAN "B" MTR DE BRG TEMP	TT-D	METAL								TTRACK-06
10HNC20CT012	ID FAN "B" MTR DE BRG TEMP	TT-D	METAL								TTRACK-06
10HNC20CT025	ID FAN "B" MTR NDE BRG TEMP	TT-D	METAL								TTRACK-06
10HNC20CT026	ID FAN "B" MTR NDE BRG TEMP	TT-D	METAL								TTRACK-06
10HNC20CT027	ID FAN "B" MTR NDE BRG TEMP	TT-D	METAL								TTRACK-06
PGC31CT010	DMCWP-A (SG) MTR BRG. TEMP -DE	TT-D	METAL								TTRACK-07
PGC31CT011	DMCWP-A (SG) MTR BRG. TEMP -DE	TT-D	METAL								TTRACK-07
PGC31CT012	DMCWP-A (SG) MTR BRG. TEMP -DE	TT-D	METAL								TTRACK-07
PGC31CT025	DMCWP-A (SG) MTR BRG. TEMP -NDE	TT-D	METAL								TTRACK-07
PGC31CT026	DMCWP-A (SG) MTR BRG. TEMP -NDE	TT-D	METAL								TTRACK-07
PGC31CT027	DMCWP-A (SG) MTR BRG. TEMP -NDE	TT-D	METAL								TTRACK-07
PGC32CT010	DMCWP-B (SG) MTR BRG. TEMP -DE	TT-D	METAL								TTRACK-08
PGC32CT011	DMCWP-B (SG) MTR BRG. TEMP -DE	TT-D	METAL								TTRACK-08
PGC32CT012	DMCWP-B (SG) MTR BRG. TEMP -DE	TT-D	METAL								TTRACK-08
PGC32CT025	DMCWP-B (SG) MTR BRG. TEMP -NDE	TT-D	METAL								TTRACK-08

NOTE:FOR SHCEME NO 16 AND 18 -WHERE EVER DESIGN PRESSURE >=40KG/CM2 OR >=280 Deg C -TWO DRAIN VALVES SHALL BE PROVIDED PER LINE.

TECHNICAL SPECIFICATION FOR LIE/LIR

INSTRUMENT SCHEDULE

KKS TAG NO	Descritption	Instrument Type	Medium	Operating Pressure	Maximum Pressure	Units of Pressure	Operating Temp(Deg C)	Maximum Temp (Deg C)	Scheme No	Purg	JB/LIE/LIR
PGC32CT026	DMCWP-B (SG) MTR BRG. TEMP -NDE	TT-D	METAL								TTRACK-08
PGC32CT027	DMCWP-B (SG) MTR BRG. TEMP -NDE	TT-D	METAL								TTRACK-08
10HBK10CT001	FURNACE PROBE TEMP-L	TT-D	FLUE GAS								TTRACK-09
10HBK30CT001	FURNACE PROBE TEMP-R	TT-D	FLUE GAS								TTRACK-09

NOTE:FOR SHCEME NO 16 AND 18 -WHERE EVER DESIGN PRESSURE >=40KG/CM2 OR >=280 Deg C -TWO DRAIN VALVES SHALL BE PROVIDED PER LINE.

PROJECT : NTPC TELANGANA SG ISLAND PACKAGE 2 X 800MW STPP

CUSTOMER : M/s NTPC

HOOK UP SCHEMES

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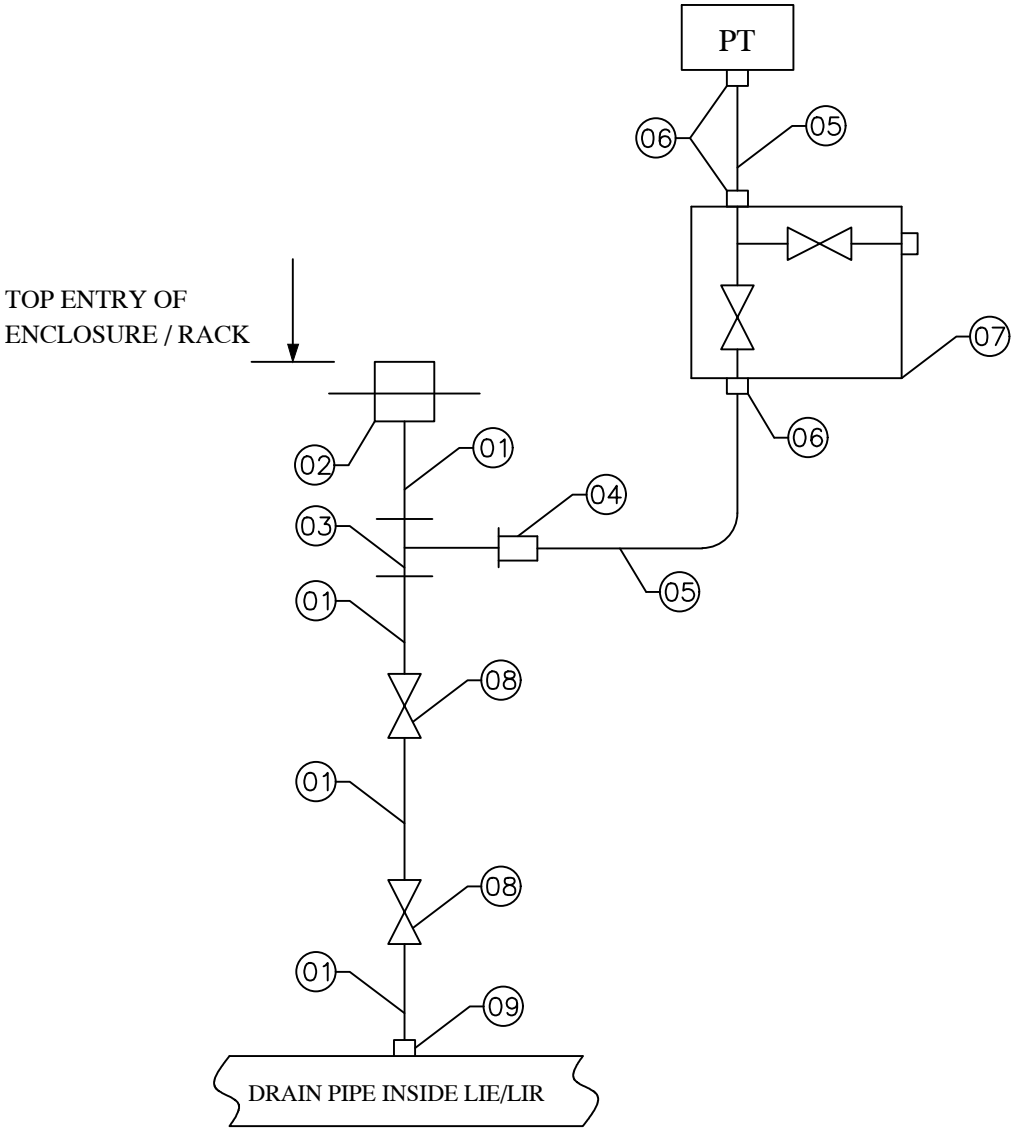

NOTES:

1. " TRANSMITTER BELOW SOURCE"
2. FOR BILL OF MATERIAL REFER PAGE 03 OF 37

A4 – 11

CE/416/NTPC TELA/HUP

REV. NO: 00

PAGE: 02 OF 37

ITEM NO.	ITEM DESCRIPTION	QTY/INST
01	IMPULSE PIPE MATL: ASTM A335 P91 SIZE: 1/2" NB-XXS	A/R
02	BULKHEAD UNION / COUPLING / AS PER ANSI B16.11 MATL: ASTM A182 F91 SIZE: 1/2" NB-SW / CL 9000	01
03	FORGED EQUAL TEE / AS PER ANSI B16.11 MATL: ASTM A182 F91 SIZE: 1/2" NB-SW / CL 9000	01
04	TEE-TUBE UNION MATL: SS316 SIZE: OD OF 1/2" NB x TO SUIT 1/2" OD SS TUBE	01
05	TUBE MATL: A213 TP 316H SIZE: 1/2" OD x 2.1mm THK.	A/R
06	TUBE FITTING: DFDC MATL: SS316 SIZE: 1/2" NPTM x TO SUIT 1/2" OD SS TUBE	03
07	TWO VALVE MANIFOLD WITH VENT PLUG BODY: SS316 PORT SIZE: 1/2" NPTF / RATING : 9000 PSI	01
08	FORGED GLOBE VALVE BODY: ASTM A182 F91 / STEM MATL: A182 Gr.F6a SIZE: 1/2" NB-SW / CL 3000 SPL	02
09	HALF COUPLING / AS PER ANSI B16.11 MATL: ASTM A182 F91 SIZE: 1/2" NB-SW / CL 9000	01

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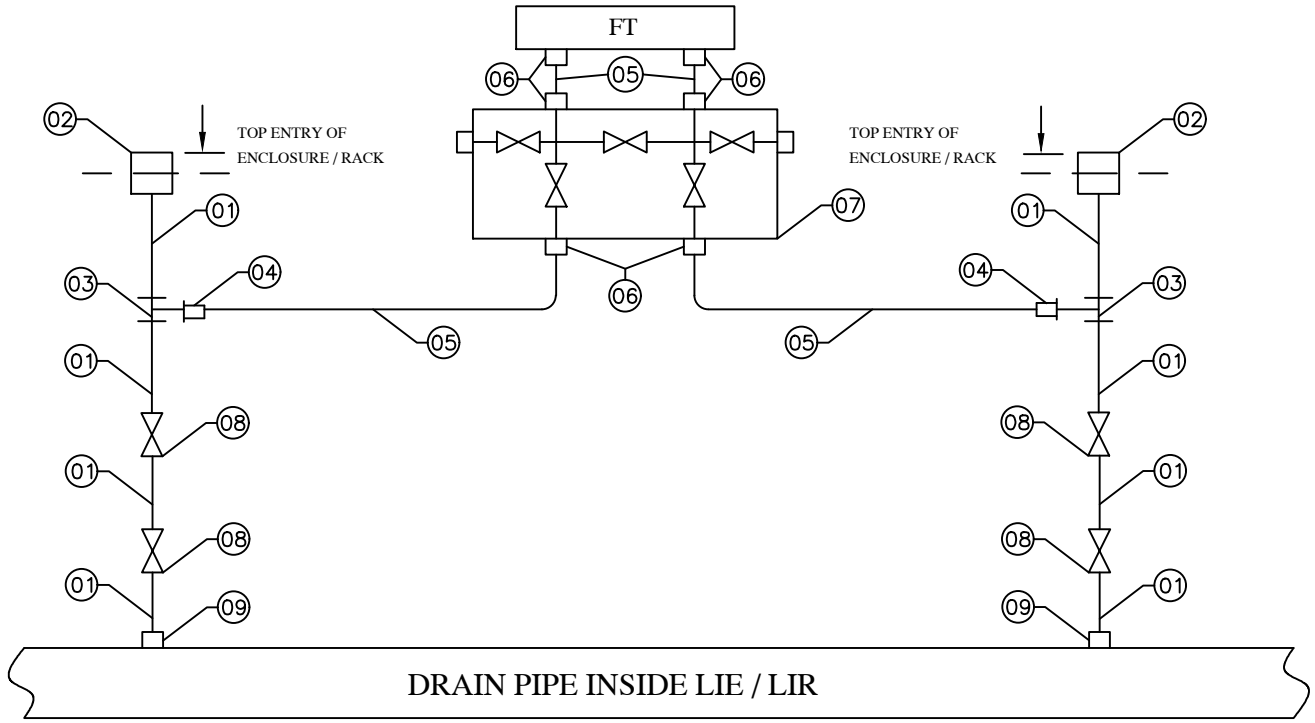
A4 – 11



NOTE:

1. " TRANSMITTER BELOW SOURCE"
2. FOR BILL OF MATERIAL REFER PAGE 05 OF 37

CE/416/NTPC TELA/HUP

REV. NO: 00

PAGE: 04 OF 37

ITEM NO.	ITEM DESCRIPTION	QTY/INST.
01	IMPULSE PIPE MATL: ASTM A335 P91 SIZE: 1/2" NB-SCH XXS	A/R
02	BULKHEAD UNION / COUPLING / AS PER ANSI B16.11 MATL: ASTM A182 F91 SIZE: 1/2" NB-SW / CL 9000	02
03	FORGED EQUAL TEE / AS PER ANSI B16.11 MATL: ASTM A182 F91 SIZE: 1/2" NB-SW / CL 9000	02
04	TEE-TUBE UNION MATL: SS316 SIZE: OD OF 1/2" NB x TO SUIT 1/2" OD SS TUBE	02
05	TUBE MATL: A213 TP 316H SIZE: 1/2" OD x 2.1mm THK.	A/R
06	TUBE FITTING / DFDC MATL: SS316 SIZE: 1/2" NPTM x TO SUIT 1/2" OD SS TUBE	06
07	FIVE VALVE MANIFOLD WITH VENT PLUG MATL: SS316 PORT SIZE: 1/2" NPTF / RATING: 6000 PSI	01
08	FORGED GLOBE VALVES BODY MATL: ASTM A182 F91 / STEM MATL: A182 Gr.F6a SIZE: 1/2" NB-SW / CL 3000SPL	04
09	HALF COUPLING / AS PER ANSI B16.11 MATL: ASTM A182 F22 SIZE: 1/2" NB-SW / CL 9000	02

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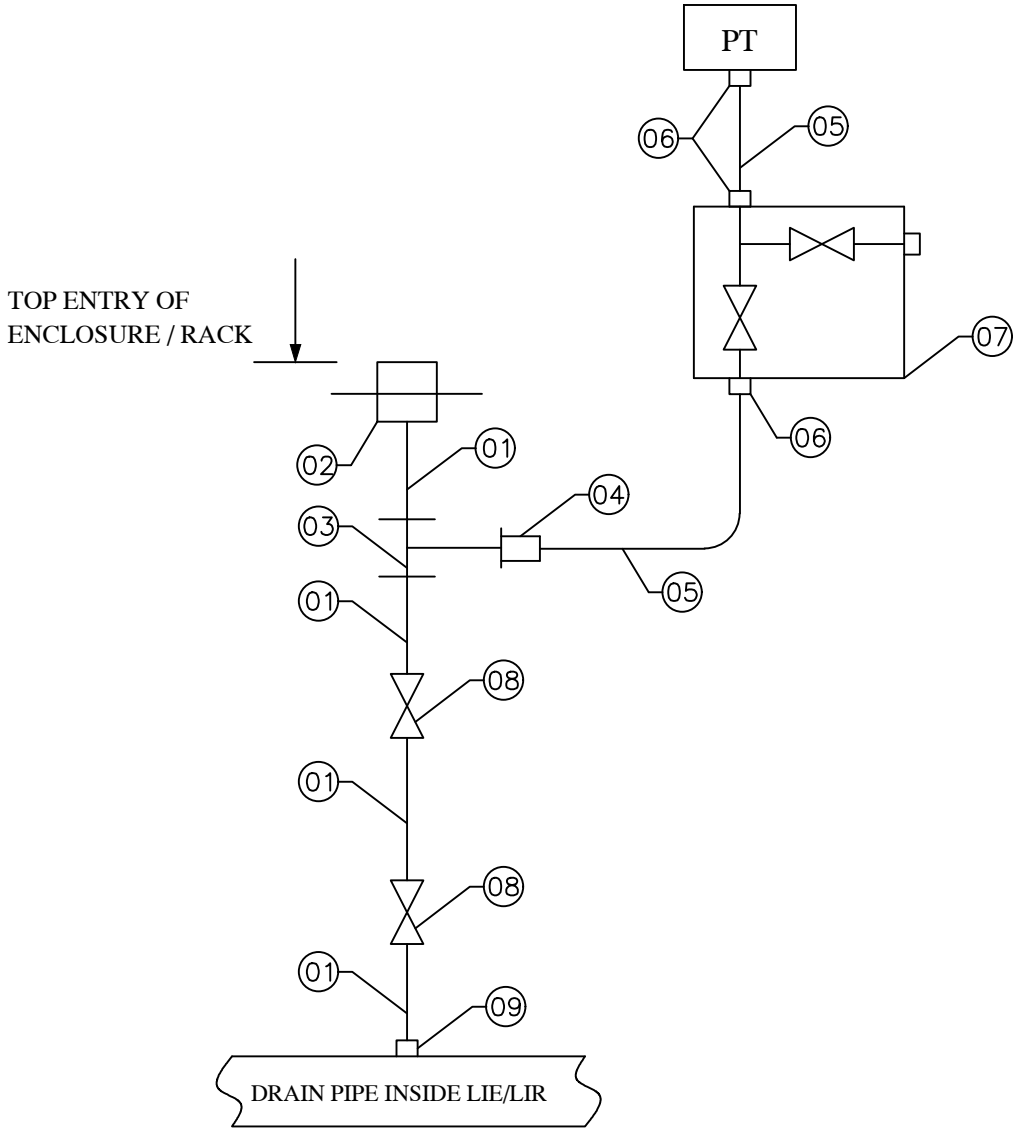

NOTES:

1. " TRANSMITTER BELOW SOURCE"
2. FOR BILL OF MATERIAL REFER PAGE 07 OF 37

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CE/416/NTPC TELA/HUP

REV. NO: 00

PAGE: 06 OF 37

ITEM NO.	ITEM DESCRIPTION	QTY/INST
01	IMPULSE PIPE MATL: ASTM A335 P22 SIZE: 1/2" NB-XXS	A/R
02	BULKHEAD UNION / COUPLING / AS PER ANSI B16.11 MATL: ASTM A182 F22 SIZE: 1/2" NB-SW / CL 9000	01
03	FORGED EQUAL TEE / AS PER ANSI B16.11 MATL: ASTM A182 F22 SIZE: 1/2" NB-SW / CL 9000	01
04	TEE-TUBE UNION MATL: SS316 SIZE: OD OF 1/2" NB x TO SUIT 1/2" OD SS TUBE	01
05	TUBE MATL: A213 TP 316H SIZE: 1/2" OD x 2.1mm THK.	A/R
06	TUBE FITTING: DFDC MATL: SS316 SIZE: 1/2" NPTM x TO SUIT 1/2" OD SS TUBE	03
07	TWO VALVE MANIFOLD WITH VENT PLUG BODY: SS316 PORT SIZE: 1/2" NPTF / RATING : 9000 PSI	01
08	FORGED GLOBE VALVE BODY: ASTM A182 F22 / STEM MATL: A182 Gr.F6a SIZE: 1/2" NB-SW / CL 3000 SPL	02
09	HALF COUPLING / AS PER ANSI B16.11 MATL: ASTM A182 F22 SIZE: 1/2" NB-SW / CL 9000	01

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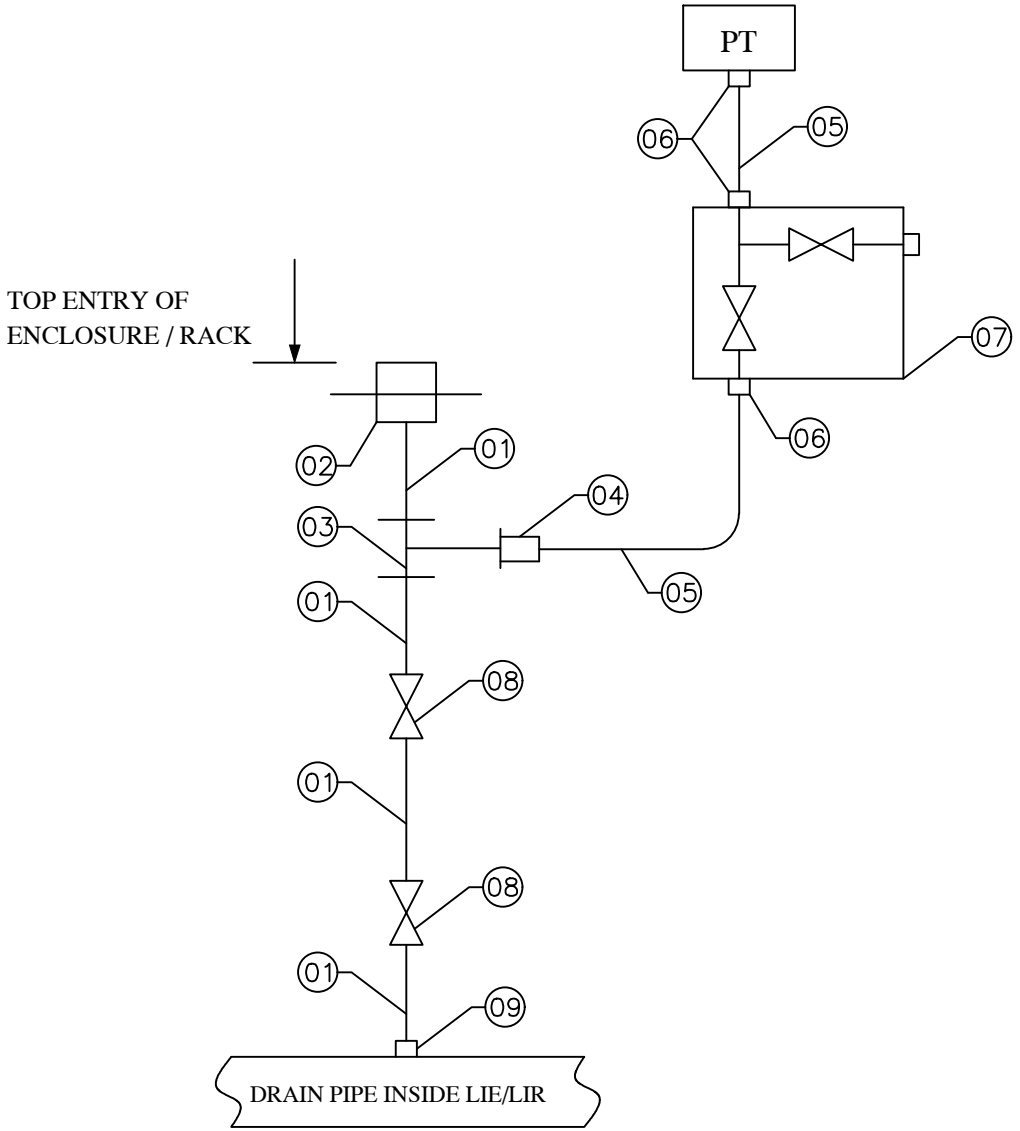

NOTE:

1. " TRANSMITTER BELOW SOURCE"
2. FOR BILL OF MATERIAL REFER PAGE 09 OF 37

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CE/416/NTPC TELA/HUP

REV. NO: 00

PAGE: 08 OF 37

ITEM NO.	ITEM DESCRIPTION	QTY/INST.
01	IMPULSE PIPE MATL: ASTM A335 P22 SIZE: 1/2" NB-SCH 160	A/R
02	BULKHEAD UNION / COUPLING / AS PER ANSI B16.11 MATL: ASTM A182 F22 SIZE: 1/2" NB-SW / CL 6000	01
03	FORGED EQUAL TEE / AS PER ANSI B16.11 MATL: ASTM A182 F22 SIZE: 1/2" NB-SW / CL 6000	01
04	TEE-TUBE UNION MATL: SS316 SIZE: OD OF 1/2" NB x TO SUIT 1/2" OD SS TUBE	01
05	TUBE MATL: A213 TP 316H SIZE: 1/2" OD x 2.1mm THK.	A/R
06	TUBE FITTING / DFDC MATL: SS316 SIZE: 1/2" NPTM x TO SUIT 1/2" OD SS TUBE	03
07	TWO VALVE MANIFOLD WITH VENT PLUG MATL: SS316 PORT SIZE: 1/2" NPTF / RATING: 6000 PSI	01
08	FORGED GLOBE VALVES BODY MATL: ASTM A182 F22 / STEM MATL: A182 Gr.F6a SIZE: 1/2" NB-SW / CL 3000SPL	02
09	HALF COUPLING / AS PER ANSI B16.11 MATL: ASTM A182 F22 SIZE: 1/2" NB-SW / CL 6000	01

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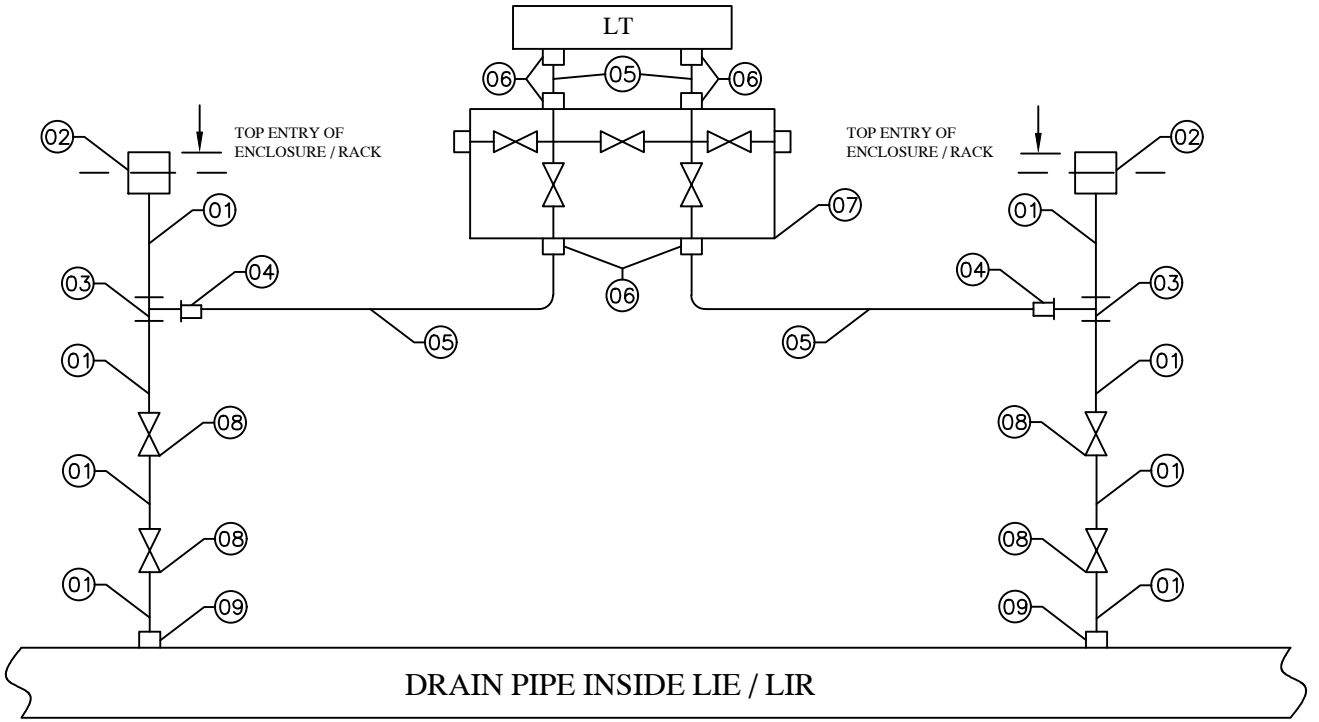

NOTE:

1. " TRANSMITTER BELOW SOURCE"
2. FOR BILL OF MATERIAL REFER PAGE 11 OF 37

ITEM NO.	ITEM DESCRIPTION	QTY/INST.
01	IMPULSE PIPE MATL: ASTM A335 P22 SIZE: 1/2" NB-SCH 160	A/R
02	BULKHEAD UNION / COUPLING / AS PER ANSI B 16.11 MATL: ASTM A182 F22 SIZE: 1/2" NB-SW / CL 6000	02
03	FORGED EQUAL TEE / AS PER ANSI B16.11 MATL: ASTM A182 F22 SIZE: 1/2" NB-SW / CL 6000	02
04	TEE-TUBE UNION MATL: SS316 SIZE: OD OF 1/2" NB TO SUIT 1/2" OD SS TUBE	02
05	TUBE MATL: A213 TP 316H SIZE: 1/2" OD x 2.1 mm THK.	A/R
06	TUBE FITTING / DFDC MATL: SS316 SIZE: 1/2" NPTM x TO SUIT 1/2" OD SS TUBE	06
07	FIVE VALVE MANIFOLD WITH VENT PLUG MATL: SS316 PORT SIZE: 1/2" NPTF / RATING: 6000 PSI	01
08	FORGED GLOBE VALVE BODY MATL: ASTM A182 F22 / STEM MATL: A182 Gr.F6a SIZE: 1/2" NB-SW / CL 3000SPL	04
09	HALF COUPLING / AS PER ANSI B 16.11 MATL: ASTM A182 F22 SIZE: 1/2" NB-SW / CL 6000	02

REVISION NO | DATE

REVISION NO	DATE	COPY RIGHT AND CONFIDENTIAL The information on this document is the property of Bharat Heavy Electricals Limited. It must not be used directly or indirectly in anyway detrimental to the interest to the Company.		

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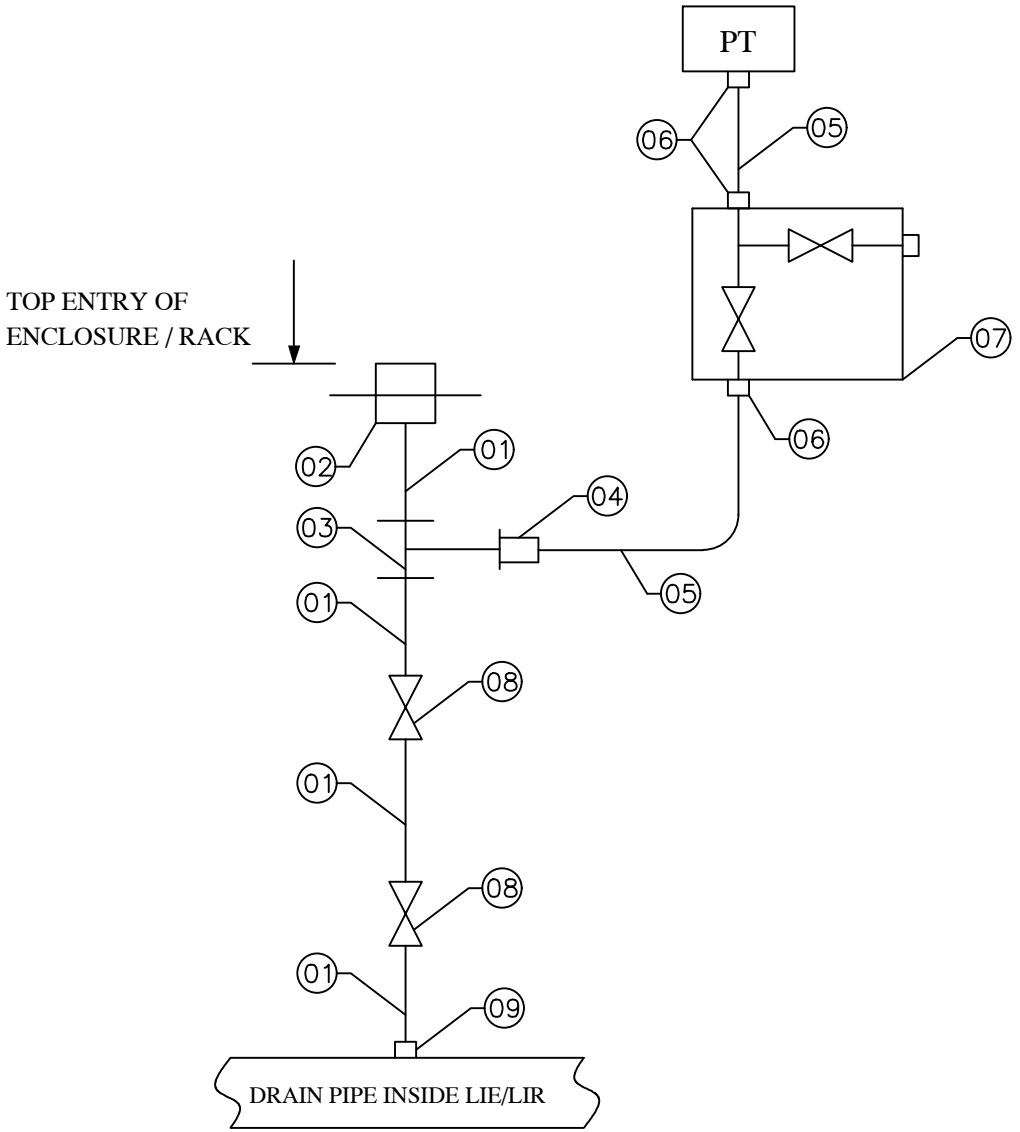

NOTE:

1. " TRANSMITTER BELOW SOURCE"
2. FOR BILL OF MATERIAL REFER PAGE 13 OF 37

CE/416/NTPC TELA/HUP

REV. NO: 00

PAGE: 12 OF 37

ITEM NO.	ITEM DESCRIPTION	QTY/INST.
01	IMPULSE PIPE MATL: ASTM A106 Gr.C SIZE: 1/2" NB-SCH 160	A/R
02	BULKHEAD UNION / COUPLING / AS PER ANSI B16.11 MATL: ASTM A105 SIZE: 1/2" NB-SW / CL 6000	01
03	FORGED EQUAL TEE / AS PER ANSI B16.11 MATL: ASTM A105 SIZE: 1/2" NB-SW / CL 6000	01
04	TEE-TUBE UNION MATL: SS316 SIZE: OD OF 1/2" NB x TO SUIT 1/2" OD SS TUBE	01
05	TUBE MATL: A213 TP 316H SIZE: 1/2" OD x 2.1mm THK.	A/R
06	TUBE FITTING / DFDC MATL: SS316 SIZE: 1/2" NPTM x TO SUIT 1/2" OD SS TUBE	03
07	TWO VALVE MANIFOLD WITH VENT PLUG MATL: SS316 PORT SIZE: 1/2" NPTF / RATING: 6000 PSI	01
08	FORGED GLOBE VALVES BODY MATL: ASTM A105 / STEM MATL: A182 Gr.F6a SIZE: 1/2" NB-SW / CL 2500	02
09	HALF COUPLING / AS PER ANSI B16.11 MATL: ASTM A105 SIZE: 1/2" NB-SW / CL 6000	01

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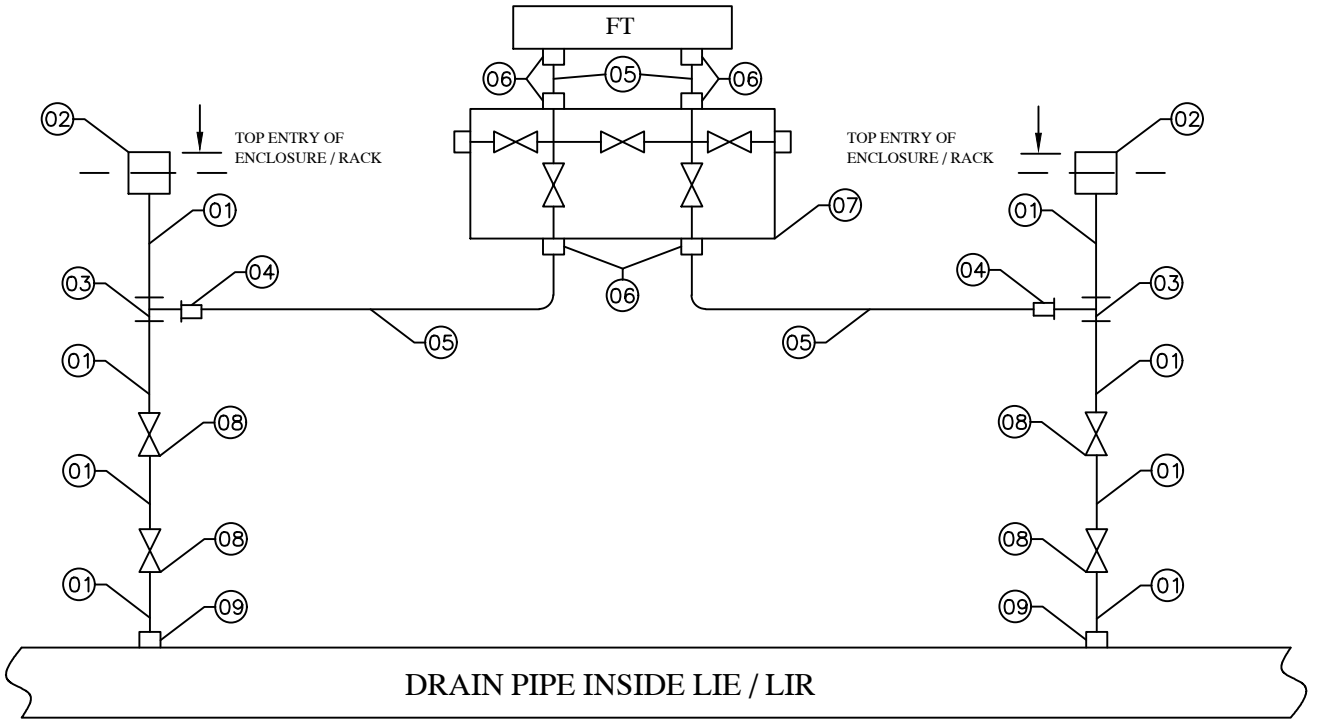
A4 – 11



NOTE:

1. " TRANSMITTER BELOW SOURCE"
2. FOR BILL OF MATERIAL REFER PAGE 15 OF 37

CE/416/NTPC TELA/HUP

REV. NO: 00

PAGE: 14 OF 37

ITEM NO.	ITEM DESCRIPTION	QTY/INST.
01	IMPULSE PIPE MATL: ASTM A106 Gr.C SIZE: 1/2" NB-SCH 160	A/R
02	BULKHEAD UNION / COUPLING / AS PER ANSI B16.11 MATL: ASTM A105 SIZE: 1/2" NB-SW / CL 6000	02
03	FORGED EQUAL TEE / AS PER ANSI B16.11 MATL: ASTM A105 SIZE: 1/2" NB-SW / CL 6000	02
04	TEE-TUBE UNION MATL: SS316 SIZE: OD OF 1/2" NB x TO SUIT 1/2" OD SS TUBE	02
05	TUBE MATL: A213 TP 316H SIZE: 1/2" OD x 2.1mm THK.	A/R
06	TUBE FITTING / DFDC MATL: SS316 SIZE: 1/2" NPTM x TO SUIT 1/2" OD SS TUBE	06
07	FIVE VALVE MANIFOLD WITH VENT PLUG MATL: SS316 PORT SIZE: 1/2" NPTF / RATING: 6000 PSI	01
08	FORGED GLOBE VALVES BODY MATL: ASTM A105 / STEM MATL: A182 Gr.F6a SIZE: 1/2" NB-SW / CL 2500	04
09	HALF COUPLING / AS PER ANSI B16.11 MATL: ASTM A105 SIZE: 1/2" NB-SW / CL 6000	02

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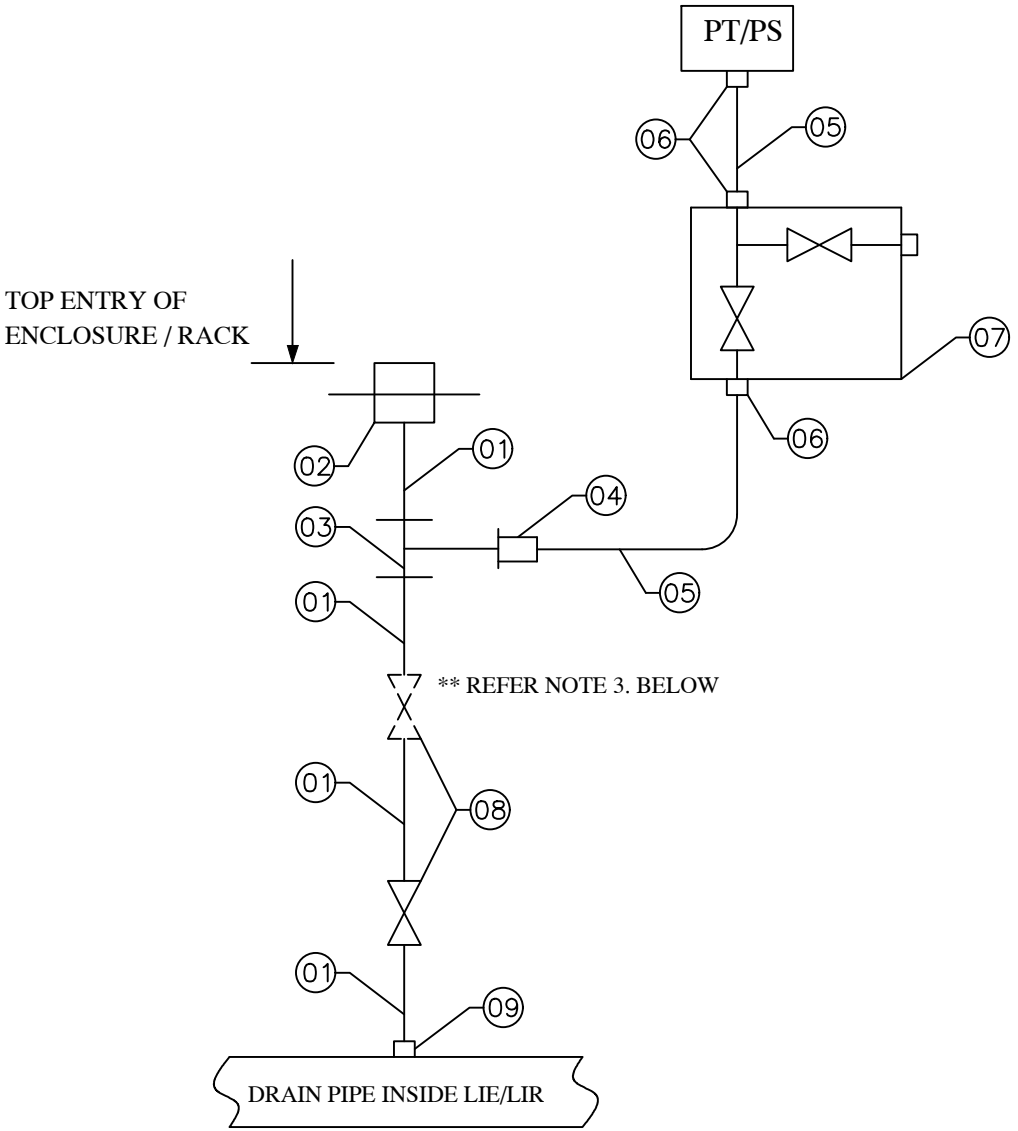
A4 – 11



NOTE:

1. " TRANSMITTER BELOW SOURCE"
2. FOR BILL OF MATERIAL REFER PAGE 17 OF 37

**3. ADDITIONAL DRAIN VALVE (ITEM 08) IS APPLICABLE FOR DESIGN PRESSURE/TEMPERATURE > OR EQUAL TO 40 Kg/Cm2 / 280 Deg C

CE/416/NTPC TELA/HUP

REV. NO: 00

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ITEM NO.	ITEM DESCRIPTION	QTY/INST.
01	IMPULSE PIPE MATL: ASTM A106 Gr.C SIZE: 1/2" NB-SCH 80	A/R
02	BULKHEAD UNION / COUPLING / AS PER ANSI B16:11 MATL: ASTM A105 SIZE: 1/2" NB-SW / CL 3000	01
03	FORGED EQUAL TEE / AS PER ANSI B16.11 MATL: ASTM A105 SIZE: 1/2" NB-SW / CL 3000	01
04	TEE-TUBE UNION MATL: SS316 SIZE: OD OF 1/2" NB x TO SUIT 1/2" OD SS TUBE	01
05	TUBE MATL: A213 TP 316H SIZE: 1/2" OD x 2.1mm THK.	A/R
06	TUBE FITTING / DFDC MATL: SS316 SIZE: 1/2" NPTM x TO SUIT 1/2" OD SS TUBE	03
07	TWO VALVE MANIFOLD WITH VENT PLUG MATL: SS316 PORT SIZE: 1/2" NPTF / RATING: 3000PSI	01
**08	FORGED GLOBE VALVES BODY MATL: ASTM A105 / STEM MATL: A182 Gr.F6a SIZE: 1/2" NB-SW / CL 800	A/R
09	HALF COUPLING / AS PER ANSI B16.11 MATL: ASTM A105 SIZE: 1/2" NB-SW / CL 3000	01

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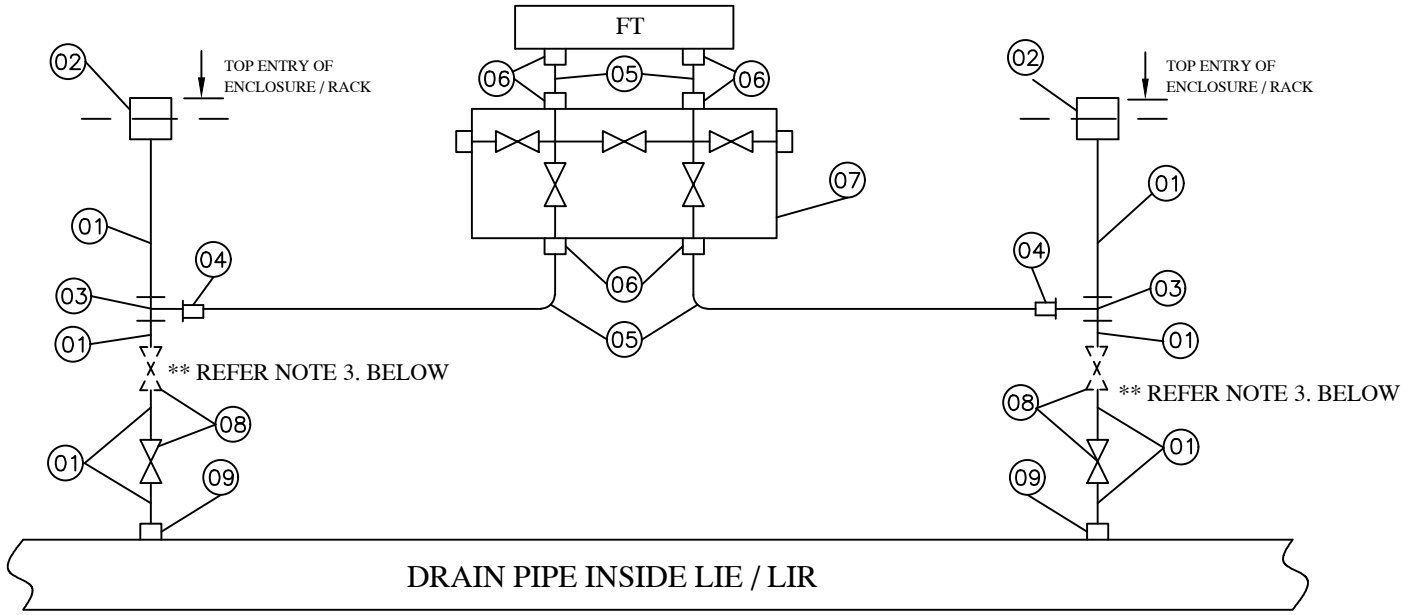
A4 – 11



NOTE:

1. " TRANSMITTER BELOW SOURCE"
2. FOR BILL OF MATERIAL REFER PAGE 19 OF 37

**3. ADDITIONAL DRAIN VALVE (ITEM 08) IS APPLICABLE FOR DESIGN PRESSURE/TEMPERATURE > OR EQUAL TO 40 Kg/Cm2/280 Deg C

CE/416/NTPC TELA/HUP

REV. NO: 00

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ITEM NO.	ITEM DESCRIPTION	QTY/INST.
01	IMPULSE PIPE MATL: ASTM A106 Gr.C SIZE: 1/2" NB-SCH 80	A/R
02	BULKHEAD UNION / COUPLING / AS PER ANSI B16.11 MATL: ASTM A105 SIZE: 1/2" NB-SW / CL 3000	02
03	FORGED EQUAL TEE/ AS PER ANSI B16.11 MATL: ASTM A105 SIZE: 1/2" NB-SW / CL 3000	02
04	TEE-TUBE UNION MATL: SS316 SIZE: OD OF 1/2" NB x TO SUIT TO 1/2" OD SS TUBE	02
05	TUBE MATL: A213 TP 316H SIZE: 1/2" OD x 2.1mm THK.	A/R
06	TUBE FITTING / DFDC MATL: SS316 SIZE: 1/2" NPTM x TO SUIT 1/2" OD SS TUBE	03
07	FIVE VALVE MANIFOLD WITH VENT PLUG BODY: SS316 PORT SIZE: 1/2" NPTF / RATING: 3000PSI	01
**08	FORGED GLOBE VALVE BODY MATL: ASTM A105 / STEM MATL: A182 Gr.F6a SIZE: 1/2" NB-SW / CL 800	A/R
09	HALF COUPLING/AS PER ANSI B16.11 MATL: ASTM A105 SIZE: 1/2" NB-SW / CL 3000	02

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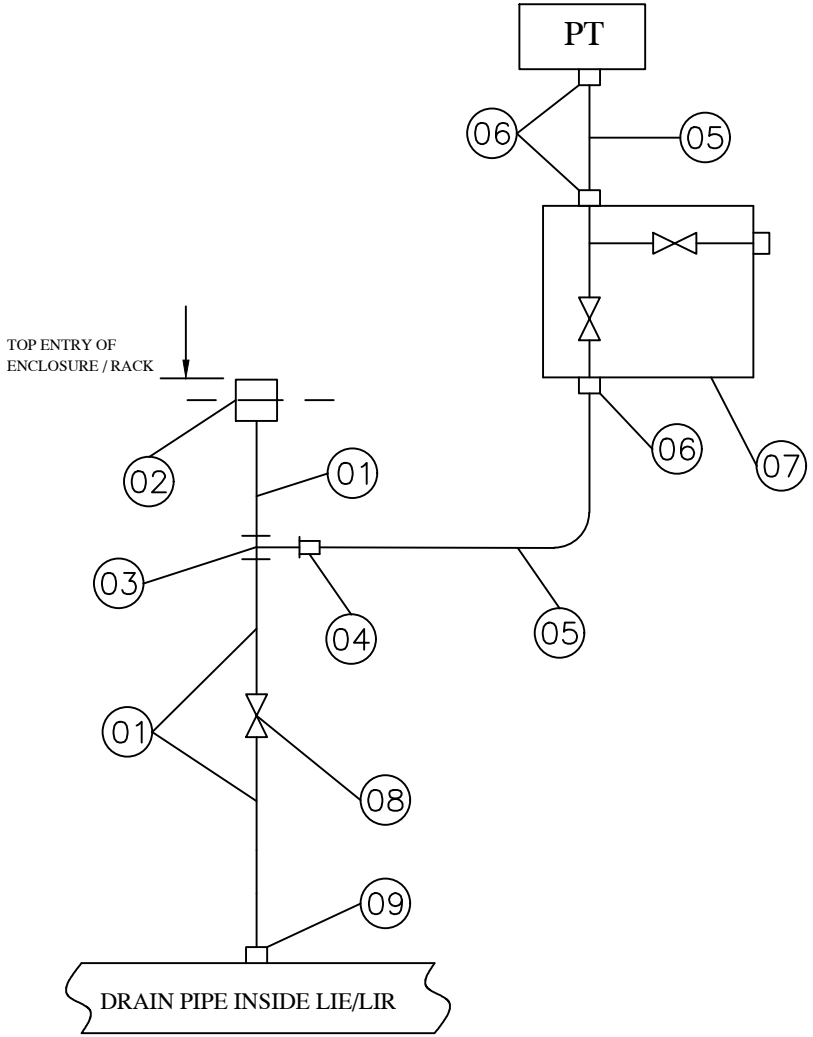

NOTE:

1. " TRANSMITTER BELOW SOURCE"
2. FOR BILL OF MATERIAL REFER PAGE 21 OF 37

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CE/416/NTPC TELA/HUP

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ITEM NO.	ITEM DESCRIPTION	QTY/INST.
01	IMPULSE PIPE MATL : ASTM A213 TP316L SIZE : 1/2" NB-SCH 80	A/R
02	BULK HEAD UNION / COUPLING / AS PER ANSI B16:11 MATL:ASTM A182 F316L SIZE : 1/2" NB-SW CL 3000	01
03	FORGED TEE / AS PER ANSI B16.11 MATL : ASTM A182 F316L SIZE : 1/2" NB-SW / CL 3000	01
04	TEE-TUBE UNION MATL: SS316L SIZE: OD OF 1/2" NBxTO SUIT 1/2" OD SS TUBE	01
05	TUBE / MATL. : A213 TP316L SIZE : 1/2" OD x 2.1 mmTHK.	A/R
06	TUBE FITTING / DFDC MATL. : SS316L SIZE : 1/2" NPTM x TO SUIT 1/2" OD SS TUBE	03
07	TWO VALVE MANIFOLD WITH VENT PLUG MATL: SS316L PORT SIZE : 1/2" NPTF / RATING : 3000PSI	01
08	FORGED GLOBE VALVES BODY : ASTM A182 F316L / STEM MATL: A182 Gr.F6a SIZE : 1/2" NB-SW / CL 800	01
09	HALF COUPLING /AS PER ANSI B16.11 MATL : ASTM A182 F316L SIZE:1/2" NB-SW / CL3000	01

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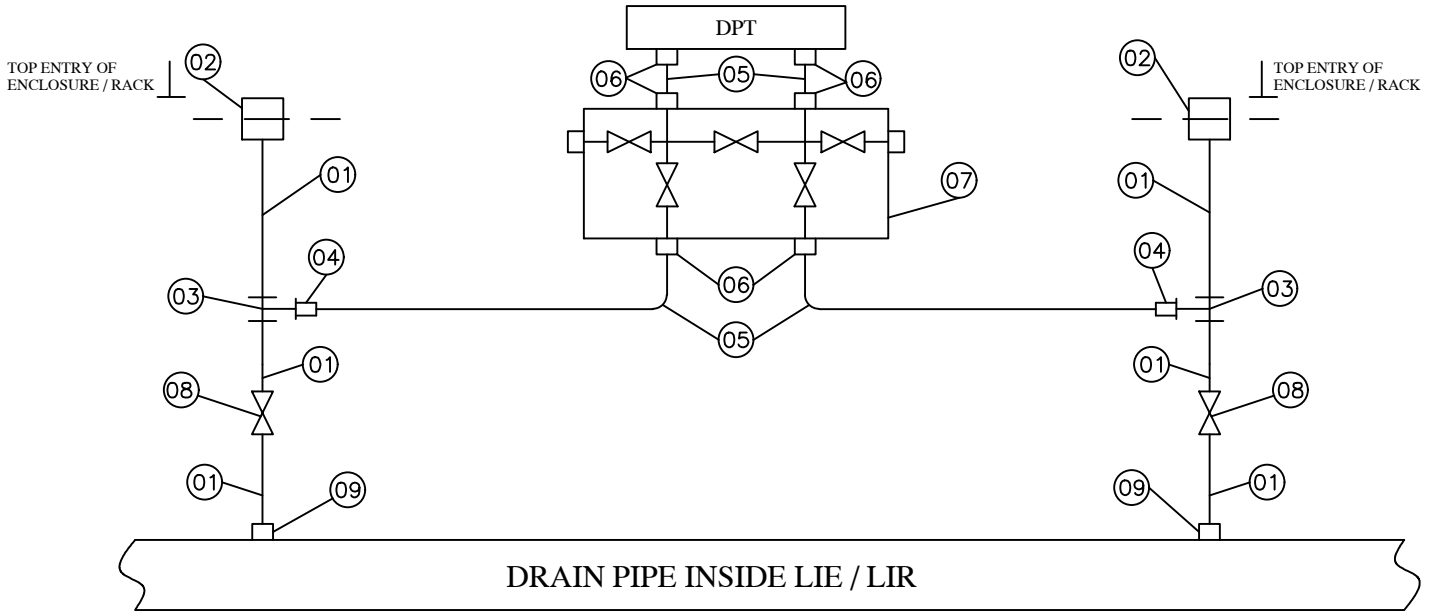
A4 – 11



NOTE:

1. " TRANSMITTER BELOW SOURCE"
2. FOR BILL OF MATERIAL REFER PAGE 23 OF 37

CE/416/NTPC TELA/HUP

REV. NO: 00

ITEM NO.	ITEM DESCRIPTION	QTY/INST.
01	IMPULSE PIPE MATL. ASTM A213 TP316L SIZE : 1/2" NB-SCH 80	A/R
02	BULK HEAD UNION / COUPLING / AS PER ANSI B16.11 MATL. : ASTM A182 F316L / SIZE : 1/2" NB-SW / CL : 3000	02
03	FORGED TEE / AS PER ANSI B16.11 MATL. ASTM A182 F316L SIZE : 1/2" NB-SW / CL : 3000	02
04	TEE TUBE UNION MATL. : SS316L SIZE : OD OF 1/2" NB X TO SUIT 1/2" OD SS TUBE	02
05	TUBE / MATL. : ASTM A 213 TP 316L SIZE : 1/2" OD X 2.1mm THK.	A/R
06	TUBE FITTING / DFDC MATL.. : SS316L SIZE : 1/2" NPTM X TO SUIT 1/2" OD SS TUBE	06
07	FIVE VALVE MANIFOLD WITH VENT PLUGS MATL. : SS316L PORT SIZE : 1/2" NPTF / RATING : 3000PSI	01
08	FORGED GLOBE VALVE BODY : ASTM A182 F316L / STEM MATL: A182 Gr.F6a SIZE : 1/2" NB-SW / CL-800	02
09	HALF COUPLING / AS PER ANSI B16.11 MATL. : ASTM A182 F316L SIZE: 1/2" NB-SW / CL 3000	02

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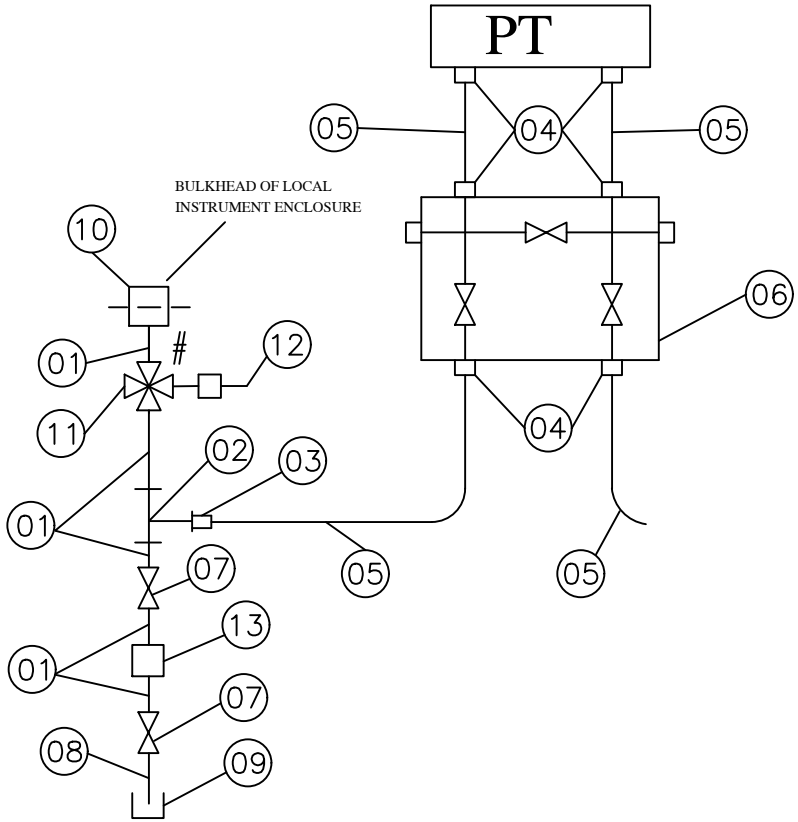
A4 – 11



NOTE:

1. " TRANSMITTER BELOW SOURCE"
2. FOR BILL OF MATERIAL REFER PAGE 25 OF 37

3. FOR INTERMITTANT PURGING REFER PAGE 36 OF 37

CE/416/NTPC TELA/HUP

REV. NO: 00

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REVISION NO	DATE	COPY RIGHT AND CONFIDENTIAL The information on this document is the property of Bharat Heavy Electricals Limited. It must not be used directly or indirectly in anyway detrimental to the interest to the Company.		

ITEM NO.	ITEM DESCRIPTION	QTY/INST.
01	IMPULSE PIPE MATL: ASTM A106 Gr. C SIZE: 3/4" NB-SCH 80	A/R
02	FORGED EQUAL TEE / AS PER ANSI B16.11 MATL: ASTM A105 SIZE: 3/4" NB-SW / RATING: CL 3000	01
03	TUBE UNION MATL: SS316 SIZE: OD OF 3/4" NB - PIPE x TO SUIT 1/2" SS TUBE	01
04	TUBE FITTING / DFDC MATL: SS316 SIZE: 1/2" NPT(M) x TO SUIT 1/2" OD TUBE	06
05	TUBE TUBE MATL: A213 TP 316L SIZE : 1/2" OD x 1.13mm THK.	A/R
06	THREE VALVE MANIFOLD MATL: SS316 PORT SIZE: 1/2" NPT (F) / RATING: 3000PSI	01
07	FORGED GLOBE VALVE BODY MATL: ASTM A105 / STEM MATL: A182 Gr.F6a SIZE: 3/4" NB-SW / CL 800	02
08	NIPPLE / MATL: ASTM A10G Gr.C SIZE: 3/4" NB-SCH 80 CONN: ONE END PLAIN x OTHER END 3/4" NPTM	01
09	CAP MATL: ASTM A105 SIZE: 3/4" NPTF	01
10	BULKHEAD UNION / COUPLING / AS PER ANSI B16.11 MATL: ASTM A105 SIZE: 3/4" NB-SW / RATING: CL 3000	01

ITEM NO.	ITEM DESCRIPTION	QTY/INST.
11	FOUR WAY VALVE BODY MATL: ASTM A105 SIZE: (2 x 3/4" NB-SW) x (2 x 1/2" NPTF) / RATING: CL 800	01
12	QUICK DISCONNECTING FITTING MATL: SS 304 SIZE: 1/2" NPTM	01
13	DRAIN POT: 2" NB-SCH 80 BODY: A106 Gr.C CONN. 3/4" NB-SW	01

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CE/416/NTPC TELA/HUP

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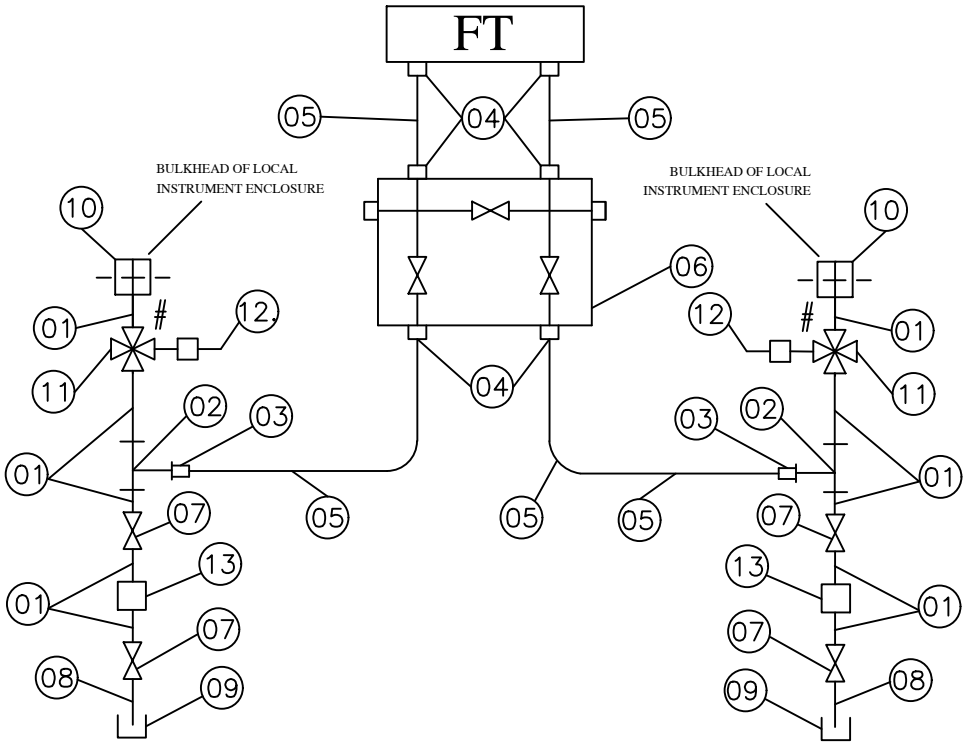
REVISION NO	DATE	COPY RIGHT AND CONFIDENTIAL The information on this document is the property of Bharat Heavy Electricals Limited. It must not be used directly or indirectly in anyway detrimental to the interest to the Company.		

A4 – 11



NOTE:

1. " TRANSMITTER BELOW SOURCE"
2. FOR BILL OF MATERIAL REFER PAGE 27 OF 37

3. FOR INTERMITTANT PURGING REFER PAGE 36 OF 37

CE/416/NTPC TELA/HUP

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REVISION NO	DATE	COPY RIGHT AND CONFIDENTIAL The information on this document is the property of Bharat Heavy Electricals Limited. It must not be used directly or indirectly in anyway detrimental to the interest to the Company.		

ITEM NO.	ITEM DESCRIPTION	QTY/INST.
01	IMPULSE PIPE MATL: ASTM A106 Gr. C SIZE: 3/4" NB-SCH 80	A/R
02	FORGED EQUAL TEE / AS PER ANSI B16.11 MATL: ASTM A105 SIZE: 3/4" NB-SW / RATING: CL 3000	02
03	TUBE UNION MATL: SS316 SIZE: OD OF 3/4" NB - PIPE x TO SUIT 1/2" SS TUBE	02
04	TUBE FITTING / DFDC MATL: SS316 SIZE: 1/2" NPT(M) x TO SUIT 1/2" OD TUBE	06
05	TUBE TUBE MATL: A213 TP 316L SIZE : 1/2" OD x 1.13mm THK.	A/R
06	THREE VALVE MANIFOLD MATL: SS316 PORT SIZE: 1/2" NPT (F) / RATING: 3000PSI	01
07	FORGED GLOBE VALVE BODY MATL: ASTM A105 / STEM MATL: A182 Gr.F6a SIZE: 3/4" NB-SW / CL 800	04
08	NIPPLE / MATL: ASTM A10G Gr.C SIZE: 3/4" NB-SCH 80 CONN: ONE END PLAIN x OTHER END 3/4" NPTM	02
09	CAP MATL: ASTM A105 SIZE: 3/4" NPTF	02
10	BULKHEAD UNION / COUPLING / AS PER ANSI B16.11 MATL: ASTM A105 SIZE: 3/4" NB-SW / RATING: CL 3000	02

ITEM NO.	ITEM DESCRIPTION	QTY/INST.
11	FOUR WAY VALVE BODY MATL: ASTM A105 SIZE: (2 x 3/4" NB-SW) x (2 x 1/2" NPTF) / RATING: CL 800	02
12	QUICK DISCONNECTING FITTING MATL: SS 304 SIZE: 1/2" NPTM	02
13	DRAIN POT: 2" NB-SCH 80 BODY: A106 Gr.C CONN. 3/4" NB-SW	02

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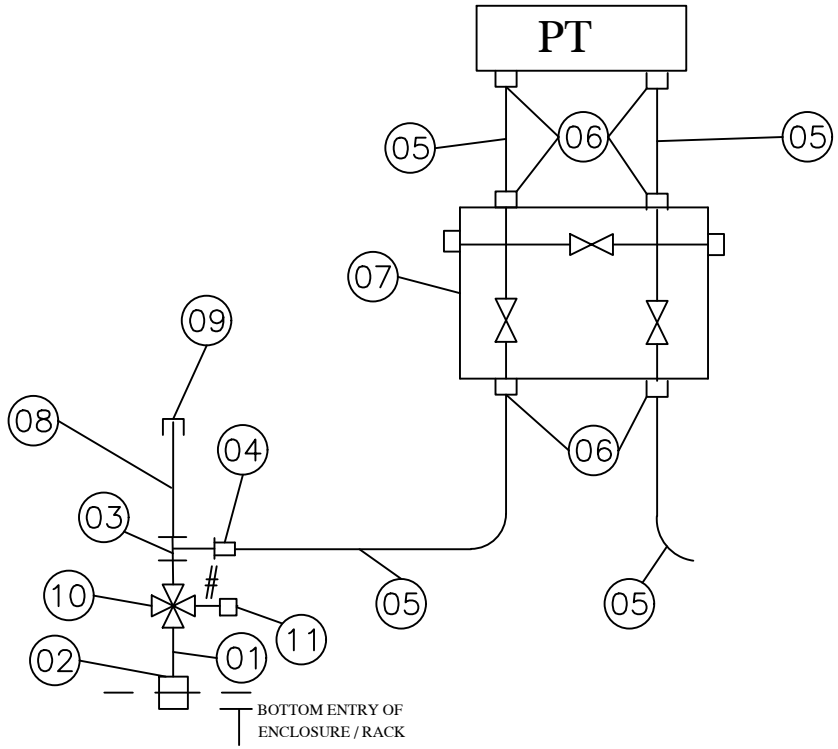
REVISION NO	DATE	COPY RIGHT AND CONFIDENTIAL The information on this document is the property of Bharat Heavy Electricals Limited. It must not be used directly or indirectly in anyway detrimental to the interest to the Company.		

A4 – 11



NOTE:

1. " TRANSMITTER ABOVE SOURCE"
2. FOR BILL OF MATERIAL REFER PAGE 29 OF 37

3. FOR INTERMITTENT PURGING REFER PAGE 36 OF 37

CE/416/NTPC TELA/HUP

REV. NO: 00

REVISION NO	DATE	COPY RIGHT AND CONFIDENTIAL The information on this document is the property of Bharat Heavy Electricals Limited. It must not be used directly or indirectly in anyway detrimental to the interest to the Company.		

ITEM NO.	ITEM DESCRIPTION	QTY/INST.
01	IMPULSE PIPE MATL: A106 GR.C SIZE: 3/4" NB-SCH 80	A/R
02	BULKHEAD UNION / COUPLING / AS PER ANSI B16.11 MATL: ASTM A105 SIZE: 3/4" NB-SW / RATING: CL 3000	01
03	FORGED EQUAL TEE / AS PER ANSI B16.11 MATL: ASTM A105 SIZE: 3/4" NB-SW / RATING: CL 3000	01
04	TEE TUBE UNION MATL: SS316 SIZE: OD OF 3/4" NB - PIPE x TO SUIT 1/2" SS TUBE	01
05	TUBE MATL: ASTM A213 TP 316L SIZE: 1/2" OD x 1.13mm THK.	A/R
06	TUBE FITTING / DFDC MATL: SS316 SIZE : 1/2" NPT (M) x TO SUIT 1/2" OD TUBE,	06
07	THREE VALVE MANIFOLD MATL: SS316 PORT SIZE: 1/2" NPT (F) / RATING: 3000PSI	01
08	NIPPLE / MATL: ASTM A106 Gr.C SIZE: 3/4" NB SCH 80 CONN. ONE END PLAIN x OTHER END 3/4"NPTM	01
09	CAP MATL: ASTM A105 SIZE: 3/4" NPTF	01

ITEM NO.	ITEM DESCRIPTION	QTY/INST.
10	FOUR WAY VALVE BODY MATL: ASTM A105 SIZE: (2 x 3/4" NB-SW) x (2 x 1/2" NPTF) / RATING: CL 800	01
11	QUICK DISCONNECTING FITTING MATL: SS 304 SIZE: 1/2" NPTM	01

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CE/416/NTPC TELA/HUP

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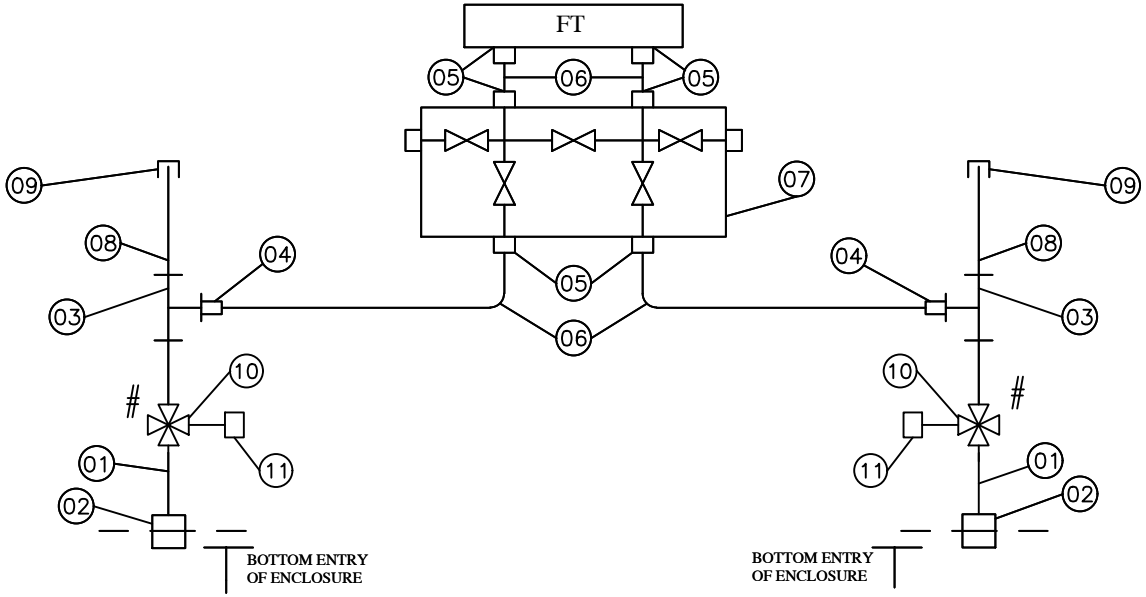

NOTE:

1. " TRANSMITTER ABOVE SOURCE"
2. FOR BILL OF MATERIAL REFER PAGE 31 OF 37

ITEM NO.	ITEM DESCRIPTION	QTY/INST.
01	IMPULSE PIPE MATL: ASTM A106 Gr.C SIZE: 3/4" SCH-80	A/R
02	BULKHEAD UNION / COUPLING / AS PER ANSI B16.11 MATL: ASTM A105 SIZE: 3/4" NB-SW / CL 3000	02
03	FORGED EQUAL TEE / AS PER ANSI B16.11 MATL: ASTM A105 SIZE: 3/4" NB-SW / CL 3000	02
04	TEE-TUBE UNION MATL: SS316 CONN: OD OF 3/4" NB-PIPE X TO SUIT OD OF 1/2" SS TUBE	02
05	TUBE FITTING / DFDC MATL: SS316 CONN: 1/2" NPTM X TO SUIT 1/2" OD SS TUBE	06
06	TUBE MATL: ASTM A213 TP 316L SIZE: 1/2" OD X 1.13mm THK.	A/R
07	FIVE VALVE MANIFOLD WITH VENT PLUG BODY: SS316 PORT SIZE: 1/2" NPTF / RATING: 3000PSI	01
08	NIPPLE MATL: ASTM A106 Gr.C SIZE: ONE END PLAIN X OTHER END 3/4" NPTM	02
09	CAP MATL: ASTM A105 SIZE: 3/4" NPTF	02
10	FOUR WAY VALVE MATL: ASTM A105 SIZE: (2 x 3/4" NB-SW) x (2 x 1/2" NPTF)	02
11	QUICK DISCONNECTING FITTING MATL: SS 304 SIZE: 1/2" NPTM	02

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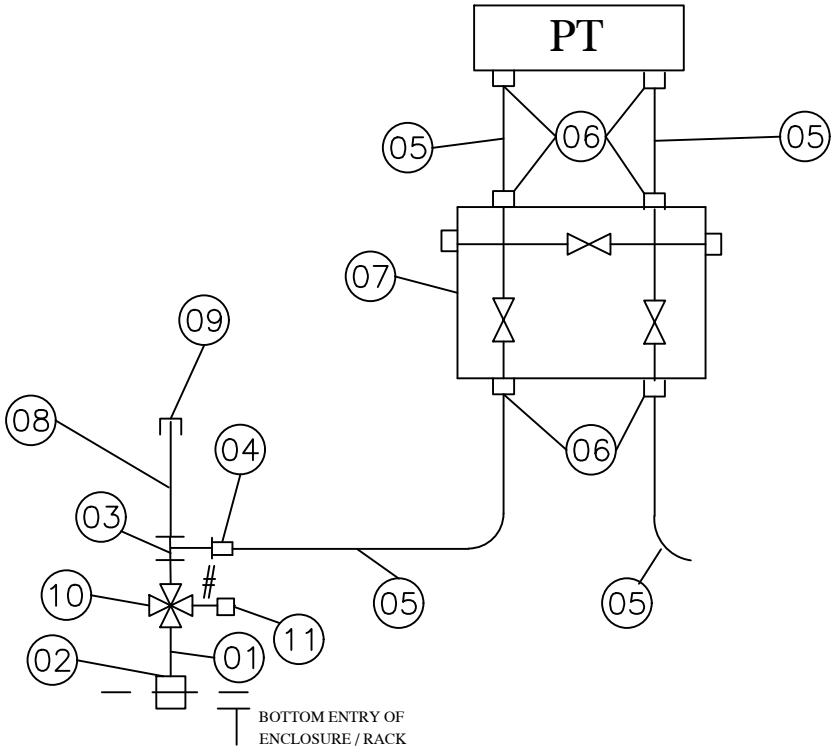
A4 – 11



NOTE:

1. " TRANSMITTER ABOVE SOURCE"
2. FOR BILL OF MATERIAL REFER PAGE 33 OF 37

3. FOR INTERMITTENT PURGING REFER PAGE 36 OF 37

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REV. NO: 00

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REVISION NO	DATE	COPY RIGHT AND CONFIDENTIAL The information on this document is the property of Bharat Heavy Electricals Limited. It must not be used directly or indirectly in anyway detrimental to the interest to the Company.		

ITEM NO.	ITEM DESCRIPTION	QTY/INST.
01	IMPULSE PIPE MATL: A335 P22 SIZE: 3/4" NB-SW SCH-80	A/R
02	BULKHEAD UNION / COUPLING / AS PER ANSI B16.11 MATL: ASTM A182 F22 SIZE: 3/4" NB-SW / RATING: CL 3000	01
03	FORGED EQUAL TEE / AS PER ANSI B16.11 MATL: ASTM A182 F22 SIZE: 3/4" NB-SW / RATING: CL 3000	01
04	TEE TUBE UNION MATL: SS316 SIZE: OD OF 3/4" NB PIPE x TO SUIT 1/2" SS TUBE	01
05	TUBE MATL: ASTM A213 TP 316L SIZE: 1/2" OD x 1.13mm THK.	A/R
06	TUBE FITTING / DFDC MATL: SS316 SIZE: 1/2" NPT (M) x TO SUIT 1/2" OD TUBE,	06
07	THREE VALVE MANIFOLD MATL: SS316 PORT SIZE: 1/2" NPT (F) / RATING: 3000PSI	01
08	NIPPLE / MATL: ASTM A335 P22 SIZE: 3/4" NB-SCH 80 CONN. ONE END PLAIN x OTHER END 3/4" NPTM	01
09	CAP MATL: ASTM A182 F22 SIZE: 3/4" NPTF	01

ITEM NO.	ITEM DESCRIPTION	QTY/INST.
10	FOUR WAY VALVE MATL: ASTM A182 F22 SIZE: (2 x 3/4" NB-SW) x (2 x 1/2" NPTF) / RATING: CL 800	01
11	QUICK DISCONNECTING FITTING MATL: SS 304 SIZE: 1/2" NPTM	01

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PAGE: 33 OF 37

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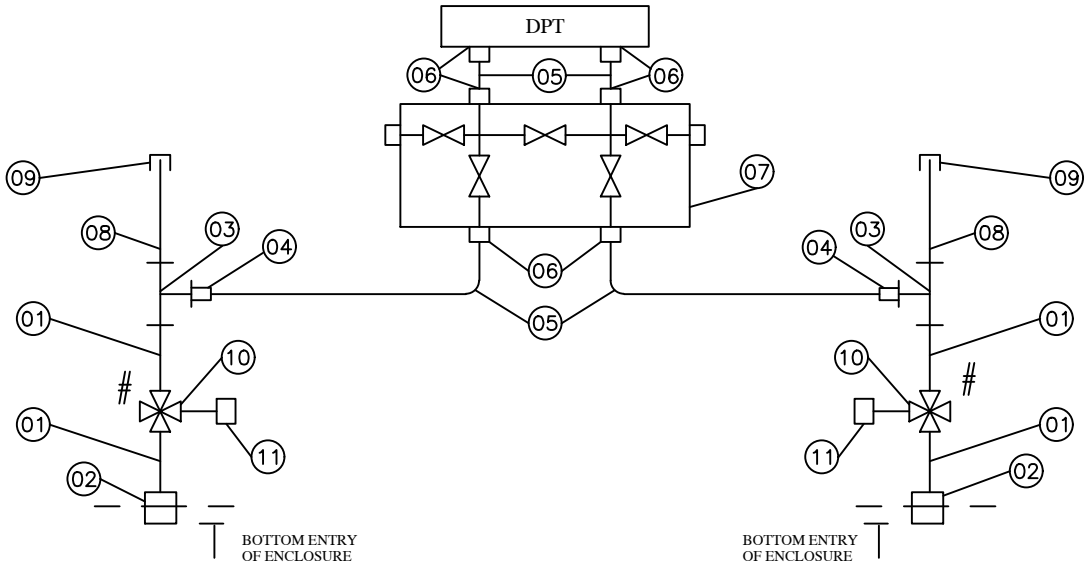

NOTE:

1. " TRANSMITTER ABOVE SOURCE"
2. FOR BILL OF MATERIAL REFER PAGE 35 OF 37

3. FOR INTERMITTANT RANGING REFER PAGE 36 OF 37

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CE/416/NTPC TELA/HUP

REV. NO: 00

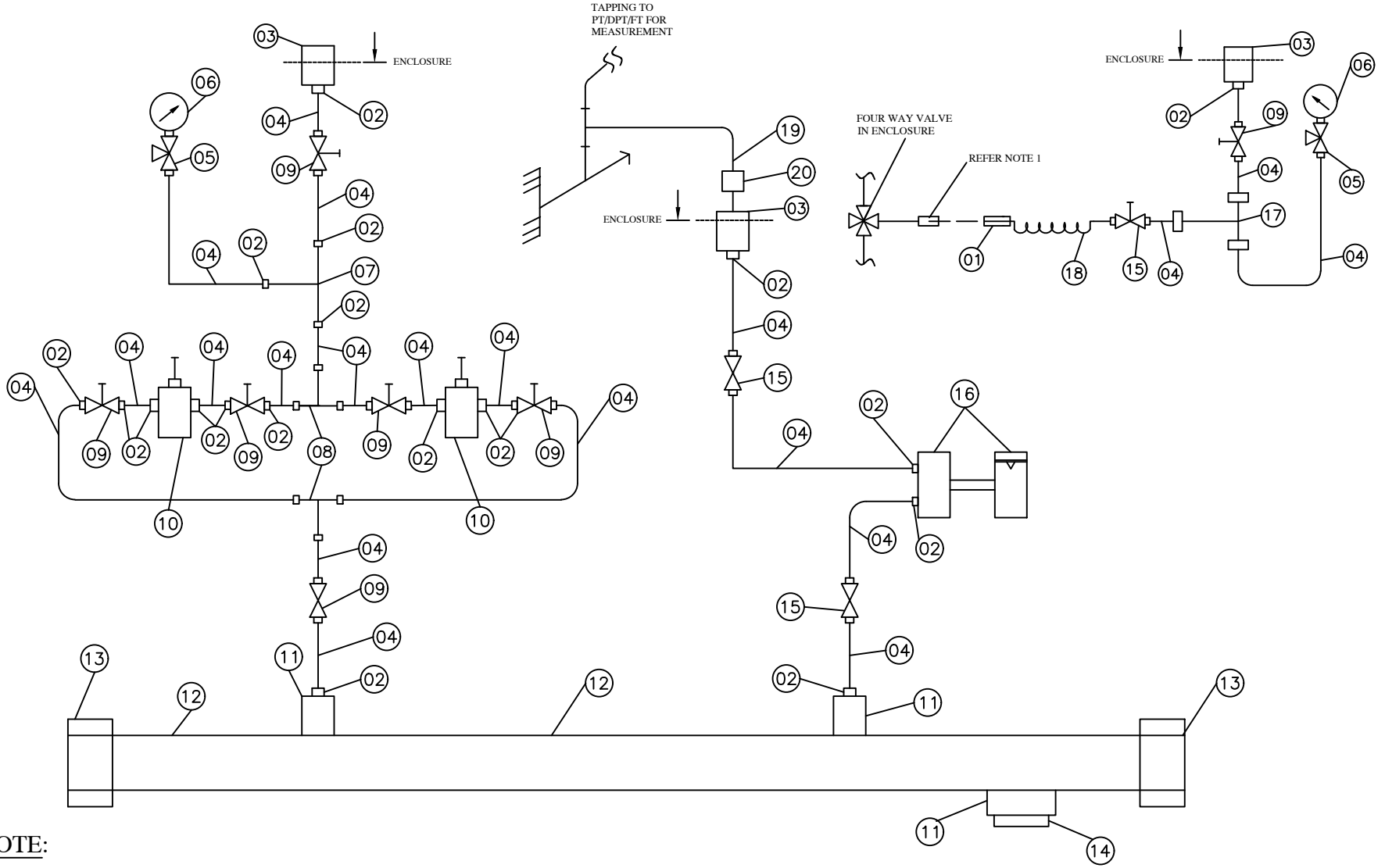
PAGE: 34 OF 37

ITEM NO.	ITEM DESCRIPTION	QTY/INST.
01	IMPULSE PIPE MATL: ASTM A335 P22 SIZE: 3/4" SCH-80	A/R
02	BULKHEAD UNION / COUPLING / AS PER ANSI B16.11 MATL: ASTM A182 F22 SIZE: 3/4" SW / CL 3000	02
03	FORGED EQUAL TEE / AS PER ANSI B16.11 MATL: ASTM A182 F22 SIZE: 3/4" NB-SW / CL 3000	02
04	TEE TUBE UNION MATL: SS316 CONN: OD OF 3/4" NB PIPE x TO SUIT TO 1/2" OD SS TUBE	02
05	TUBE MATL: A213 TP 316L SIZE: 1/2" OD x 1.13mm THK.	A/R
06	TUBE FITTING / DFDC MATL: SS316 CONN: 1/2" NPTM x TO SUIT 1/2" OD SS TUBE	06
07	FIVE VALVE MANIFOLD WITH VENT PLUGS MATL: SS316 SIZE: 1/2" NPTF / RATING: 3000PSI	01
08	NIPPLE MATL : A335 P22 SIZE: ONE END PLAIN x OTHER END 3/4" NPTM	02
09	CAP MATL: A182 F22 SIZE: 3/4" NPTF	02
10	FOUR WAY VALVE MATL: A182 F22 SIZE: (2 x 3/4" NB-SW) x (2 x 1/2" NPTF) / RATING: CL 800	02
11	QUICK DISCONNECTING FITTING MATL: SS 304 SIZE: 1/2" NPTM	02

REVISION NO | DATE

REVISION NO	DATE	COPY RIGHT AND CONFIDENTIAL		
		The information on this document is the property of Bharat Heavy Electricals Limited. It must not be used directly or indirectly in anyway detrimental to the interest to the Company.		

TYPICAL PURGE AIR SCHEME



NOTE:

1. THIS QUICK DISCONNECT FITTING IS CONNECTED TO FOUR WAY VALVE IN SERVICES WHERE MEDIUM IS FLUE GAS/DIRTY AIR
2. FOR BILL OF MATERIAL REFER PAGE 37 OF 37
3. THE PURGE AIR SCHEME IS COMING INSIDE LOCAL INST. ENCLOSURE (LIE) IN BHEL-EDN'S SCOPE OF SUPPLY

CE/416/NTPC TELA/HUP

REV. NO: 00

REVISION NO	DATE	COPY RIGHT AND CONFIDENTIAL The information on this document is the property of Bharat Heavy Electricals Limited. It must not be used directly or indirectly in anyway detrimental to the interest to the Company.		

ITEM NO.	ITEM DESCRIPTION	QTY/INST.
01	QUICK DISCONNECTING FITTING-SS304/MALE SIZE : END CONN. TO SUIT 1/2" OD SS-TUBE	01
02	TUBE CONNECTOR SIZE : 1/2" NPTM x TO SUIT 1/2" OD SS TUBE MATL. ASTM Gr. SS316	03
03	BULK HEAD UNION / MATL : SS316 SIZE : 1/2" NPT (F) x 1/2" NPTF	A/R
04	TUBE MATL: ASTM A213 TP316L SIZE: 1/2" OD - 1.13mm THK.	A/R
05	THREE WAY GUAGE COCK MATL: SS316 SIZE: 1/2" NPTF x TO SUIT 1/2" OD SS TUBE	02
06	PRESSURE GUAGE / DIAL SIZE : 4" RANGE : 0-10 KG/Sq. CM BOTTOM CONN: 1/2" NPTM	02
07	EQUAL TEE FITTING / SS316 END CONN: 1/2" NPTF x (2 x TO SUIT 1/2" OD SS TUBE)	01
08	EQUAL TEE FITTING / FLARELESS FITTING SIZE : TO SUIT 1/2" OD SS TUBE	02
09	ISOLATING VALVE/GATE TYPE PROCESS CONN : 1/2" OD SS TUBE MTL : ASTM A182 F316	04
10	AIR FILTER REGULATOR PROCESS CONN : 1/2" NPTF	02

ITEM NO.	ITEM DESCRIPTION	QTY/INST.
11	SS COUPLET SIZE : 1/2" NPTF MATL : SS316	01
12	AIR HEADER SIZE : 1" NB-SCH 40 / MATL: SS316	01
13	SS END CAP SIZE : 1" BSPF / MATL : SS316	02
14	PLUG SIZE : 1/2" NPTM MAT : SS316	01
15	NEEDLE VALVE/MATL : SS316 SIZE : END CONN. TO SUIT 1/2" OD SS TUBE	02
16	PURGE ROTAMETER PROCESS CONN : 1/2" NPTF	01
17	EQUAL TEE FITTING / MATL : A182 Gr F316 END CONN. - TO SUIT 1/2" OD SS TUBE	01
18	NYLON FLEXIBLE HOSE BRAIDED WITH SS WIRE SIZE = 1/2 " DIA.	1 MTR
19	G.I. PIPE / AS PER IS 1239 SIZE : 1/2" NB - HEAVY GRADE	A/R
20	GI COUPLING MATL: ASTM A105 SIZE : 1/2" NPTF / RATING CL: 3000	A/R

BHEL

CE/416/NTPC TELA/HUP

REV. NO: 00

PAGE: 37 OF 37

PROJECT : NTPC TELANGANA SG ISLAND PACKAGE 2 X 800MW STPP

CUSTOMER : M/s NTPC

SCHEMATIC DRAWINGS
FOR
LOCAL INSTRUMENT ENCLOSURE / RACKS
(LIE / LIR)

REVISIONS :

APPROVED BY

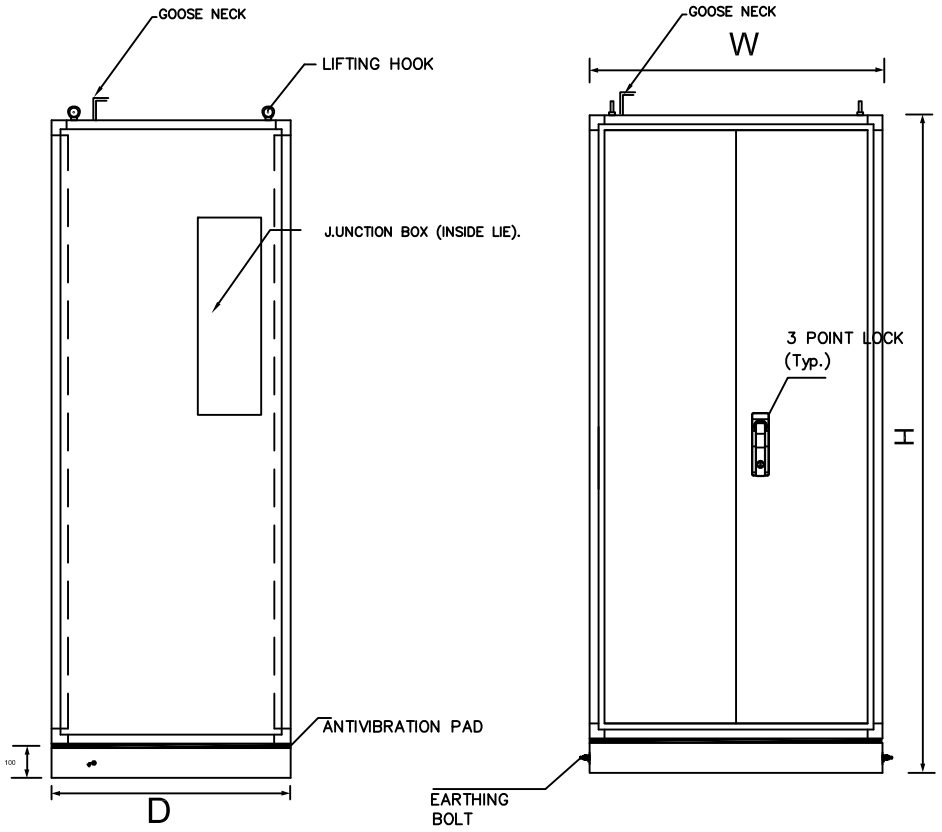
ASHISH MANJHI

PREPARED BY	ISSUED	DATE
RAJESH LINGUTLA	416	06/01/18

FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

DRG. No. CE/416/LIE/LIR/OGA2



NOTES:–

1. ALL SHEETs SHOULD BE MADE WITH CRCA SHEET
2. ALL DOORS WILL BE FLUSH / CONCEALED TYPE
3. BULK HEAD PLATE FOR TOP & BOTTOM SHALL BE PROVIDED
4. CABLE GLAND PLATE OF THICKNESS 3.0 mm. CRCA SHEET SHALL BE PROVIDED AT BOTTOM OF J.B
5. ENCLOSURE SHALL BE OF IP–55 PROTECTION CLASS
6. TERMINAL SHALL BE PROVIDED IN SIDE THE J.B. AS PER TRANSMITTER GROUPING
7. DOORS SHALL BE THREE POINT LOCKING FOR FRONT AND REAR DOOR
8. GASKET SHALL BE PROVIDED BETWEEN BULK HEAD PLATE & ENCLOSURE
9. EARTH BUS BAR 25x6mm COPPER SHALL BE USED
10. MIN JB DIMENSION 800 MM X 200 MM X 200 MM.
11. BASE FRAME SHALL BE MADE OF ISMC 100
12. 1 No CFL 11W,230V AC WITH FIXTURE SHALL BE PROVIDED
13. DRAIN PIPE SLOPE WILL BE I : 50 APPROX.
14. POWER SOCKET SHALL BE PROVIDED IN J.B. OF ENCLOSURE

LIE TYPE	H	W	D
A	2200	1400	800
B	2200	1000	800
C	2200	700	800

REF. DRG. No. FLREF

SIGN. & DATE

INVENTORY No.

PROD / PROJ : –

CUSTOMER: –

REV.	DATE	ALTERED – / CHECKED – / APPROVED –
–	–	

REV.	DATE	ALTERED – / CHECKED – / APPROVED –
–	–	

	NAME	SIGN	DATE
DRAWN	RKL		07.04.2015
CHECKED	AM		07.04.2015
APPROVED	AM		07.04.2015

DEPT. BOP | CODE 415

BHARAT HEAVY ELECTRICALS LIMITED.
ELECTRONICS DIVISION, BANGALORE

TITLE: OGA–FOR–LIE

No. OF SHEETS: 04

SHEET No.: 02

WBS. No. –

DRG. No. CE/416/LIE/LIR/OGA2

REV 00

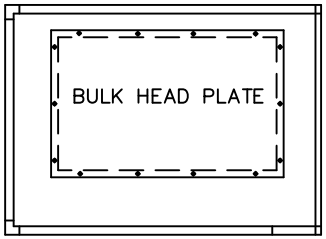
FORM No. A3–03

A3 SIZE

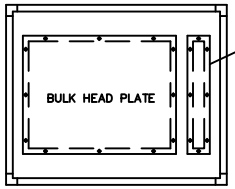
FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

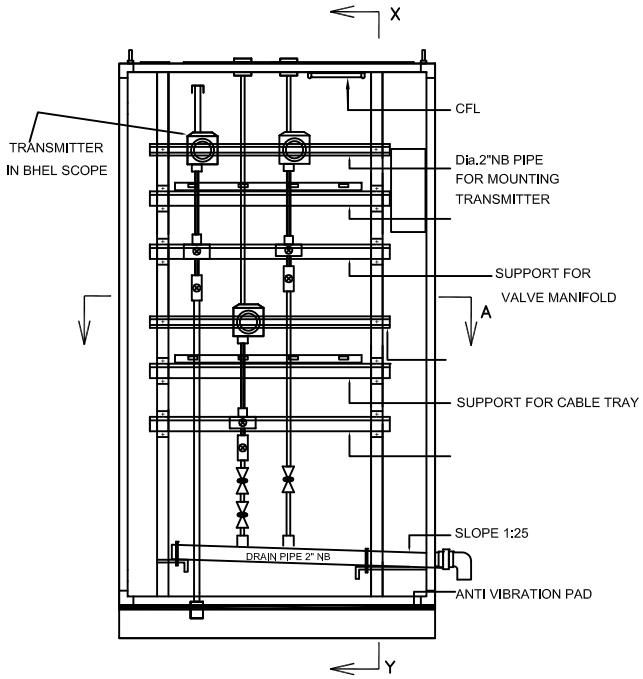
DRG. No. CE/416/LIE/LIR/OGA2



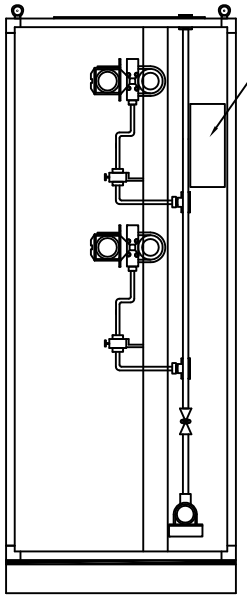
TOP VIEW



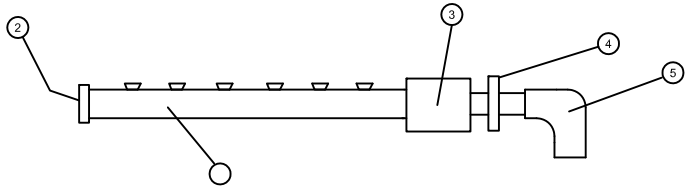
BOTTOM VIEW



FRONT VIEW



SIDE VIEW FROM X–Y



DRAIN PIPE

ITEM	DESCRIPTION	QTY.
1	2" NB ASTM A-106' SCH80/GR-C	A/R
2	2" S.W.CAP,CS ASTM A105	1No.
3	2" NBSW X 1" NPT(F) COUPLING CS ASTM A105	1No.
4	1" NPT (M) X1" BSP(M) HEX. COUPLING, CS ASTM105	1No.
5	1" BSP (F) ELBOW, CS ASTM A105	1No.

PROD / PROJ : –

CUSTOMER: –

REV.	DATE	ALTERED – / CHECKED – / APPROVED –	REV.	DATE	ALTERED – / CHECKED – / APPROVED –
–	–		–	–	

	NAME	SIGN	DATE
DRAWN	RKL		07.04.2015
CHECKED	AM		07.04.2015
APPROVED	AM		07.04.2015

DEPT. BOP | CODE 415

BHARAT HEAVY ELECTRICALS LIMITED.
ELECTRONICS DIVISION, BANGALORE

TITLE: OGA–FOR–LIE

No. OF SHEETS: 04

SHEET No.: 03

WBS. No. –

DRG. No. CE/416/LIE/LIR/OGA2

REV 00

REF. DRG. No. FLREF

SIGN. & DATE

INVENTORY No.

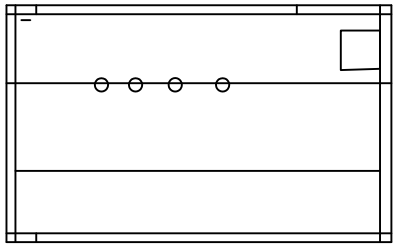
FORM No. A3–03

A3 SIZE

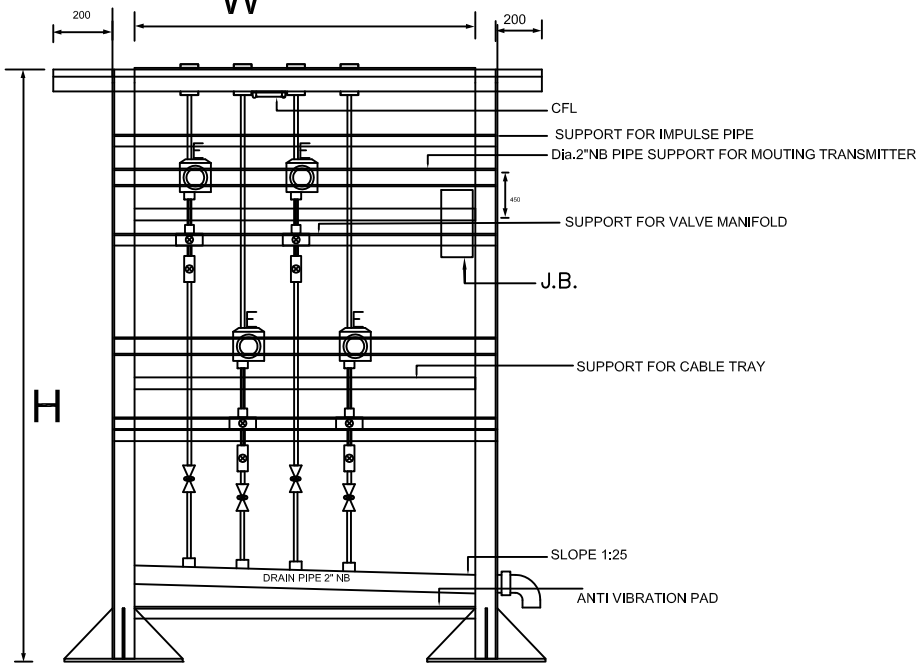
FIRST ANGLE PROJECTION

(ALL DIMENSIONS ARE IN mm)

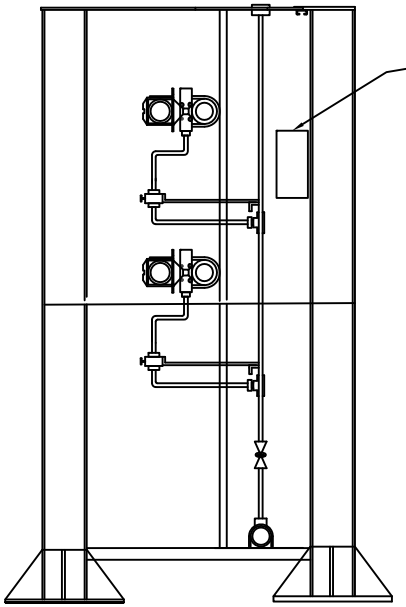
DRG. No. CE/416/LIE/LIR/OGA2



TOP VIEW



FRONT VIEW



SIDE VIEW

NOTES:

1. JB TO BE LOCATED INSIDE THE LIR. JB DOOR SHALL OPEN FORM OUTSIDE.
2. LIR's ARE WITH 4 LEGS.
3. MIN JB DIMENSION 800 MM X 200 MM X 200 MM.
4. SUPPORTING LEG SHALL BE MADE OF 6 MM THK ANGLE.
5. BULK HEAD PLATE SHALL BE PROVIDED AT THE TOP
6. TERMINAL SHALL BE PROVIDED IN SIDE THE J.B. AS PER TRANSMITTER GROUPING
7. GASKET SHALL BE PROVIDED BETWEEN BULK HEAD PLATE & RACK
8. EARTH BUS BAR 25x6mm COPPER SHALL BE USED
9. 1 No CFL 11W,230V AC WITH FIXTURE SHALL BE PROVIDED
10. POWER SOCKET SHALL BE PROVIDED IN J.B. OF RACK
11. CANPAY ASSEMBLY WITH 3MM THICK CRCA SHEET

LIR TYPE	H	W	D
A	2200	1650	800
B	2200	1330	800
C	2200	1010	800

REF. DRG. No. FLREF

SIGN. & DATE

INVENTORY No.

PROD / PROJ : –

CUSTOMER: –

REV.	DATE	ALTERED – / CHECKED – / APPROVED –	REV.	DATE	ALTERED – / CHECKED – / APPROVED –
–	–		–	–	

	NAME	SIGN	DATE
DRAWN	RKL		07.04.2015
CHECKED	AM		07.04.2015
APPROVED	AM		07.04.2015

DEPT. BOP | CODE 415

BHARAT HEAVY ELECTRICALS LIMITED.
ELECTRONICS DIVISION, BANGALORE

TITLE: OGA–FOR–LIR

No. OF SHEETS 04

SHEET No. 04

WBS. No. –

DRG. No. CE/416/LIE/LIR/OGA2

REV 00

FORM No. A3–03

A3 SIZE

PROJECT : NTPC TELANGANA SG ISLAND PACKAGE 2 X 800MW STPP

CUSTOMER : M/s NTPC

COMPONENT VENDOR LIST

REVISIONS :

APPROVED BY

ASHISH MANJHI

PREPARED BY	ISSUED	DATE
RAJESH LINGUTLA	416	06/01/18

VENDOR LIST

Sl No	Item Description	Approved Vendors
1	Socket Weld Fittings	PRECISION ENGG INDUSTRIES, MUMBAI
		V.K.INDUSTRIES,BANGALORE
		VIKAS INDUSTRIAL PRODUCTS,NOIDA
		EXCEL HYDRO-PNEUMATICS PVT LTD,MUMBAI
		METPRESS ENGINEERING WORKS,KOLKATA
		BALDOTA VALVE AND FITTINGS PVT LTD,MUMBAI
		PMT ENGINEERS,AHMEDABAD
		FLOWTECH,KOLKATA.
		PANAM ENGINEERS LTD,MUMBAI
		AURA INC,NEW DELHI
		PAUL INDUSTRIES,HOWRAH
		ARCELLOR CONTROLS ,AHMEDABAD
		HP VALVES & FITTINGS (INDIA) PVT. LTD,CHENNAI
		NAV DURGA FORGING AND FITTINGS PVT LTD,THANE,MAHARASTRA.
		PRIME ENGINEERS,MUMBAI
		ARYA CRAFTS & ENGINEERING PVT. LTD,MUMBAI
2	Compression Fitting	EXCEL HYDRO-PNEUMATICS PVT LTD, MUMBAI (Ferrules are to be hardened at Exim Holland for pressure 9000 class and above).
		ASTEC VALVES & FITTINGS PVT LTD,MUMBAI
		PARKER,USA
		HP VALVES AND FITTINGS, CHENNAI (Ferrules are to be hardened at Exim Holland for pressure 9000 class and above).
		PANAM,MUMBAI
		FLUID CONTROLS ,PUNE
		PRECISION ENGG INDUSTRIES, MUMBAI
		SWAGELOCK, USA
3	Instrument Valves	BALDOTA VALVE AND FITTING CO PVT LT, MUMBAI
		BHARAT HEAVY ELECTRICALS LTD, TRICHY
		SWAGELOCK, USA
		PARKER, USA
		HP VALVES AND FITTINGS CHENNAI
		METPRESS ENGINEERING WORKS,KOLKATA
		EXCEL HYDRO,MUMBAI
		FLUID CONTROLS ,PUNE
		INSTRUMENTATION LIMITED, PALGHAT
4	Valve Manifolds	ASTEC VALVES & FITTINGS PVT LTD,THANE
		HP VALVES AND FITTINGS CHENNAI
		BALDOTA VALVE AND FITTING CO PVT LT, MUMBAI
		SCHNEIDER , GERMANY
		EXCEL HYDRO-PNEUMATICS PVT LTD, MUMBAI
		SWAGELOCK, USA
		MICROPRECISSION,FARIDABAD
		PARKER HANNIFIN, USA
		METPRESS ENGINEERING WORKS,KOLKATA
		PARKER,USA
		ANDERSON GREEN WOOD ,USA
		FLUID CONTROLS ,PUNE

VENDOR LIST

Sl No	Item Description	Approved Vendors
5	Air Filter Regulator	PLACKA INSTRUMENTS INDIA PVT LTD CHENNAI
		FAIRCHILD,USA
		SMC PNEUMATICS,NOIDA
		EMERSON(ASCO),CHENNAI
		FESTO,BANGALORE
		SHAVO NORGREN(INDIA)PVT LTD MUMBAI
6	Impulse Pipes / Seamless Tube	BHARAT HEAVY ELECTRICALS LTD, TRICHY
		INDIAN SEAMLESS METAL TUBES LTD, INDIA (only for CS pipes approved)
		SANDVIK (Approved for SS Pipes and tubes only)
		RATNAMANI SEAMLESS TUBES LTD (Approved for SS Pipes and tubes only)
		MAHARASHTRA SEAMLESS LTD, MAHARASHTRA (only for CS pipes approved)
		HEAVY METALS (Approved for CS and SS Pipes and Tubes)
		VELURIC & MANNESMANN AG, GERMANY
		SUMITOMO CORPORATION, JAPAN / KAWASAKI / NIPPON
		TPS TECHNITUBE ROHREN WERKE GMBH, GERMANY
7	Instrumentation Cable	PARAMOUNT COMMUNICATIONS LTD.,KHUSKHERA
		POLYCAB WIRES, DAMAN
		DELTON CABLES, FARIDABAD
		KEI INDUSTRIES, BHIWADI
		ELKAY TELELINKS LTD FARIDABAD
		CORDS CABLE, KAHARANI
		CORDS CABLE, CHOPANKI
		NICCO ,KOLKATA
		TEW & C, USA
		HABIA CABLES,SWEEDAN
		KERPEN CABLES,GERMANY
		LAPP CABLES,GERMANY
		THERMO ELETRA BV,NETHERLAND
		UNIVERSAL CABLE,SATNA
		THERMO CABLES LTD., HYDERABAD
		GUPTA POWER INFRASTRUCTURE LTD. KHURDHA

PROJECT : NTPC TELANGANA SG ISLAND PACKAGE 2 X 800MW STPP

CUSTOMER : M/s NTPC

TYPICAL QUALITY CHECK LIST

REVISIONS :	APPROVED BY ASHISH MANJHI		
	PREPARED BY	ISSUED	DATE
	RAJESH LINGUTLA	416	06/01/18

	MANUFACTURER'S NAME & ADDRESS	MANUFACTURING QUALITY PLAN		
		ITEM : LOCAL INSTRUMENT ENCLOSURE & LOCAL INSTRUMENT RACK	QP Ref NO.: CE/416/LIE-LIR/QP REV. : 00 DT. :06.01.2018 PAGE : 02 OF 06	

S. NO.	COMPONENTS & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY D*	AGENCY **10 M	C	E	REMARKS
1	2	3	4	5	6	7	8	9	D*	**10 M	C	E	11
(A)	***MATERIAL***												
1	CRCA SHEET	A) MATERIAL	MAJOR	CHEMICAL COMPOSITION	SAMPLE	IS-513 APP.DRG	IS-513	M.T.C./Q.A.REP.		V	V	V	
		B) THICKNESS	MAJOR	MEASUREMENT	100%	APP.DRG	APP.DRG	M.T.C./Q.A.REP.		P	V	V	
		C) HARDNESS	MAJOR	STRENGTH	SAMPLE	IS-513	IS-513	M.T.C./Q.A.REP.		V	V	V	
		D) SURFACE FINISH	MAJOR	VISUAL	100%	IS-513	IS-513	M.T.C./Q.A.REP.		P	V	V	
2	MS C- CHANNELS / MS ANGLE	A) DIMENSION	MAJOR	VISUAL	100%	APP.DRG/ F.S.	APP.DRG/ F.S.	M.T.C./Q.A.REP.		P	V	V	
		B) SURFACE DEFECTS	MAJOR	VISUAL	100%	APP.DRG/ F.S.	APP.DRG/ F.S.	M.T.C./Q.A.REP.		V	V	V	
		C) STRAIGHTNESS	MAJOR	MESUERMENT	100%	APP.DRG/ F.S.	APP.DRG/ F.S.	M.T.C./Q.A.REP.		V	V	V	
3	GASKET	A) DIMENSION	MAJOR	MEASUREMENT	SAMPLE	APP.DRG/ F.S.	APP.DRG/ F.S.	M.T.C./Q.A.REP.		P	V	V	
		B) HARDNESS/SHORE HARDNESS	MAJOR	MEASUREMENT	SAMPLE	APP.DRG/ F.S.	APP.DRG/ F.S.	M.T.C.		V	V	V	
4	TERMINALS	A) TYPE, SIZE & MAKE	MAJOR	VISUAL	100%	APP.DRG	APP.DRG	M.T.C./Q.A.REP.		P	V	V	

		LEGEND :	FOR END USER :	DOC. NO.
		* RECORDS, INDENTIFIED WITH `TICK' SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION.		
		** M : MANUFACTURER/ SUBCONTRACTOR		
MANUFACTURER /SUBCONTRACTOR	CONTRACTOR	C: CONTRACTOR/ NOMINATED INSPECTION AGENCY E : END USER		
		INDICATE `P' PERFORM, `W' WITNESS AND `V' VERIFICATION		
SIGNATURE		AS APPROPRIATE "CHP" END USER SHALL IDENTIFIED IN COLUMN `E'	REVIEWED BY	NAME & SIGN OFAPPROVING AUTHORITY WITH SEAL

	MANUFACTURER'S NAME & ADDRESS	MANUFACTURING QUALITY PLAN		
		ITEM : LOCAL INSTRUMENT ENCLOSURE & LOCAL INSTRUMENT RACK	QP Ref NO.: CE/416/LIE-LIR/QP REV. : 00 DT. : 06.01.2018 PAGE : 03 OF 06	

S. NO.	COMPONENTS & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	RECORD		M	C	E	REMARKS
1	2	3	4	5	6	7	8	9	D*		**10		11
5	PVC WIRE/ CABLE	A) TYPE, SIZE, MAKE	MAJOR	MEASUREMENT	SAMPLE	IS 694/APPD. APP.DRG	IS 694/APPD. APP.DRG	M.T.C./Q.A.REP.		P	V	V	
6	PAINT	A) SHADE	MAJOR	VISUAL	SAMPLE	APP. DRG	APP. DRG	M.T.C./Q.A.REP.		P	V	V	
		B) FINISH	MAJOR	VISUAL	SAMPLE	APP. DRG	APP. DRG	M.T.C./Q.A.REP.		P	V	V	
7	FLEXIBLE CONDUIT / M.S. CABLE TRAY	A) TYPE, SIZE & MAKE	MAJOR	VISUAL	SAMPLE	APP.DRG	APP.DRG	M.T.C./Q.A.REP.		P	V	V	
(B)	***COMPONENTS **												* TYPE / MODEL /RANGE OF COMPONENTS AS PER BOM
1	VALVES, MANIFOLDS	MECHANICAL	MAJOR	A)CHEM. TEST	SAMPLE	SUPPLIER CAT./ APP.DRG	SUPPLIER CAT./ APP.DRG	M.T.C./Q.A.REP.		V	V	V	OF LIE/ LIR .
				B)FUNCTIONAL	100%	-DO-	-DO-	M.T.C./Q.A.REP.		P	V	V	
				C) DIMENSION	100%/SAM.	-DO-	-DO-	M.T.C./Q.A.REP.		P	V	V	
				D)HYDROSTA-TIC	10%	-DO-	-DO-	M.T.C./Q.A.REP.		V	V	V	
2	FITTINGS	MECHANICAL	MAJOR	A)CHEM. TEST	SAMPLE	-DO-	-DO-	M.T.C./Q.A.REP.		V	V	V	
				B) DIMENSION	100%/SAM.	-DO-	-DO-	M.T.C./Q.A.REP.		P	V	V	
				C)HYDROSTA-TIC	10%	-DO-	-DO-	M.T.C./Q.A.REP.		V	V	V	
3.a	PIPES	MECHANICAL	MAJOR	A)CHEM. & PHY. TEST	SAMPLE	-DO-	-DO-	M.T.C./Q.A.REP. M.T.C./Q.A.REP.		V	V	V	
				B) DIMENSION	100%/ SAM.	-DO-	-DO-	M.T.C./Q.A.REP.		P	V	V	

		LEGEND : * RECORDS, INDENTIFIED WITH `TICK' SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION. ** M : MANUFACTURER/ SUBCONTRACTOR C: CONTRACTOR/ NOMINATED INSPECTION AGENCY E : END USER INDICATE `P' PERFORM, `W' WITNESS AND `V' VERIFICATION AS APPROPRIATE "CHP" END USER SHALL IDENTIFIED IN COLUMN `E'
MANUFACTURER /SUBCONTRACTOR	CONTRACTOR	
SIGNATURE		

FOR END USER :	DOC. NO.
REVIEWED BY	NAME & SIGN OFAPPROVING AUTHORITY WITH SEAL

	MANUFACTURER'S NAME & ADDRESS	MANUFACTURING QUALITY PLAN												
		ITEM : LOCAL INSTRUMENT ENCLOSURE & LOCAL INSTRUMENT RACK				QP Ref NO.: CE/416/LIE-LIR/QP REV. : 00 DT. : 06.01.2018 PAGE : 04 OF 06								
S. NO.	COMPONENTS & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	RECORD		M	C	E	REMARKS	
1	2	3	4	5	6	7	8	9	D*	**10			11	
3.b	TUBES	MECHANICAL	MAJOR	A)CHEM. & PHY. TEST	SAMPLE	SUPPLIER CAT./ APP.DRG	SUPPLIER CAT./ APP.DRG	M.T.C./Q.A.REP.		V	V	V		
				B) DIMENSION	100%	-DO-	-DO-	M.T.C./Q.A.REP.		P	V	V		
				C) HYDROSTA-TIC	10%	-DO-	-DO-	M.T.C./Q.A.REP.		P	V	V		
(C)	**INPROCESS**													
1	FABRICATED/CUBICLE AND COMPONENTS	A) DIMENSION	CRITICAL	MEASUREMENT	100%	APP.DRG	APP.DRG	Q.A. REPORT		P	V	V		
		B) LIFTING FACILITY	CRITICAL	VISUAL	100%	APP.DRG	APP.DRG	Q.A. REPORT		P	V	V		
		C) CABLE ENTRY	CRITICAL	VISUAL	100%	APP.DRG	APP. APP.DRG	Q.A. REPORT		P	V	V		
		D) STRAIGHTNESS / WAVINESS	CRITICAL	VISUAL	100%					P	V	V		
		E) GASKET ARGMNT.	CRITICAL	VISUAL	100%	APP.DRG	APP.DRG	Q.A. REPORT		P	V	V		
		F) DEBURRING	CRITICAL	VISUAL	100%	APP.DRG	APP.DRG	Q.A. REPORT		P	V	V		
		G) WELDING	CRITICAL	VISUAL	100%	APP.DRG	APP.DRG	Q.A. REPORT		P	V	V		
		H) REMOVAL OF WELDING SLAGS	CRITICAL	VISUAL	100%	APP.DRG	APP.DRG	Q.A. REPORT		P	V	V		

		LEGEND :	FOR END USER :	DOC. NO.
		* RECORDS, INDENTIFIED WITH `TICK' SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION.		
		** M : MANUFACTURER/ SUBCONTRACTOR		
MANUFACTURER /SUBCONTRACTOR	CONTRACTOR	C: CONTRACTOR/ NOMINATED INSPECTION AGENCY E : END USER INDICATE `P' PERFORM, `W' WITNESS AND `V' VERIFICATION		
SIGNATURE		AS APPROPRIATE "CHP" END USER SHALL IDENTIFIED IN COLUMN `E'	REVIEWED BY	NAME & SIGN OFAPPROVING AUTHORITY WITH SEAL

	MANUFACTURER'S NAME & ADDRESS	MANUFACTURING QUALITY PLAN		
		ITEM : LOCAL INSTRUMENT ENCLOSURE & LOCAL INSTRUMENT RACK	QP Ref NO.: CE/416/LIE-LIR/QP REV. : 00 DT. : 06.06.2018 PAGE : 05 OF 06	

S. NO.	COMPONENTS & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY			REMARKS
										M	C	E	
1	2	3	4	5	6	7	8	9	D*	**10			11
2	PRETREATMENT	A) DEGREASING	CRITICAL	VISUAL	100%	IS- 6005/F.S.	IS- 6005/F.S.	Q.A. REPORT		P	V	V	
	(7 TANK PROCESS)	B) DERUSTING	CRITICAL	VISUAL	100%	IS- 6005/F.S.	IS- 6005/F.S.	Q.A. REPORT		P	V	V	
		C) PHOSPHATISING	CRITICAL	MEASUREMENT	100%	IS- 6005/F.S.	IS- 6005/F.S.	Q.A. REPORT		P	V	V	
		D) PASSIVATION	CRITICAL	VISUAL	100%	IS- 6005/F.S.	IS- 6005/F.S.	Q.A. REPORT		P	V	V	
3	SURFACE PREPARA-	A) PRIMER(2 COATS)	CRITICAL	VISUAL	100%	APP.DRG	APP.DRG	Q.A.REPORT		P	V	V	
	-TION & PAINTING	B) SURFACER	CRITICAL	VISUAL	100%	APP.DRG	APP.DRG	Q.A.REPORT		P	V	V	
		C) FINAL PAINTING	CRITICAL	VISUAL	100%	APP.DRG	APP.DRG	Q.A.REPORT		P	V	V	
		D) THICKNESS	CRITICAL	MEASUREMENT	SAMPLE	APP.DRG	APP.DRG	Q.A.REPORT		P	V	V	
4	ELECTRICAL & MECH.	A) CHECK ARRANGE / LAYOUT OF COMP. & MOUNTING	CRITICAL	VISUAL	100%	APP.DRG	APP.DRG	Q.A.REPORT		P	V	V	
		B) WIRE CLAMPING & FERULING	CRITICAL	VISUAL	100%	APP.DRG	APP.DRG	Q.A.REPORT		P	V	V	
		C) INTERCONNECTION B/W COMPONENT	CRITICAL	VISUAL	100%	APP.DRG	APP.DRG	Q.A.REPORT		P	V	V	
		D)LUG SIZE&CRIMPING	CRITICAL	VISUAL	100%	APPD. APP.DRG	F.S./APP.DRG	Q.A.REPORT		P	V	V	
		E) COMPONENT IDENTIFICATION	CRITICAL	VISUAL	100%	APPD. APP.DRG	APP.DRG	Q.A.REPORT		P	V	V	
		F) WIRE SIZE	MAJOR	VISUAL	SAMPLE	IS-694 / APP.DRG	IS-694 / APP.DRG	M.T.C./QA REP.		P	V	V	
		G) NAME PLATES	CRITICAL	VISUAL	100%	APP.DRG	APP.DRG	Q.A.REPORT		P	V	V	
		H) PIPING	MAJOR	VISUAL	100%	APP.DRG	APP.DRG	Q.A.REPORT		P	V	V	

		LEGEND :	FOR END USER :
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		** M : MANUFACTURER/ SUBCONTRACTOR	
MANUFACTURER /SUBCONTRACTOR	CONTRACTOR	C: CONTRACTOR/ NOMINATED INSPECTION AGENCY E : END USER	
		INDICATE `P' PERFORM, `W' WITNESS AND `V' VERIFICATION	
SIGNATURE		AS APPROPRIATE "CHP" END USER SHALL IDENTIFIED IN COLUMN `E'	REVIEWED BY
			NAME & SIGN OFAPPROVING AUTHORITY WITH SEAL

MANUFACTURER'S NAME & ADDRESS	**MANUFACTURING QUALITY PLAN**	
	ITEM : LOCAL INSTRUMENT ENCLOSURE & LOCAL INSTRUMENT RACK	**QP Ref NO.: CE/416/LIE-LIR/QP** **REV. : 00** **DT. : 06.01.2018** **PAGE : 06 OF 06**

S. NO.	COMPONENTS & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD		AGENCY M	AGENCY C	AGENCY E	REMARKS
1	2	3	4	5	6	7	8	9	D*	**10			11
D)	***FINAL INSPECTION***												
1	A) VERIFICATION OF COMPONENTS /RATING/ ARRANGEMENTS/ LOCATION FOR EASY ACCESSABILITY AND MAINTENANCE .		CRITICAL	VISUAL	100%/SAM.	APP.DRG	APP.DRG	Q.A. REPORT		P	W	W	
	B) COMPLETENESS OF WIRING ,TUBING/ PIPING		CRITICAL	VISUAL	100%/SAM.	APP.DRG	APP.DRG	Q.A. REPORT		P	W	W	
	C) TERMINAL ARRANGEMENTS,SPARE TER--MINALS , EARTH BUS TIN PLATED COPPER)		CRITICAL	VISUAL	100%/SAM.	APP.DRG	APP.DRG	Q.A. REPORT		P	W	W	
	D) PAINT SHADE,THICKNESS & ADHESION		CRITICAL	MEASUREMENT	SAMPLE	APP.DRG	APP.DRG	Q.A. REPORT		P	W	W	
	E) DOOR ALIGNMENT		MAJOR	VISUAL	100%/SAM.	APP.DRG	APP.DRG	Q.A. REPORT		P	W	W	
	F) GENERAL APPEARENCE (STRAIGHTNESS, FREE FROM SCRATCHES, BENDS, DENTS AND SHEET THICKNESS)		MAJOR	VISUAL	100%/SAM.	APP.DRG	APP.DRG	Q.A. REPORT		P	W	W	
	G) HYDROSTATIC TEST FOR ASSEMBLY. (1.5 TIMES RATED PRESSURE)		CRITICAL	MECHANICAL	100%	APP.DRG	APP.DRG/ NO LEAK/ PRESSURE DROP	Q.A. REPORT		P	W	W	PERFORMED BY VENDOR 100 % BHEL WITNESS ON 10%
	(PNEUMATIC TEST FOR PURGING LINES (NO LEAKAGED WITH SOAP SOLUTION)												
2	OVERALL FINISH		MAJOR	VISUAL	100%/SAM.	APP.DRG	APP.DRG	Q.A. REPORT		P	W	W	
3	CONTINUITY TEST		MAJOR	FUNCTIONAL	100%/SAM.	APP.DRG	APP.DRG	Q.A. REPORT		P	W	W	
4	IR TEST		MAJOR	MEASUREMENT	100%/SAM.	APP.DRG	APP.DRG	Q.A. REPORT		P	W	W	
5	HV TEST		MAJOR	MEASUREMENT	100%/SAM.	APP.DRG	APP.DRG	Q.A. REPORT		P	W	W	
6	FUNCTIONAL TEST		MAJOR	FUNCTIONAL	100%/SAM.	APP.DRG	APP.DRG	Q.A. REPORT		P	W	W	
7	IP TEST TYPE TEST		MAJOR	VERIFICATION	100%/SAM.	APP.DRG	APP.DRG	Q.A. REPORT		P	V	V	

M. T.C. = MANUFACTURER'S / MATERIAL TEST CERTIFICATE
F.S. = FACTORY STANDARD
Q.A.REP.= QUALITY ASSURANCE REPORT
APP. APP.DRG = APPROVED DRAWING
SAM. = SAMPLE

NOTE :- CUSTOMER / INSPECTION AGENCY / END USER MAY DO INSPECTION ON SAMPLE BASIS

LEGEND :
* RECORDS, INDENTIFIED WITH `TICK' SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION.
** M : MANUFACTURER/ SUBCONTRACTOR
C: CONTRACTOR/ NOMINATED INSPECTION AGENCY E : END USER
INDICATE `P' PERFORM, `W' WITNESS AND `V' VERIFICATION
AS APPROPRIATE "CHP" END USER SHALL IDENTIFIED IN COLUMN `E'

MANUFACTURER /SUBCONTRACTOR	CONTRACTOR	REVIEWED BY	NAME & SIGN OFAPPROVING AUTHORITY WITH SEAL
SIGNATURE			

CORPORATE QUALITY ASSURANCE
SUB-VENDOR QUESTIONNAIRE

i.	**Item/Scope of Sub-contracting**			
ii.	**Address of the registered office**	**Details of Contact Person (Name, Designation, Mobile, Email)**		
iii.	**Name and Address of the proposed Sub-vendor's works where item is being manufactured**	**Details of Contact Person: (Name, Designation, Mobile, Email)**		
iv.	**Annual Production Capacity for proposed item/scope of sub-contracting**			
v.	**Annual production for last 3 years for proposed item/scope of sub-contracting**			
vi.	**Details of proposed works**			
1.	**Year of establishment of present works**			
2.	**Year of commencement of manufacturing at above works**			
3.	**Details of change in Works address in past (if any)**			
4.	**Total Area**			
	Covered Area			
5.	**Factory Registration Certificate**	**Details attached at Annexure – F2.1**		
6.	**Design/ Research & development set-up (No. of manpower, their qualification, machines & tools employed etc.)**	**Applicable / Not applicable if manufacturing is as per Main Contractor/purchaser design) Details attached at Annexure – F2.2 (if applicable)**		
7.	**Overall organization Chart with Manpower Details (Design/Manufacturing/Quality etc)**	**Details attached at Annexure – F2.3**		
8.	**After sales service set up in India, in case of foreign sub-vendor (Location, Contact Person, Contact details etc.)**	**Applicable / Not applicable Details attached at Annexure – F2.4**		
9.	**Manufacturing process execution plan with flow chart indicating various stages of manufacturing from raw material to finished product including outsourced process, if any**	**Details attached at Annexure – F2.5**		

CORPORATE QUALITY ASSURANCE
SUB-VENDOR QUESTIONNAIRE

10.	**Quality Control exercised during receipt of raw material/BOI, in-process , Final Testing, packing**	**Details attached at Annexure – F2.6**
11.	**Manufacturing facilities** **(List of machines, special process facilities, material handling etc.)**	**Details attached at Annexure – F2.7**
12.	**Testing facilities** **(List of testing equipment)**	**Details attached at Annexure – F2.8**
13.	**If manufacturing process involves fabrication then-** **List of qualified Welders** **List of qualified NDT personnel with area of specialization**	**Applicable / Not applicable** **Details attached at Annexure – F2.9** **(if applicable)**
14.	**List of out-sourced manufacturing processes with Sub-Vendors' names & addresses**	**Applicable / Not applicable** **Details attached at Annexure. –F2.10** **(if applicable)**
15.	**Supply reference list including recent supplies**	**Details attached at Annexure – F2.11** **(as per format given below)**

Project/ package	*Customer Name*	*Supplied Item (Type/Rating/Model /Capacity/Size etc)*	*PO ref no/date*	*Supplied Quantity*	*Date of Supply*

16.	**Product satisfactory performance feedback letter/certificates/End User Feedback**	**Attached at annexure - F2.12**
17.	**Summary of Type Test Report (Type Test Details, Report No, Agency, Date of testing) for the proposed product (similar or higher rating)** **Note:- Reports need not to be submitted**	**Applicable / Not applicable** **Details attached at Annexure – F2.13** **(if applicable)**
18.	**Statutory / mandatory certification for the proposed product**	**Applicable / Not applicable** **Details attached at Annexure – F2.14** **(if applicable)**
19.	**Copy of ISO 9001 certificate** **(if available)**	**Attached at Annexure – F2.15**
20.	**Product technical catalogues for proposed item (if available)**	**Details attached at Annexure – F2.16**

Name:		**Desig:**		**Sign:**		**Date:**	

Company's Seal/Stamp:-

Bharat Heavy Electricals Ltd.,
(A Government of India undertaking)
Electronics Division
PB 2606 , Mysore Road Bangalore , 560026 INDIA

CE: PR: 003- Rev 00

SPECIAL COMMERCIAL CONDITIONS OF CONTRACT

Reference is brought to BHEL's Instructions to Bidders (Document Ref: CE: PR: 001- Rev 01) and General Commercial Conditions for Contract (Document Ref: CE: PR: 002- Rev 01) which are also sent along with the RFQ. These two documents along with Special Conditions of Contract annexed to this RFQ will form an integral part of the contract as and when the RFQ culminates into a Purchase Order / Contract.

RFQ No: SAM0000194 RFQ Date: 10.01.2018 Due Date: 22.01.2018 Project: NTPC TELANGANA, KARIMNAGAR (2X800 MW) STPP.
Item Description: LIE/LIR

TYPE OF BID: ~~SINGLE PART BID~~ ~~/ TWO PART BID~~ / THREE PART BID

Purchase Executives:-Ms. Sarita Mohapatra or Mr. Umapathi K.
E-mail IDs:- sarita@bheledn.co.in & umapathi@bheledn.co.in

E-tendering: Applicable-/ ~~Not Applicable.~~

Reverse Auction: ~~Not Applicable~~ / Will be intimated during commercial clarifications to technically acceptable vendors.
In case BHEL does not resort to Reverse Auction, the price bids and price impacts (if any) shall be opened as per BHEL's standard practice.

Splitting of tendered quantity to MSE vendors: The tendered quantity ~~will~~ /will not be split to MSE vendors subject to submission of relevant documents by vendors. **Refer clause H of Instructions to Bidders for conditions applicable and for information on documents to be submitted.**

Destination: Items are to be directly despatched to BHEL's Site Office or Stores/Customer's Stores located in **KARIMNAGAR, RAMAGUNDAM, TELANGANA.**
Road Permit, if applicable, will be issued by BHEL along with Despatch Clearance.

Project Benefits:
~~**Imported scope of supply:**~~

a) ~~DEEC / EPCG/DFIA contract: Eligible for "NIL" Basic Customs Duty~~.
~~b) Physical Export project: Eligible for exemption of Customs Duty and GST.~~
~~c) Project Imports: Eligible for Concessional Basic Custom Duty.~~
~~d) Basic Custom duty and Cess on Basic Custom duty are reimbursable by customer.~~

Terms of Delivery:
Indicate station of despatch: _____
Indicate place of manufacturing (wherever applicable): _____

- **Indigenous scope of supply:** Ex-works (including Packing & Forwarding charges but excluding Taxes & Duties): _____

- ~~**Imported scope of supply:** F.C.A. (for air consignments) /F.O.B. (for sea consignments)~~

~~(Including Packing, Forwarding, Handling, Ancillary charges like processing of Sight Draft/ Letter of Credit, negotiation of bank Documents, Export declaration, Country of Origin etc.): _____~~

~~Kindly indicate the **approximate weight of the total consignment for the imported portion** of the subject item. This is required for calculating freight charges to the Project Site. _____ Kgs.~~

Also indicate the following:
a) Works address _____
b) Office address _____
c) In the event of your company being the lowest bidder, PO to be placed on works or office address._____

S NO.	TERMS	BHEL ACCEPTABLE TERM	BIDDER'S CONFIRMATION	DEVIATION IF ANY
01	**Validity**	The offer will be valid for a period of 120 days from the date of technical bid opening.	**AGREE**	
02	**Goods and Services Tax**	Please indicate current rate of GST, HSN Number of the quoted goods and GSTIN Number of the billing location. However, reimbursement of GST shall be at actuals against proof of Tax Invoice only. (Within contractual delivery).	**APPLICABLE / NOT APPLICABLE** Present rate of GST .....% HSN Number ..... GSTIN Number	
03	**Octroi**	If applicable, indicate current rate of Octroi.	**AGREE** Present Octroi rate ……..%	
04	**Freight Charges (for indigenous scope of supply)** **Kindly quote freight charges in % of the total basic material cost for the complete project.**	Freight charges shall be to vendor's account. Quote lump sum reasonable Freight charges separately in priced offer, clearly indicating the applicable taxes. Vendor's offer will be evaluated on "Total cost basis" including freight charges. Vendor shall book the consignment through their approved Road carriers on "Freight pre-paid" and door delivery consignee copy attached basis. Freight charges to be claimed from BHEL along with POD (Proof of Delivery) on original L/R.	**AGREED** And quoted as lumpsum amount in price bid. Applicable Tax _____% (extra in freight charges)	Freight _____% of Total Basic Material Cost for complete project.
~~05~~	~~**Tax on E&C and Training Charges**~~	~~Please indicate current rate of GST applicable, SAC (Service Accounting Code No.) and GSTIN Number of place of supply of service.~~ ~~However, reimbursement of GST shall be at actuals against proof of Tax Invoice only. (Within contractual delivery).~~	~~**APPLICABLE / NOT APPLICABLE**~~ ~~Present rate of GST~~ ~~.....%~~ ~~SAC Number~~ ~~.....~~ ~~GSTIN Number~~ ~~.....~~	
06	~~**Parting of license for imported raw materials**~~	~~In case of Mega project, Ultra-Mega project and Physical Export project where Custom Duty and Excise Duty are NIL and vendor is importing any raw materials / components for the enquired item, same are eligible for Zero Customs duty. As per EXIM policy, BHEL will part the import licence with the vendors to obtain import licence by themselves and custom clear the raw materials/ components by availing zero customs duty. Hence, please furnish list of raw materials / components to be imported by you with Quantity and CIF value (for which BHEL has to share import licence). The benefit due to the above shall be passed on to BHEL and confirmed in the quotation.~~ ~~If there are no imported raw materials/components, same shall be confirmed in the offer.~~	**AGREE** CIF value …….. **Yes, benefit passed-on to BHEL in the price quotation.** **We confirm that there are no imported components.**	
07	**Delivery Period**	Within **08** weeks from the date of issue of approved documents or manufacturing clearance by BHEL, whichever is later.	**AGREE** …… weeks	
08	**Guarantee/ Warranty**	**24** months from the date of delivery of goods or **18** months from the date of commissioning of goods, whichever is earlier.	**AGREE**	

09	**Inspection agency**	Materials will be inspected by : • BHEL • Customer/Consultant/BHEL nominated Third Party Inspection Agency (TPIA)	**AGREE**	
10	**Terms of Payment at the time of material supply**	Refer Clause "**F**" of Instructions to Bidder for BHEL standard Payment terms and loading factors applicable for non-compliance against payment terms: **Indigenous Scope:** ~~a)Supply with E&C~~ ~~b)Supply with Supervision of E&C~~ c) Supply only **Imported Scope:** ~~d)Supply with E&C~~ ~~e)Supply with Supervision of E&C~~ ~~f) Supply only~~ ~~Note: Kindly indicate if High Sea Sales will be operated. If yes, confirm submission of relevant documents as per Annexure V.~~	**AGREE** **YES / NO** **CONFIRMED**	
11	~~**Performance Bank Guarantee (PBG)**~~	~~PBG will be applicable for a period of 24 months + claim period of 6 months for a value equal to 10% of the basic value of the purchase order.~~ ~~Refer Clause "**G**" of Instructions to Bidders.~~	~~**AGREE**~~	
12	~~**Terms of Payment not related to material supply**~~	~~**For Training:**~~ ~~100% will be paid in 45 days from the date of completion of Training or 15 days from the date of submission of complete set of documentation, whichever is later.Separate invoice shall be submitted for Training charges along with documentary evidence.~~ ~~**For Engineering & Documentation Charges:**~~ ~~100% will be paid in 45 days from the date of approval of final documents or 15 days from the date of submission of invoice, whichever is later. Separate invoice to be submitted for Engineering & documentation charges.~~	~~**AGREE**~~	
13	**Mode of despatch**	**Indigenous Scope:** By Road on Door Delivery Consignee Copy attached basis through your approved transporter (unless otherwise indicated in Despatch Instructions), only on receipt of Despatch Clearance from BHEL. ~~**Imported Scope:**~~ ~~By Air/Sea through BHEL approved Consolidator/Freight Forwarder, only on receipt of Despatch Clearance from BHEL.~~	**AGREE**	
14	**Despatch Documents**	Complete set of despatch documents (original + 1 photocopy set) as per Purchase Order shall be forwarded to BHEL directly. Depending upon the project/customer demands, despatch documents may include one or more documents from the following: Original GST Invoice, Original Lorry Receipt (L/R), Signed Packing List, ~~Air Way Bill (AWB), Country of origin certificate,~~ Warranty Certificate, Insurance Intimation letter, NIL Short Shipment Certificate, ~~Original Performance Bank Guarantee (directly from issuing bank to BHEL)~~, POD (Proof of Delivery) on original L/R, ~~Disclaimer Certificate (as per BHEL format attached as Annexure XI) along with ER-1 form & attested excise invoice (as per project demands like Nuclear Power plant)~~ etc. **The precise list of despatch documents needed for a particular project will be specified in the Purchase Order.** One set of Invoice, Packing List and L/R or AWB shall be e-mailed/faxed immediately to BHEL-EDN after despatch.	**AGREE**	

15	**O & M Manuals**	As built Drawings, O & M Manuals and other approved documents shall be furnished in required no. of sets as per Specification/Purchase Order. Note: Supply of above documents (O&M) in required no. of sets along with material shall be indicated in packing list. If not mentioned BHEL may insist for submission in required sets once again.	**AGREE**	
16	**Evaluation criteria for tendered item**	**Items will not be split on item wise lowest offer. Items to be evaluated and procured as a package.**	**AGREE**	
17	**Integrity Commitment**	Integrity commitment will be applicable in the tender process and execution of contracts as mentioned in clause "**I**" of Instructions to Bidders.	**AGREE**	

With this, it is inferred that vendor has understood and accepts all terms & conditions as indicated in Instructions to Bidders (Document Ref: CE: PR: 001- Rev 01) & General Commercial Conditions for Contract (Document Ref: CE: PR: 002- Rev 01).

VENDOR'S SIGNATURE WITH SEAL

NOTE: 1) The above filled-in and signed-sealed document shall be furnished as part of Part-I Bid without fail. If no deviations are brought, it will be treated as if all terms and conditions of this enquiry are accepted by vendor without any deviation.

2) For EPS tenders, bidder should also necessarily fill the corresponding columns of "SPECIAL COMMERCIAL CONDITIONS OF CONTRACT" in EPS portal and the confirmation provided by bidder against these commercial terms in EPS portal will only be considered by BHEL.

Bharat Heavy Electricals Ltd.,
(A Government of India undertaking)
Electronics Division
PB 2606 , Mysore Road Bangalore , 560026 INDIA

CE:PR:001- Rev 01

INSTRUCTIONS TO BIDDERS (Common for all RFQs)

Bidder is requested to read the instructions carefully and submit their quotation taking into consideration of all the points:

A. GENERAL INSTRUCTIONS:

1. Any Purchase Order resulting from this enquiry shall be governed by the Instructions to Bidders (document reference: CE: PR: 001 – Rev 01),General Conditions of Contract(document reference: CE: PR: 002 - Rev 01) and Special Conditions of Contract, if any, of the enquiry.
2. Any deviations from or additions to the "General Conditions of Contract"or "Special Conditions of Contract" require BHEL's express written consent. The general terms of business or sale of the bidder shall not apply to this tender.
3. Bidders (also includes the term suppliers / contractors wherever used in this document) are instructed to quote their most competitive price and best delivery, etc. in the offer. Prices should be indicated in both figures & words**(Please also refer clause 12 under section B)**
4. Regret letter (either through post or by mail or by EPS) indicating reasons for not quoting must be submitted without fail, in case of non-participation in this tender. If a bidder fails to respond against 3 consecutive tenders for the same item, he shall be liable for removal as a registered vendor of BHEL.
5. Procurement directly from the manufacturers shall be preferred. However, if the OEM/ Principal insist on engaging the services of an agent, such agent shall not be allowed to represent more than one manufacturer/ supplier in the same tender. Moreover, either the agent could bid on behalf of the manufacturer/ supplier or the manufacturer/ supplier could bid directly but not both. In case bids are received from the manufacturer/ supplier and his agent, bid received from the agent shall be ignored.
6. Consultant / firm (and any of its affiliates) shall not be eligible to participate in the tender/s for the related goods for the same project if they were engaged for consultancy services for the same project.
7. If an Indian representative/associate/liaison office quotes on behalf of a foreign based bidder, such representative shall furnish compulsorily the following documents:
    a. Authorization letter to quote and negotiate on behalf of such foreign-based bidder.
    b. Undertaking from such foreign based bidder that such contract will be honored and executed according to agreed scope of supply and commercial terms and conditions.
    c. Undertaking shall be furnished by the Indian representative stating that the co-ordination and smooth execution of the contract and settlement of shortages/damages/replacement/repair of imported scope till system is commissioned and handed over to customer will be the sole responsibility of the Indian representative/associates/agent/liaison office.
    d. Refer **Annexure I** on "Guidelines for Indian Agents".
8. In case of imported scope of supply, customs clearance & customs duty payment will be to BHEL account after the consignment is received at Indian Airport /Seaport.Bidders must provide all original documents

required for completing the customs clearance along with the shipment. Warehousing charges due to incomplete or missing documentation will be recovered from the supplier's bill. All offers for imported scope of supply by air, must be made from any of the gateway ports (within the country) indicated **(Refer Annexure II).**

9. The offers of the bidders who are on the banned list and also the offers of the bidders, who engage the services of the banned firms, shall be rejected. The list of the banned firms is available on BHEL website: **www.bhel.com**
10. Business dealings with bidders will be suspended if they are found to have indulged in any malpractices/misconduct which are contrary to business ethics like bribery, corruption, fraud, pilferage, cartel formation, submission of fake/false/forged documents, certificates, information to BHELor if they tamper with tendering procedure affecting the ordering process or fail to execute a contract, or rejection of 3 consecutive supplies or if their firms / works are under strike/lockout for a long period.Bidder may refer "Guidelines for Suspension of Business Dealings with Suppliers/ Contractors" available on www.bhel.com for more details.

B. GUIDELINES FOR PREPARATION OF OFFER:

1. Quotation shall be submitted in Single Part Bid, Two Part Bid or Three Part Bid, as called for in the tender:
   - **SINGLE PART BID**: Technical and Commercial Bid with prices along with price summary & filled in BHEL Standard Commercial terms and conditions in a single sealed envelope.
   - **TWO PART BID**: Unpriced offer i.e. "Techno-commercial Bid" with filled in BHEL Standard Commercial terms and conditions in a sealed envelope **along with the copy of the "Price Bid"without the prices** should be enclosed in one cover and the cover must be super scribed **"Techno-commercial offer)** and Priced offer i.e. "Price Bid"containing price summary in a separate sealed envelope and must be super scribed **"Price Bid"**.Both these envelopes shall be enclosed in a single sealed envelope superscribed with enquiry number, due date of tender and any other details as called for in the tender document.
   - **THREE PART BID**: Pre-qualification Bid(Part-I), Techno Commercial Bid with filled in BHEL Standard Commercial terms and conditions (Part-II), and Price Bid (Part-III). All three envelopes shall be enclosed in a single sealed envelope superscribed with enquiry number, due date of tender and any other details as called for in the tender document.

   If any of the offers (Part I, Part II or Part III) are not submitted before the due date and time of submission (or) if any part of the offer is incomplete, the entire offer of the bidder is liable for rejection.

2. Supplier shall ensure to superscribe each envelope with RFQ number, RFQ Date, RFQ Due date and time, Item Description and Project clearly & boldly. Also mention on the envelope whether it is "Techno Commercial Bid" or "Price Bid" or "Pre-Qualification Bid". Pease ensure complete address, department name and purchase executive name is mentioned on the envelope (before dropping in the tender box or handing over) so that the tender is available in time for bid opening.
3. BHEL standard Commercial Terms and Conditions (duly filled, signed & stamped) must accompany Technical-Commercial offer without fail and should be submitted in original only. Xerox copy will not be accepted.

   The above indicated submission of Offers in "sealed envelope/hard copy" as mentioned in points B.1-B.3 is applicable for tenders that are not floated through EPS.

4. Validity: Unless otherwise specified in SCC(special commercial conditions of contract), the original offer will be valid for a period of 120 days from the date of technical bid opening.

5. Any of the terms and conditions not acceptable to supplier, shall be explicitly mentioned in the Techno-Commercial Bid. If no deviations are brought out in the offer it will be treated as if all terms and conditions of this enquiry are accepted by the supplier without deviation.
6. Deviation to this specification/item description, if any, shall be brought out clearly indicating "DEVIATION TO BHEL SPECIFICATION" without fail, as a part of Techno-Commercial Bid. If no deviations are brought out in the offer it will be treated as if the entire specification of this enquiry is accepted without deviation.
7. Suppliers shall submit one set of original catalogue, datasheets, bill of materials, dimensional drawings, mounting details and/or any other relevant documents called in purchase specification as part of Technical Bid.
8. "Price Bid" shall be complete in all respects containing price break-up of all components along with all applicable taxes and duties, freight charges (if applicable) etc. Once submitted no modification / addition / deletion will be allowed in the "Price Bid." Bidders are advised to thoroughly check the unit price, total price to avoid any discrepancy.
9. In addition, bidder shall also quote for erection & commissioning charges/erection supervision & commissioning charges (E&C/service charges) if & as applicable, documentation charges, testing Charges (type & routine), training charges etc. as applicable along with corresponding tax. The price summary must indicate all the elements clearly.
10. Vendors should indicate "lumpsum" charges (including To & Fro Fare, Boarding, Lodging, Local Conveyance etc.) for carrying out Erection and Commissioning (or) Erection Supervision and Commissioning, as applicable and further handing over to customer. The quotation shall clearly indicate scope of work, likely duration of commissioning, pre-commissioning checklist and service tax (if any).
11. Wherever bidders require PAC (Project Authority Certificate)/applicable certificates for import of raw materials, components required for DECC,EPCG Power Projects, Export Projects or other similar projects wherein supplies are eligible for customs duty benefits, lists and quantities of such items and their values (CIF) has to be mentioned in the offer. Prices must be quoted taking into account of such benefits.
12. All quotations shall be free from corrections/overwriting. Corrections if any should be authenticated with signature and seal. Any typographical error, totaling mistakes, currency mistake, multiplication mistake, summing mistakes etc. observed in the price bids will be evaluated as per **Annexure III** "Guidelines for dealing with Discrepancy in Words & Figures – quoted in price bid" and BHEL decision will be final.
13. Documents submitted with the offer shall be signed and stamped in each page by authorized representative of the bidder. This clause is not mandatory for offers uploaded through E-Procurement System(EPS).

C. <u>GUIDELINES FOR OFFER SUBMISSION:</u>

1. Offers / Quotations must be dropped in tender box before 13.00 Hrs. on or before due date mentioned in RFQ.The offers are to be dropped in the proper slot of the Tender Box kept in our reception area with caption "CE, SC&PV, DEFENCE."Tenders are opened on 3 days in a week (Monday/Wednesday/Friday). Tender must be deposited in the slot corresponding to the day (Monday - Box no.4/Wednesday - Box no. 6 /Friday - Box no.8) while depositing the offer (Dropping of offers in tender box is not applicable for EPS tenders).

2. E-Mail/ Internet/EDI offers received in time shall be considered only when such offers are complete in all respects. In case of offers received through E-mail, please send the offer to the email ID specified in the SCC document of the tender (This clause will not be applicable for EPS tenders).
3. In cases where tender documents are bulky, or due to some reasons tender documents are required to be submitted by hand or through posts/couriers, the offers are to be handed over either of the two officers whose names are mentioned in the SCC document of tender RFQ. (This clause will not be applicable for EPS tenders).

4. Tenders will be opened on due date, time and venue as indicated in the RFQ in the presence of bidders at the venue indicated in the RFQ. For EPS tenders, e-mail notifications will be automatically generated and forwarded to registered e-mail ID/s of bidders during opening of tenders.
5. Vendor will be solely responsible:
   a. For submission of offers before due date and time. Offers submitted after due date and time will be treated as "Late offers" and will be rejected.
   b. For submission of offers in the correct compartment of the tender box based on the day of due date(Monday/Wednesday/Friday). Please check before dropping your offer in the correct tender box.
   c. For depositing offers in proper sealed condition in the tender box. If the bidder drops the tender in the wrong tender box (or) if the tender document is handed over to the wrong person, BHEL will not be responsible for any such delays.
   d. For offers received through email etc., suppliers are fully responsible for lack of secrecy on information and ensuring timely receipt of such offers in the tender box before due date & time (This clause will not be applicable for EPS tenders).

      The above indicated submission of Offers as mentioned in points 5.a-5.d is applicable for tenders that are not floated through EPS.
   e. In case of e-tender, all required documents should be uploaded before due date and time.Availability of power, internet connections,system/software requirements etc. will be the sole responsibility of the vendor. Wherever assistance is needed for submission of e-tenders, help-line numbers as available in the web-site of service provider of BHEL may be contacted.
      Purchase Executive/ BHEL shall not be responsible for any of the activities relating to submission of offer.

D. <u>PROCESSING OF OFFERS RECEIVED:</u>

1. Any discount/ revised offer submitted by the supplier on its own shall be accepted provided it is received on or before the due date and time of offer submission (i.e. Part-I bid). The discount shall be applied on pro-rata basis to all items unless specified otherwise by the bidder.
2. Changes in offers or Revised offers given after Part-I bid opening shall not be considered as a part of the original offer unless such changes/revisions are requested by BHEL.
3. In case there is no change in the technical scope and/ or specifications and/ or commercial terms & conditions, the supplier will not be allowed to change any of their bids after Technical bids are opened (after the due date and time of tender opening).
4. In case of changes in scope and/ or technical specifications and/ or commercial terms & conditions by BHEL and it accounts for price implications from vendors, all techno-commercially acceptable bidders shall be asked by BHEL (after freezing the scope, technical specifications and commercial terms & conditions) to submit the impact of such changes on their price bid. Impact price will be applicable only for changes in technical specification / commercial conditions by BHEL. The impact price must be submitted on or before the cut-off date specified by BHEL and the original price bid and the price impact bid will be opened together at the time of price bid opening.
5. BHEL EDN reserves the right to adopt Reverse Auction or standard Price Bid Opening procedure for price evaluation, at its discretion. This shall be decided after completion of techno-commercial evaluation of tender. **(Refer BHEL website <u>www.bhel.com</u> for Guidelines of Reverse Auction)**. In case BHEL does not resort to Reverse Auction, the price bids and price impacts (if any) already submitted and available with BHEL shall be opened as per BHEL's standard practice.
6. Un-opened bids (including price bids) will be returned to the respective bidders after release of Purchase order. Regarding Offers for EPS tenders that get rejected on PQC/ techno-commercial grounds, the bids for

the subsequent parts will not be opened i.e., both technical bid and price bid (Parts-II & III)will not be opened in case of rejection on PQC ground and price bid (Part-II/Part-III, as applicable) will not be opened in case of rejection on techno-commercial ground.

7. After receipt of Purchase Order, supplier should submit required documents viz.,specified drawings, bill of materials, datasheets, catalogues, quality plan, test procedure, type test report , O & M Manuals and/or any other relevant documents as per Specification/Purchase Order, as and when required by BHEL/Customer.
8. Any deviation to the terms and conditions not mentioned in the quotation by supplier in response to this enquiry will not be considered, if put forth subsequently or after issue of Purchase Order, unless clarification is sought for by BHEL EDN and agreed upon in the Purchase Order.
9. Evaluation shall be on the basis of delivered cost (i.e. “Total Cost to BHEL").
   “Total Cost to BHEL” shall include total basic cost, packing & forwarding charges, taxes and duties(if & as applicable), freight charges, taxes on Services, customs clearance charges for imported items, any other cost indicated by bidder for execution of the contract and loading factors (for non-compliance to BHEL Standard Commercial Terms & Conditions). Benefits arising out of Nil Import Duty on DEEC, EPCG, DFIA Projects, Physical Exports or such 100% exemptions (statutory benefits), project imports,customer reimbursements of statutory duties (like Basic Customs Duty and cess on customs duty),Input tax credits as applicable will also be taken into account for arriving at the Total cost to BHEL (wherever applicable and as indicated in SCC document of tender).
10. No deviation will be permitted from the duration of Guarantee/Warranty and/or Comprehensive Annual Maintenance Contract period specified in SCC.
11. For evaluation of offers in foreign currency, the exchange rate (TT selling rate of SBI) shall be taken as under:

    Single part bids: Date of tender opening
    Two/three part bids: Date of Part-I bid opening
    Reverse Auction: Date of Part-I bid opening
    In case of Performance Bank Guarantee (PBG) also, exchange rate will be considered as mentioned above for converting foreign currency to Indian currency and vice versa.

    If the relevant day happens to be a bank holiday, then the exchange rate as on the previous working day of the bank (SBI) shall be taken.
12. Ranking (L-1, L-2 etc.) shall be done only for the techno-commercially acceptable offers.

E. <u>INFORMATION ON PAYMENT TERMS:</u>

1. All payments will be through Electronic Fund transfer (EFT). Vendor has to furnish necessary details as per BHEL standard format **(Refer Annexure IV)** for receiving all payments through NEFT.(Applicable for Indian vendors only)
2. In case of High Sea Sales transaction, customs clearance of the consignment landed on Indian Sea/Air ports will be done by BHEL based on the original HSS documents provided by vendors. All warehousing charges due to delay in submission of complete and or correct HSS documents to BHEL will be to supplier’s account only. Such recovery will be made out of any of the available bills**(Refer Annexure V)**.
3. Statutory deductions, if any, will be made and the deduction certificate shall be issued. In case vendor does not provide PAN details, the TDS deduction shall be at the maximum percentage stipulated as per the provisions of Income Tax Act (Applicable for Indian vendors only).
   Foreign vendors shall submit relevant details of their bankers like Swift Code, Banker’s Name &Address etc.
4. Incomplete documentation will not be accepted. Delayed submission of invoice / documents may result in corresponding delay in payment. In this connection, request to also refer clause: K about invoicing &

payment formalities under GST regime. Applicable documents shall be submitted to the purchaser at the time of execution of supplies/services for availing GST input credits.

F. STANDARD PAYMENT TERMS OF BHEL-EDN

Against Purchase Orders for indigenous procurement-(a), (b) & (c):

(a)SUPPLY WITH ERECTION&COMMISSIONING:

85% of basic value + 100% of taxes and freight charges will be paid in 45 days from the date of dispatch or 15 days from the date of submission of complete set of documentation, whichever is later.

Retention money equivalent to balance 15% of basic value will be paid in 15 days from the date of submission of supplementary invoice/documents along with E & C charges (if any) against proof of completion of E&C.

(b) SUPPLY WITH ERECTION SUPERVISION &COMMISSIONING:

90% of the basic value + 100% of taxes and freight charges will be paid in 45 days from the date of dispatch or 15 days from the date of submission of complete set of documentation, whichever is later.

Retention money equivalent to balance 10% of basic value will be paid in 15 days from the date of submission of supplementary invoice/documents along with erection supervision & commissioning charges (if any) against proof of completion of commissioning.

(c)SUPPLY ONLY:

100% of PO value with taxes and freight will be paid in 45 days from the date of dispatch or 15 days from the date of submission of complete set of documentation, whichever is later.

Against Purchase orders for import procurement-(d), (e) & (f):

(d) SUPPLY WITH ERECTION & COMMISSIONING:

85% of the basic value will be paid on the 45th day, against usance draft of 45 days, from the date of AWB/BOL on submission of complete set of documents.

Retention money equivalent to balance 15% of basic value will be paid in 15 days from the date of submission of supplementary invoice/documents along with E&C charges (if any) against proof of completion of E&C.

(e)SUPPLY WITH ERECTION SUPERVISION & COMMISSIONING:

90% of the basic value will be paid on the 45th day, against usance draft of 45 days, from the date of AWB/BOL on submission of complete set of documents.

Retention money equivalent to balance 10% of basic value will be paid in 15 days from the date of submission of supplementary invoice/documents along with erection supervision & commissioning charges (if any) against proof of completion of commissioning.

(f) SUPPLY ONLY:

100% of PO value will be paid against usance draft of 45 days from the date of AWB/BOL on submission of complete set of documents.

Against Purchase orders for High-sea sales procurement-(g), (h) & (i):

g) SUPPLY WITH ERECTION & COMMISSIONING:

85% of basic value will be paid in 45 days from the date of signing of High Sea Sale agreement or 15 days from the date of submission of complete set of documentation, whichever is later.

Retention money equivalent to balance 15% of basic value will be paid in 15 days from the date of submission of supplementary invoice/documents along with E & C charges (if any) against proof of completion of E&C.

h) SUPPLY WITH ERECTION SUPERVISION & COMMISSIONING:

90% of the basic value + 100% of taxes, duties and freight charges will be paid in 45 days from the date of signing of High Sea Sale agreement or 15 days from the date of submission of complete set of documentation, whichever is later.

Retention money equivalent to balance 10% of basic value will be paid in 15 days from the date of submission of supplementary invoice/documents along with erection supervision & commissioning charges (if any) against proof of completion of commissioning.

i) SUPPLY ONLY:

100% of PO value with taxes, duties and freight will be paid in 45 days from the date of signing of High Sea Sale agreement or 15 days from the date of submission of complete set of documentation, whichever is later.

j) Comprehensive Annual Maintenance Contract:

Evaluation methodology: Unless and otherwise specified in SCC, CAMC will be applicable for a period of 04 years from the date of expiry of warranty period (or) from the date of completion of commissioning of equipment, whichever is later and the total AMC value should not be less than 20% of the main supply value. In case the quoted total AMC value is less than 20% of the main supply value, BHEL shall evaluate Bidders Price deducting differential amount from main supply price and apportioning towards AMC charges.

Payment terms: 100% AMC charges along with tax as applicable, will be paid in 15 days from the date of submission of supplementary invoice/documents against proof of completion of AMC on yearly basis.

k) Terms of Payment for Training: 100% payment will be made in 45 days from the date of completion of Training or 15 days from the date of submission of complete set of invoice along with documentary evidence, whichever is later.

LOADING FACTORS FOR PAYMENT TERMS:

1) In all cases where credit period is <45 days and >=30 days with the above offered standard payment terms, loading applicable will be 5% of basic value.
(This loading factor is applicable only for purchase orders against indigenous supply or High-sea sales procurement).

2) For offers received with usance draft of less than 45 days, loading of 5% will be applicable.
(This loading factor is applicable only for purchase orders for imported supply).

3) For offers received with Letter of Credit payment term in place of usance draft payment term, loading applicable will be 5% of basic value.
Additional loading of 5% will be applicable for payment terms as Letter of Credit with usance of less than 45 days.
(This loading factor is applicable only for purchase orders for imported supply).

4) All payment terms with credit period of less than 30 days for indigenous supply/HSS and any other variation of payment terms are liable for rejection.

5) Standard payment terms indicated in Clauses: F (a), (b), (c), (d), (e), (f), (g), (h), (i),(j)&(k) will not attract any loading.

Note 1: Basic value of Purchase Order mentioned above will include all components of the purchase order and will exclude only taxes, duties, freight, training charges, E&C and AMC charges (wherever applicable).

Wherever the Purchase Order is split into import portion and indigenous portion of supply, the retention money will be 10% (where scope includes E&C) or 05% (where scope includes Erection supervision & Commissioning) of both purchase order values put together.

Note 2:*If the E&C could not be completed till the end of the Warranty period due to reasons not attributable to the supplier, BHEL will release the retention money to the supplier against Bank Guarantee for equivalent value valid for an initial period of one year.*

Note 3: In case of multiple packages/units in a power plant, payment of retention money/E&C charges will be processed on pro-rata basis.

G. <u>Performance bank guarantee (PBG):</u>

Performance bank guarantee (PBG) will be applicable as called in the tender documents.

Unless otherwise specified in the SCC, the PBG against performance of the contract shall be valid for a period of 24 months from the date of dispatch of goods + claim period of 06 months, for a value equal to 10 % of the basic value of the purchase order which will include all components of the purchase order and will exclude only taxes, duties, freight, training charges,E&C and AMC charges (wherever applicable).

1. The BG issued in Indian Rupees by Banks in India is to be executed on Non-Judicial Stamp paper/e-stamp paper of appropriate value as per Stamp Act prevailing in the State(s) where the BG is submitted or is to be acted upon or the rate prevailing in the State where the BG was executed, whichever is higher. The Stamp Paper/e-stamp paper shall be purchased in the name of Vendor/Contractor/Supplier /Bank issuing the guarantee.

2. No deviation for the duration and value of PBG will be permitted.
3. PBG shall be from any of the BHEL consortium of bankers **(refer Annexure VI)**.
4. PBGs from nationalized banks are also acceptable.
5. PBG should be sent directly by the bank to the dealing executive mentioned in the purchase order located at the address mentioned in the purchase order.
6. PBG should be in the format indicated **(refer annexure VII)**. No deviation to this format will be allowed.However in case BHEL changes the PBG format, bidder shall honor the same.
7. In Case of Bank Guarantees submitted by Foreign Vendors-

a. From Nationalized/Public Sector / Private Sector/ Foreign Banks (BG issued by Branches in India) can be accepted subject to the condition that the Bank Guarantee should be enforceable in the town/city or at nearest branch where the BHEL Unit is located i.e. Demand can be presented at the Branch located in the town/city or at nearest branch where the Unit is located.

b. From Foreign Banks (wherein Foreign Vendors intend to provide BG from local branch of the Vendor country's Bank)

b.1 Please note that Bank Guarantee issued by any of the Consortium Banks only will be accepted by BHEL. As such, Foreign Vendor needs to make necessary arrangements for issuance of Counter-

Guarantee by Foreign Bank in favour of the Indian Bank's (BHEL's Consortium Bank) branch in India. It shall be noted that all charges for issuance of Bank Guarantee/ counter- Guarantee should be borne by the Foreign Vendor.

b.2 In case, Foreign Vendors intend to provide BG from Overseas Branch of our Consortium Bank (e.g. if a BG is to be issued by SBI Frankfurt), the same is acceptable. However, the procedure at sl.no. b.1 is required to be followed.

b.3 The BG issued may preferably be subject to Uniform Rules for Demand Guarantees (URDG) 758 (as amended from time to time).

8. Expired BGs / PBGs will be returned only after expiry of the claim period or on completion of the contractual obligation with respect to Purchase Order.

H. PROVISONS APPLICABLE FOR MSE VENDORS (MICRO AND SMALL ENTERPRISES)

Benefits/facilities as applicable for Micro and Small Enterprises (MSEs) shall be available to MSEs registered with Government designated authorities as per the Purchase & Price Preference Policy of the Government subject to them becoming eligible otherwise.

Vendors who qualify as MSE vendors are requested to submit applicable certificates (as specified by the Ministry of Micro, Small and Medium Enterprises) at the time of vendor registration. Vendors have to submit any of the following documents along with the tender documents in the Part I / Technical bid to avail the applicable benefits:

a. Attested copy of valid NSIC certificate or

b. Attested copy of Entrepreneur's Memorandum part II (EM II) certificate having deemed validity (two years from the date of issue of acknowledgement in EM II) or

c. EM II certificate along with attested copy of a CA certificate (Format enclosed at Annexure VIII where deemed validity of EM II certificate for two years has expired) applicable for the relevant financial year (latest audited) or

d. Udyog Aadhaar Memorandum and Acknowledgement along with attested copy of a CA certificate.

Documents has to be notarized/attested by a Gazetted officer and must be valid as on the date of part I / technical bid opening for the vendors to be eligible for the benefits applicable for MSE vendors. Please note that no benefit shall be applicable if any deficiency in the above required documents are not submitted before price bid opening of the tender.

Bidders to however note the documents that shall be furnished in order to establish credentials as MSE vendor should be as per the extant statutory requirements specified by the Ministry of Micro, Small and Medium Enterprises.

Note: If the tender is to be submitted through e-procurement portal, then the above required documents are to be uploaded in the EPS portal.

PURCHASE PREFERENCE FOR MSE VENDORS:

e. MSE vendors quoting within a price band of L1 + 15% shall be allowed to supply up to 20% of the requirement against this tender provided

1. The MSE vendor matches the L1 price.
2. L1 price is from a non MSE vendor.
3. L1 price will be offered to the vendor nearest to L1 in terms of price ranking (L2 - nearest to L1). In case of non-acceptance by the MSE vendor (L2),next ranking MSE vendor will be offered who is within the L1 + 15% band (if L3 is also within 15% band).

4. 20% of the 20% (i.e. 4% of the total enquired quantity) will be earmarked for SC/ST owned MSE firms provided conditions as mentioned in (1) and (2) are fulfilled.
5. In case no vendor under SC / ST category firms are meeting the conditions mentioned in (1) and (2) or have not participated in the tender, in such cases the 4% quantity will be distributed among the other eligible MSE vendors who have participated in the tender.
6. Serial no. 1 to 5 will not be applicable wherever it is not possible to split the tendered quantity/items on account of customer contract requirement, or the items tendered are systems. Such information that tendered quantity will not be split will be indicated in the SCC.

I. INTEGRITY COMMITMENT IN THE TENDER PROCESS, AND EXECUTION OF CONTRACTS:

1. Commitment by BHEL:

   BHEL commits to take all measures necessary to prevent corruption in connection with the Tender process and execution of the Contract. BHEL will, during the tender process, treat all bidder / suppliers in a transparent and fair manner, and with equity.

2. Commitment by Bidder(s)/ Contractor(s):

   a. The Bidder(s)/ Contractor(s) commit(s) to take all measures to prevent corruption and will not directly or indirectly try to influence any decision or benefit which he is not legally entitled to.
   b. The Bidder(s)/ Contractor(s) will not enter with other Bidder(s) into any undisclosed agreement or understanding or any actions to restrict competition.
   c. The Bidder(s)/ Contractor(s) will not commit any offence under the relevant Acts. The Bidder(s)/ Contractor(s) will not use improperly, for purposes of competition or personal gain or pass on to others, any information or document provided by BHEL as part of business relationship.
   d. The Bidder(s)/ Contractor(s) will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract and shall adhere to the relevant guidelines issued from time to time by Government of India/ BHEL.

   If the Bidder(s) / Contractor(s), before award or during execution of the Contract commit(s) a transgression of the above or in any other manner such as to put his reliability or credibility in question, BHEL is entitled to disqualify the Bidder(s) / Contractor (s) from the tender process or terminate the contract and/ or take suitable action as deemed fit.

J.Integrity Pact (IP):

a) IP is a tool to ensure that activities and transactions between the Company and its Bidders/ Contractors are handled in a fair, transparent and corruption free manner.
   A panel of independent External Monitors (IEMs) have been appointed to oversee implementation of IP in BHEL.

   The IP as enclosed with the tender is to be submitted (duly signed by authorized signatory who signs in the offer) along with techno-commercial bid. Only those Bidders who have entered into such an IP with BHEL would be competent to participate in the bidding. In other words, entering into this Pact would be a preliminary qualification.

b) Please refer Section-8 of the IP for Role and Responsibilities of IEMs (Annexure-IX). In case of any complaint arising out of the tendering process, the matter may be referred to the IEM mentioned in the tender.

Note: No routine correspondence shall be addressed to the IEM (phone/ post/ email) regarding the clarifications, time extensions or any other administrative queries, etc. on the tender issued. All such clarification/ issues shall be addressed directly to the tender issuing (procurement) department."

K. Information regarding invoicing under GST regime:

Vendor should intimate BHEL immediately on the same date of invoicing without any delay.

I. Vendor shall necessarily submit tax invoices in the format as specified under GST Laws, with details as below:

(a) Name,address and GST registration number(GSTIN) of the supplier

(b) Invoice number, Date of issue.

(c) HSN Code (Harmonized System of Nomenclature) / SAC (Services Accounting Code).

(d) Description,quantity,unit,total value of goods or services,rate of tax,amount of tax (CGST,SGST,IGST, UTGST), place of supply (consignor address), address of buyer and/or consignee (as applicable) with GSTIN etc.

II. Payment of GST as applicable, will be made to vendor only if it is matching with the data uploaded by Vendor in GST portal.

III. Vendor to give a declaration to the effect that all invoice particulars are/were uploaded in the GSTN network/ portal & all tax liability as per GST rules and regulations have been and will be discharged, shall be mentioned in the invoice. If not mentioned in the invoice, a separate declaration shall be submitted as per the requirement of BHEL(if asked by BHEL).

Bharat Heavy Electricals Ltd.,
(A Government of India undertaking)
Electronics Division
PB 2606 , Mysore Road Bangalore , 560026 INDIA

CE: PR: 002- Rev 01

GENERAL COMMERCIAL CONDITIONS FOR CONTRACT

These 'General Commercial Conditions for Contract for Purchase' herein after referred to as GCC apply to all enquiries, tenders, requests for quotations, orders, contracts and agreements concerning the supply of goods and the rendering of related services (hereinafter referred to as "deliveries") to Bharat Heavy Electricals Limited and any of its units, regions or divisions (hereinafter referred to as "BHEL" or the Purchaser) or its projects/ customers.

Any deviations from or additions to these GCC require BHEL's express written consent. The general terms of business or sale of the vendor shall not apply to BHEL. Acceptance, receipt of shipments or services or effecting payment shall not mean that the general terms of business or sale of the vendor have been accepted.

Orders, agreements and amendments thereto shall be binding if made or confirmed by BHEL in writing. Only the Purchasing department of BHEL is authorized to issue the Purchase Order or any amendment thereof.

Definitions: Throughout these conditions and in the specifications, the following terms shall have the meanings assigned to them, unless the subject matter or the context requires otherwise.

a) 'The Purchaser' means Bharat Heavy Electricals Limited, Electronics division, Mysore road, Bangalore 560 026, a Unit of Bharat Heavy Electricals Limited (A Govt. of India Undertaking) incorporated under the Companies Act having its registered office at BHEL House, Siri Fort, New Delhi-110049, India and shall be deemed to include its successors and assigns. It may also be referred to as BHEL.
b) 'The vendor' means the person, firm, company or organization on whom the Purchase Order is placed and shall be deemed to include the vendor's successors, representative heirs, executors and administrator as the case may be. It may also be referred to as Seller, Contractor or Supplier.
c) 'Contract' shall mean and include the Purchase Order incorporating various agreements, viz. tender/ RFQ, offer, letter of intent/acceptance/ award, the General Conditions of Contract and Special Conditions of Contract for Purchase, Specifications, Inspection/ Quality Plan, Schedule of Prices and Quantities, Drawings, if any enclosed or to be provided by BHEL or his authorized nominee and the samples or patterns if any to be provided under the provisions of the contract.
d) 'Parties to the Contract' shall mean the 'The Vendor' and the Purchaser as named in the main body of the Purchase Order.

Interpretation:

In the contract, except where the context requires otherwise:

a) words indicating one gender include all genders;
b) words indicating the singular also include the plural and words indicating the plural also include the singular;
c) provisions including the word "agree", "agreed" or "agreement" require the agreement to be recorded in writing, and
d) "Written" or "in writing" means hand-written, type-written, printed or electronically made, and resulting in a permanent record.

Applicable Conditions:

1. Price Basis:All prices shall be firm until the purchase order is executed / completed in all respects. No price variations / escalation shall be permitted unless otherwise such variations / escalations are provided for and agreed by BHEL in writing in the purchase order.

2. Ordering and confirmation of Order:Vendor shall send the order acceptance on their company letter head within 02 weeks from the date of receipt of Purchase Order or such other period as specified/ agreed by BHEL. BHEL reserves the right to revoke the order placed if the order confirmation differs from the original order placed. The acceptance of goods/services/supplies by BHEL as well as payments made in this regard shall not imply acceptance of any deviations.
   The purchase order will be deemed to have been accepted if no communication to the contrary is received within one week (or the time limit as specified/agreed by BHEL) from the date of receipt of the purchase order.

3. Documentation:After receipt of Purchase Order, vendor should submit necessary documents(if & as applicable) like drawings specified, bill of materials, datasheets, catalogues, quality plan, test procedure, type test report , O & M Manuals and/or any other relevant documents as per Specification/Purchase Order, as and when required by BHEL/Customer.
   At any stage within the contract period, the vendor shall notify of any error, fault or other defect found in BHEL's documents /specifications or any other items for reference. If and to the extent that (taking account of cost and time) any vendor exercising due care would have discovered the error, fault or other defect when examining the documents/specifications before submitting the tender, the time for completion shall not be extended. However if errors, omissions, ambiguities, inconsistencies, inadequacies or other defects are found in the vendor's documents, they shall be corrected at his cost, notwithstanding any consent or approval.

4. Penalty:
   a. For delay in documentation: In the event of delay in submission of complete set of specified documents ((like drawings, bill of materials, datasheets, catalogues, quality plan etc. as called in tender specifications including soft copies wherever applicable) in required sets beyond three(03) weeks (or as agreed/indicated in the SCC/Purchase Order) from the date of receipt of Purchase Order(by email), penalty at 0.5% (half percent) per week or part thereof, limited to a maximum of 5% (five percent) of the basic material value of the Purchase Order will be applicable.
      Penalty for delayed documentation if applicable, shall be deducted at the time of first supply payment. If penalty is applicable for duration of less than a week, penalty @ 0.5% (half percent) of the basic material value will be deducted.

   b. For delay in delivery:In the event of delay in agreed contractual delivery as per Purchase Order, penalty @ 0.5 % (half percent) per week or part thereof but limited to a max of 10% (ten percent) value of undelivered portion (basic material cost) will be applicable. Delivery will commence from the date of issue of manufacturing clearance or approved document by BHEL, whichever is later. The date for which Inspection call is issued by vendor along with test certificates / test reports /Certificate of Conformance / calibration reports, as proof of completion of manufacturing will be treated as date of deemed delivery for penalty calculation. In the absence of furnishing such document indicated above as proof of completion of manufacturing along with inspection call, actual date of inspection will be considered as date of deemed delivery and BHEL will not be responsible for delay in actual date of inspection.

      Penalty for delayed delivery if applicable, shall be deducted at the time of first supply payment. If penalty is applicable for duration of less than a week, penalty @ 0.5% (half percent)of the basic material value will be deducted.

5. Contract variations (Increase or decrease in the scope of supply): BHEL may vary the contracted scope as per requirements at site. If vendor is of the opinion that the variation has an effect on the agreed price or delivery period, BHEL shall be informed of this immediately in writing along with technical details. Where unit rates are available in the Contract, the same shall be applied to such additional work. Vendor shall not

perform additional work before BHEL has issued written instructions/ amendment to the Purchase Order to that effect. The work which the vendor should have or could have anticipated in terms of delivering the service(s) and functionality (i.e.) as described in this agreement, or which is considered to be the result of an attributable error on the vendor's part, shall not be considered additional work.

6. Inspection: Prior written notice of atleast 10 days shall be given along with internal test certificates/COC and applicable test certificates. Materials will be inspected by BHEL-EDN-QS/CQS or BHEL nominated Third Party Inspection Agency (TPIA) or BHEL authorized Inspection Agency or Customer / Consultant or jointly by BHEL & Customer / consultant. All tests have to be conducted as applicable in line with approved Quality plan or QA Checklist or Purchase specification and original reports shall be furnished to BHEL-EDN, Bangalore for verification/acceptance for issue of dispatch clearance.
   All costs related to inspections & re-inspections shall be borne by vendor. Whether the Contract provides for tests on the premises of the vendor or any of his Sub-contractor/s, vendor shall be responsible to provide such assistance, labour, materials, electricity, fuels, stores, apparatus, instruments as may be required and as may be reasonably demanded to carry out such tests efficiently. Cost of any type test or such other special tests shall be borne by BHEL only if specifically agreed to in the purchase order.

7. Transit Insurance:Transit insurance coverage between vendor's works and project site shall be to the account of BHEL, unless specifically agreed otherwise. However, vendor shall send intimation directly to insurance agency (as mentioned in dispatch instructions issued by BHEL) through fax/courier/e-mail, immediately on dispatch of goods for covering insurance. A copy of such intimation sent by vendor to insurance agency shall be given to BHEL along with dispatch documents. Dispatch documents will be treated as incomplete without such intimation copy.BHEL shall not be responsible for sending intimations to insurance agency on behalf of the vendor.

8. Mode of dispatch:
   Indigenous Scope: By road on Door Delivery Consignee Copy attached basis through your approved transporter (unless otherwise indicated in Dispatch Instructions), only on receipt of Despatch Clearance from BHEL.
   Imported Scope: By Air/Sea through BHEL approved Freight Forwarder/supplier approved Consolidator respectively as per agreed contractual terms, only on receipt of Dispatch Clearance from BHEL.

9. High Sea Sales (HSS): Customs clearance of the consignment landed on Indian Sea/Air ports will be done by BHEL based on the original HSS documents provided by vendors.
   Any delay in submission of complete/correct HSS documents to BHEL may incur demurrage charges. All demurrage charges on account of incomplete /incorrect HSS documents submission by vendor will be to vendor's account and all such charges will be recovered from any of the available vendor bills with BHEL.

10. Packaging and dispatch:The Seller shall package the goods safely and carefully and pack them suitably in all respects considering the peculiarity of the material for normal safe transport by Sea/ Air / Rail/ Road to its destination suitably protected against loss, damage, corrosion in transit and the effect of tropical salt laden atmosphere. The packages shall be provided with fixtures/ hooks and sling marks as may be required for easy and safe handling. If any consignment needs special handling instruction, the same shall be clearly marked with standard symbols / instructions. Hazardous material should be notified as such and their packing, transportation and other protection must conform to relevant regulations.
    The packing, shipping, storage and processing of the goods must comply with the prevailing legislation and regulations concerning safety, the environment and working conditions. Any Imported/Physical Exports items packed with raw/ solid wood packing material should be treated as per ISPM – 15 (fumigation) and accompanied by Phytosanitory/ Fumigation certificate. If safety information sheets (MSDS – Material Safety Data Sheet) exist for an item or the packaging, vendor must provide this information without fail along with the consignment.
    Each package must be marked with Consignee name, Purchase order number, Package number, Gross weight and net weight, dimensions (LxBxH) and Seller's name. Packing list of goods inside each package with PO item number and quantity must also be fixed securely outside the box to indicate the contents of each box. Total number of packages in the consignment must also be indicated in the packing list.
    Separate packing & identification of items should be as follows.
    1. Main Scope - All items must be tagged with part no. & item description.

2. Commissioning spares - All items must be tagged with part no. & item description.
3. Mandatory spares - All items must be tagged with part no. & item description.All boxes/containers of spare items are to be distinctly marked in Red colour with boldly written "S" mark on each face of the containers /secure boxes as indication of items to be handed over directly to customer.

11. Assignment of Rights & Obligations; Subcontracting:Vendor is not permitted to subcontract the delivery or any part thereof to third partyor to assign the rights and obligations resulting from this agreement in whole or in part to third parties without prior written permission from BHEL. Any permission or approval given by the BHEL shall, however, not absolve the vendor of the responsibility of his obligations under the Contract.

12. Progress report:Vendor shall render such report as to the progress of work and in such form as may be called for by the concerned purchase officer from time to time. The submission and acceptance of such reports shall not prejudice the rights of BHEL in any manner.

13. Non-disclosure and Information Obligations:Vendor shall provide with all necessary information pertaining to the goods as it could be of importance to BHEL. Vendor shall not reveal any specified confidential information that may be divulged by BHEL to Vendor's employees not involved with the tender/ contract & its execution and delivery or to third parties, unless BHEL has agreed to this in writing beforehand. Vendor shall not be entitled to use the BHEL name in advertisements and other commercial publications without prior written permission from BHEL.

14. Cancellation /Termination of contract: BHEL shall have the right to completely or partially terminate the agreement by means of written notice to that effect. Termination of the Contract, for whatever reason, shall be without prejudice to the rights of the parties accrued under the Contract up to the time of termination.
    BHEL shall have the right to cancel/foreclose the Order/ Contract, wholly or in part, in case it is constrained to do so on account of any decline, diminution, curtailment or stoppage of the business.

15. Risk Purchase Clause:In case of failure of supplier,BHEL at its discretion may make purchase of the materials / services not supplied / rendered in time at the RISK & COST of the supplier. Under such situation, the supplier who fails to supply the goods in time shall be wholly liable to make good to BHEL any loss due to risk purchase.
    In case of items demanding services at site like erection and commissioning, vendor should send his servicemen/representatives within 7 days from the service call. In case a vendor fails to attend to the service call, BHEL at its discretion may also make arrangements to attend such service by other parties at the **RISK & COST** of the supplier. Under such situation the supplier who fails to attend the service shall be wholly liable to make good to BHEL any loss due to risk purchase/service including additional handling charges due to the change.

16. Shortages:In the event of shortage on receipt of goods and/or on opening of packages at site, all such shortages, caused by supplier's act or omission, shall be made good within a reasonable time that BHEL may allow from such intimation and at free of cost.
    Transit Damages: In the event of receipt of goods in damaged condition or having found them so upon opening of packages at site, supplier shall make good of all such damages within a reasonable time from such intimation by BHEL. In case BHEL raises an insurance claim, the cost of material limited to insurance settled amount less handling charges will be reimbursed to supplier.

17. Remedial work: Notwithstanding any previous test or certification, BHEL may instruct the vendor to remove and replace materials/goods or remove and re-execute works/services which are not in accordance with the purchase order. Similarly BHEL may ask the vendor to supply materials or to execute any services which are urgently required for any safety reasons, whether arising out of or because of an accident, unforeseeable event or otherwise. In such an event, Vendor shall provide such services within a reasonable time as specified by BHEL.

18. Indemnity Clause:Vendor shall comply with all applicable safety regulations and take care for the safety of all persons involved.Vendoris fully responsible for the safety of its personnel or that of his subcontractor's

men / property, during execution of the Purchase Order and related services. All statutory payments including PF, ESI or other related charges have to be borne by the vendor. Vendor is fully responsible for ensuring that all legal compliances are followed in course of such employment.

19. Product Information, Drawings and Documents:All specified drawings, technical documents or other technical information received by Vendor from BHEL or vice versa shall not, without the consent of the other party, be used for any other purpose than that for which they were provided. They may not, without the consent of the Disclosing party, otherwise be used or copied, reproduced, transmitted or communicated to third parties. All information and data contained in general product documentation, whether in electronic or any other form, are binding only to the extent that they are by reference expressly included in the contract.
    Vendor, as per agreed date/s but not later than the date of delivery, provide free of charge information and drawings which are necessary to permit and enable BHEL to erect, commission, operate and maintain the product. Such information and drawings shall be supplied in as many numbers of copies as may be agreed upon.
    All intellectual properties, including designs, drawings and product information etc. exchanged during the formation and execution of the Contract shall continue to be the property of the disclosing party.

20. Intellectual Property Rights, Licenses:If any Patent, design, Trade mark or any other intellectual property rights apply to the delivery(goods/related service) or accompanying documentation shall be the exclusive property of the Vendor and BHEL shall be entitled to the legal use thereof free of charge by means of a non-exclusive, worldwide, perpetual license. All intellectual property rights that arise during the execution of the Purchase Order/ contract for delivery by vendor and/or by its employees or third parties involved by the vendor for performance of the agreement shall belong to BHEL. Vendor shall perform everything necessary to obtain or establish the above mentioned rights. The Vendor guarantees that the delivery does not infringe on any of the intellectual property rights of third parties. The Vendor shall do everything necessary to obtain or establish the alternate acceptable arrangement pending resolution of any (alleged) claims by third parties. The Vendor shall indemnify BHEL against any (alleged) claims by third parties in this regard and shall reimburse BHEL for any damages suffered as a result thereof.

21. Force Majeure:Notwithstanding anything contained in the purchase order or any other document relevant thereto, neither party shall be liable for any failure or delay in performance to the extent said failures or delays are caused by the “Act of God” and occurring without its fault or negligence, provided that, force majeure will apply only if the failure to perform could not be avoided by the exercise of due care and vendor doing everything reasonably possible to resume its performance.
    A party affected by an event of force majeure which may include fire, tempest, floods, earthquake, riot, war, damage by aircraft etc., shall give the other party written notice, with full details as soon as possible and in any event not later than seven (7) calendar days of the occurrence of the cause relied upon. If force majeure applies, dates by which performance obligations are scheduled to be met will be extended for a period of time equal to the time lost due to any delay so caused.

    Notwithstanding above provisions, in an event of Force Majeure, BHEL reserves for itself the right to cancel the order/ contract, wholly or partly, in order to meet the overall project schedule and make alternative arrangements for completion of deliveries and other schedules.

22. Guarantee / Warranty:
    Wherever required, and so provided in the specifications/ Purchaser Order, the Seller shall guarantee that the stores supplied shall comply with the specifications laid down, for materials, workmanship and performance.
    Unless otherwise specified in SCC,guarantee / warranty period for main supply items shall be applicable for a period of 24 months from the date of delivery of goods or 18 months from the date of commissioning of goods, whichever is earlier.
    The guarantee / warranty period as described above shall apply afresh to replaced, repaired or re-executed parts of a delivery. Unless otherwise specifically provided in the Purchase Order, Vendor’s liability shall be co terminus with the expiration of the applicable guarantee / warranty period.

23. Limitation of Liability:Vendor's liability towards this contract is limited to a maximum of 100% of the contract value and consequential damages are excluded. However the limits of liability will have no effect in cases of criminal negligence or wilful misconduct.
    The total liability of Vendor for all claims arising out of or relating to the performance or breach of the Contract or use of any Products or Services or any order shall not exceed the total Contract price.

24. Liability during guarantee / warranty: Vendor shall arrange replacement / repair of all the defective materials / services under its obligation under the guarantee / warranty period. The rejected goods shall be taken away by vendor and replaced / repaired. In the event of the vendor's failure to comply, BHEL may take appropriate action including disposal of rejections and replenishment by any other sources at the cost and risk of the vendor.

25. Liability after guarantee / warranty period: At the end of the guarantee / warranty, the Vendor's liability ceases except for latent defects. For the purpose of this clause, latent defects shall be the defects inherently lying within the material or arising out of design deficiency which do not manifest themselves during the guarantee / warranty Period, but later.The Contractor's liability for latent defects warranty for the equipment including spares shall be limited to a period of six months from the end of the guarantee / warrantyperiod of the respective equipment including spares or first time commissioning whichever is later but not later than three (03) years from the date of shipment.

26. Compliance with Laws:Vendor shall, in performing the contract, comply with all applicable laws. The vendor shall make all remittances, give all notices, pay all taxes, duties and fees, and obtain all permits, licences and approvals, as required by the laws in relation to the execution and completion of the contract and for remedying of any defects; and the Contractor shall indemnify and hold BHEL harmless against and from the consequences of any failure to do so.

27. Settlement of Disputes:Except as otherwise specifically provided in the Purchase Order, decision of BHEL shall be binding on the vendor with respect to all questions relating to the interpretation or meaning of the terms and conditions and instructions herein before mentioned and as to the completion of supplies/work/services, other questions, claim, right, matter or things whatsoever in any way arising out of or relating to the contract, instructions, orders or these conditions or otherwise concerning the supply or the execution or failure to execute the order, whether arising during the schedule of supply/work or after the completion or abandonment thereof.Any disputes or differences among the parties shall to the extent possible be settled amicably between the parties thereto, failing which the disputed issues shall be settled through arbitration. Vendor shall continue to perform the contract, pending settlement of dispute(s).

28. Arbitration Clause: In case amicable settlement is not reached in the event of any dispute or difference arising out of the execution of the Contract or the respective rights and liabilities of the parties or in relation to interpretation of any provision in any manner touching upon the Contract, such dispute or difference shall (except as to any matters, the decision of which is specifically provided for therein) be referred by either party to the sole arbitration of an Arbitrator appointed by the Executive Director/ General Manager of the purchasing unit/ region/ division of BHEL. Vendor shall have no objection even if the Arbitrator so appointed is an employee of BHEL or has ever dealt/ had to deal with any matter relating to this Contract.
    Subject as aforesaid the provisions of the Arbitration and Conciliation Act, 1996 of India or any statutory modification or re-enactment thereof and the rules made there under and for the time being in force shall apply to the arbitration proceedings under this clause. It is a term of contract that the party initiating arbitration shall specify the dispute or disputes to be referred to arbitration under this clause together with the amount or amounts claimed in respect of each such dispute. The venue for the arbitration shall be Bangalore, India. The award of the arbitrator shall be a speaking award and shall be final, conclusive and binding on all parties to this contract.
    The cost of arbitration shall be borne equally by the parties. Notwithstanding the existence of any dispute or difference or any reference for the arbitration, the vendor shall proceed with and continue without hindrance the performance of the work under the contract with due diligence and expedition in a professional manner.

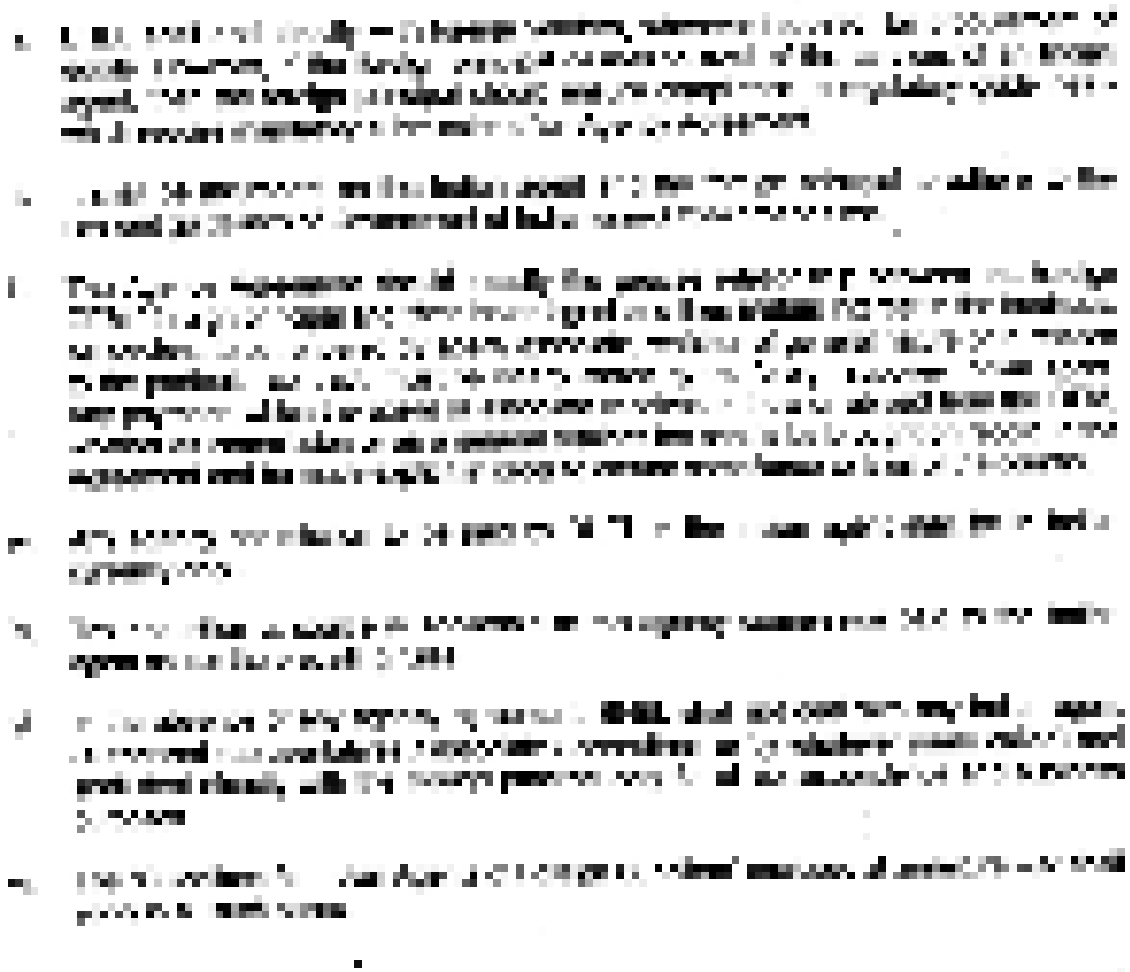
29. Applicable Laws and Jurisdiction of Courts:Prevailing Indian laws both substantive and procedural, including modifications thereto, shall govern the Contract.Subject to the conditions as aforesaid, the competent courts in Bangalore alone shall have jurisdiction to consider over any matters touching upon this contract.

30. General Terms: That any non-exercise, forbearance or omission of any of the powers conferred on BHEL and /or any of its authorities will not in any manner constitute waiver of the conditions hereto contained in these presents.
    That the headings used in this agreement are for convenience of reference only.
    That all notices etc., to be given under the Purchase order shall be in writing, type script or printed and if sent by registered post or by courier service to the address given in this document shall be deemed to have been served on the date when in the ordinary course, they would have been delivered to the addressee.

Annexure I

- **Definition of Indian Agent**: An Indian Agent of foreign prinicipal is an individual, a partnership, an association of persons, a private or pubile company, that carries our specific obligation(s) towards processing of BHEL tender or finalization or execution of BHEL's contract on behalf of the foreign supplier.

In case of yes, vendor to note the following and reply accordingly:



VENDOR SIGNATURE WITH SEAL

VENDOR SIGNATURE WITH SEAL

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ANNEXURE - II

LIST OF INTERNATIONAL GATEWAY AIRPORTS

For air based consignment, terms of delivery will be on FCA basis from following listed airports only. Vendors are requested to verify this list for use before submission of offer.

SCHEDULE NO	COUNTRY	CURRENCY CODE	AIRPORT
D01	UK	GBP	LONDON (HEATHROW)
D02	UK	GBP	NEW CASTLE
D03	UK	GBP	OXFORD. CHETLAM
D04	UK	GBP	BRISTOL. WELLINGBOROUGH
D05	UK	GBP	BIRMINGHAM
DO6	UK	GBP	EAST MIDLANDS
D07	UK	GBP	MANCHESTER
D08	UK	GBP	LEEDS
D09	UK	GBP	GLASGOW
D10	FRANCE	EURO	PARIS (ROISSY) & LYON
D11	SWEDEN	EURO	STOCKHOLM
D12	SWEDEN	EURO	GOTHENBERG & MALMO
D13	ITALY	EURO	ROMA, MILAN
D14	ITALY	EURO	TURIN, BOLOGNA, FLORENCE
D15	NETHERLANDS	EURO	AMSTERDAM, ROTTERDAM
D16	AUSTRIA	EURO	VIENNA, LINZ, GRAZ
D17	BELGIUM	EURO	ANTWERP, BRUSSELS
D18	DENMARK	DKK	COPENHAGEN
D19	JAPAN	JPY	TOKYO, OSAKA
D20	SINGAPORE	SGD	SINGAPORE
D21	CANADA	CAD	TORONTO
D22	CANADA	CAD	MONTREAL
D23	USA	USD	NEW YORK, BOSTON
D24	USA	USD	CHICAGO
D25	USA	USD	SAN FRANCISCO, LOS ANGELES
D26	USA	USD	ALANTA, HOUSTON
D27	GERMANY	EURO	MUNICH, KOLN, DUSSELDORF, HANNOVER, HAMBURG, STUTTGART, DAMSTADT, MANIHIEM, NURUMBERG
D28	GERMANY	EURO	FRANKFURT
D29	GERMANY	EURO	BERLIN
D30	SWITZERLAND	SFR	BASLE, ZURICH, GENEVA
D31	SPAIN	EURO	BARCELONA
D32	AUSTRALIA	AUD	SYDNEY
D33	AUSTRALIA	AUD	MELBOURNE
D34	AUSTRALIA	AUD	PERTH
D35	CZECH	EURO	PRAGUE
D36	HONG KONG	HKD	HONG KONG
D37	NEW ZELAND	NZD	AUCKLAND
D38	RUSSIA	USD	MOSCOW
D39	SOUTH KOREA	USD	KIMPO INTERNATIONAL, INCHEON
D40	FINLAND	EURO	HELSINKI
D41	ROMANIA	EURO	BUCHAREST
D42	NORWAY	EURO	OSLO
D43	IRELAND	EURO	DUBLIN
D44	ISRAEL	USD	TEL AVIV
D45	UAE	USD	DUBAI
D46	OMAN	USD	MUSCAT
D47	EGYPT	USD	CAIRO
D48	TAIWAN	USD	TAIPEI
D49	UKRAINE	USD	KIEV
D50	CHINA	USD	SHANGHAI, SHENZHEN
D51	PHILIPINES	USD	MANILA
D52	MALAYSIA	USD	KUALALUMPUR, PE NANG
D53	CYPRUS	USD	LARNACA
D54	SOUTH AFRICA	USD	JOHANNESBERG, DURBAN
D55	SLOVAKIA	EURO	BARTISLOVA
D56	SAUDI ARABIA	SAR	RIYADH
D57	TURKEY	EURO	ISTANBUL
D58	THAILAND	USD	BANGKOK
D59	BRAZIL	USD	SAO PAULO, RIO DE JANEIRO

ANNEXURE – III
DISCREPANCY IN WORDS & FIGURES – QUOTED IN PRICE BID

Following guidelines will be followed in case of discrepancy in words & figures-quoted in price bid:

(a) If, in the price structure quoted for the required goods/services/works, there is discrepancy between the unit price and the total price (which is obtained by multiplying the unit price by the quantity), the unit price shall prevail and the total price corrected accordingly, unless in the opinion of the purchaser there is an obvious misplacement of the decimal point in the unit price, in which case the total price as quoted shall govern and the unit price corrected accordingly.

(b) If there is an error in a total corresponding to the addition or subtraction of subtotals, the subtotals shall prevail and the total shall be corrected; and

(c) If there is a discrepancy between words and figures, the amount in words shall prevail, unless the amount expressed in words is related to an arithmetic error, in which case the amount in figures shall prevail subject to (a) and (b) above.

(d) If there is such discrepancy in an offer, the same shall be conveyed to the bidder with target date upto which the bidder has to send his acceptance on the above lines and if the bidder does not agree to the decision of the purchaser, the bid is liable to be ignored.

ANNEXURE - IV

Electronic Funds Transfer (EFT) OR

Paylink Direct Credit Form

Please Fill up the form in **CAPITAL LETTERS** only.

TYPE OF REQUEST(Tick one): _____ CREATE _____ CHANGE

BHEL Vendor / Supplier Code:	
Company Name :	
Permanent Account Number(PAN):	
Address	

City:	PINCODE		STATE	

Contact Person(s)	
Telephone No:	
Fax No:	
e-mail id:	

1	Bank Name:	
2	Bank Address:	
3	Bank Telephone No:	
4	Bank Account No:	
5	Account Type: Savings/Cash Credit	
6	9 Digit Code Number of Bank and branch appearing on MICR cheque issued by Bank	
7	Bank IFSC Code(applicable for NEFT)	
8	Bank IFSC code(applicable for RTGS)	(Indian Financial System Code)

A I hereby certify that the particulars given above are true, correct and complete and that I, as a representative for the above named Company, hereby authorise BHEL, EDN, Bangalore to electronically deposit payments to the designated bank account.

B If the transaction is delayed or not effected at all for reasons of incomplete or incorrect information, I would not hold BHEL / transfering Bank responsible.

C This authority remains in full force until BHEL, EDN,Bangalore receives written notification requesting a change or cancellation.

D I have read the contents of the covering letter and agree to discharge the responsibility expected of me as a participant under ECS / EFT.

Date:

Authorised Signatory:

Designation: Telephone No. with STD Code

Company Seal

Bank Certificate

We certify that_____has an Account No_____ with us and we confirm that the bank details given above are correct as per our records.

Date: (……..)

Place: Signature

Please return completed form **along with a blank cancelled cheque or photocopy** thereof to:

Bharath Heavy Electricals Ltd,

Attn:

Electronics Division, Mysore Road,

BANGALORE - 560 026

In case of any Querry, please call concerned purchase executive.

ANNEXURE - V
PRESENT PROCEDURE FOR SALE IN TRANSIT (HIGH SEA SALES)

In case of High Sea Sales, vendor should submit following documents:

1. **ORIGINAL HIGH SEA SALES AGREEMENT**
   - Sale agreement (on Rs. 200/- non-judicial stamp paper & notarised with 2 witnesses with identity) has to be signed between BHEL and the Party importing material. The date of the sale documents should be in between the date of House Air Way Bill / Bill of Lading and before landing of the goods in Indian origin.
   - The date of the stamp paper should be prior to the Air Way Bill / Bill of Lading date.
   - Following shall be included in the High Sea Sales Agreement:
     "THE BUYER ALSO UNDERTAKE DISCHARGES, THE OBLIGATION AND FULFILLMENT OF CONDITIONS, IF ANY, ATTACHED TO THE IMPORTATION, ASSESSMENT AND CLEARANCE OF THE GOODS IN TERMS CUSTOMS TARIFF ACT 1975, THE CUSTOMS ACT 1962 & RULES & REGULATIONS MADE THERE UNDER AND OTHER RELEVANT ACTS, ORDERS, NOTIFICATIONS**".**

2. **ORIGINAL INVOICES: INDIGENOUS RUPEE INVOICE & FOREIGN CURRENCY INVOICE**
   - Prices should be C.I.F., designated airport/seaport basis.
   - I.E.C., C.S.T., K.S.T. Nos. to be mentioned.
   - Description of item (Nomenclature), Unit & Quantity in both the Foreign Currency & the Indigenous Invoice in Rupee shall be exactly as per Purchase Order Description of item, Quantity and Unit. The Indigenous Invoice value shall be exactly as per Purchase Order value.
   - Seller should give Foreign Currency Invoice from the original consignor. The Foreign Currency Invoice value should be at least 2% (two per cent) less than the Indigenous Rupee Invoice value in equivalent foreign currency.

4. **ORIGINAL HOUSE AIR WAY BILL/ BILL OF LADING**
   - The sale agents should duly endorse House Air Way Bill (HAWB) for air shipments or original Bill of Lading (O.B.L.) for sea shipments and Foreign Currency Invoice in favour of BHEL-EDN.

5. **ORIGINAL CARGO ARRIVAL NOTICE FROM FORWARDER**.

6. **ORIGINAL DELIVERY ORDER ISSUED IN NAME OF BHEL-EDN.**

7. **ORIGINAL PACKING LIST.**

8. **A LETTER TO THE COMMISSIONER OF CUSTOMS FOR EFFECTING ABOVE SALE.**

9. **A LETTER TO THE DEPUTY ASSESSOR (OCTROI) FOR EFFECTING ABOVE SALE IN FAVOUR OF BHEL**.

REMARKS: In case vendor needs any clarifications on the above, the same may be sought in writing.

Annexure-VI

BHEL MEMBER BANKS (LIST OF CONSORTIUM BANKS)

BANK GUARANTEE (BG) SHALL BE ISSUED FROM THE FOLLOWING BANKS ONLY:

	Nationalised Banks		**Nationalised Banks**
1	Allahabad Bank	19	Vijaya Bank
2	Andhra Bank		**Public Sector Banks**
3	Bank of Baroda	20	IDBI
4	Canara Bank		**Foreign Banks**
5	Corporation Bank	21	CITI Bank N.A
6	Central Bank	22	Deutsche Bank AG
7	Indian Bank	23	The Hongkong and Shanghai Banking Corporation Ltd. (HSBC)
8	Indian Overseas Bank	24	Standard Chartered Bank
9	Oriental Bank of Commerce	25	J P Morgan
10	Punjab National Bank		
11	Punjab & Sindh Bank		**Private Banks**
12	State Bank of India	26	Axis Bank
13	State Bank of Hyderabad	27	The Federal Bank Limited
14	Syndicate Bank	28	HDFC Bank
15	State Bank of Travancore	29	Kotak Mahindra Bank Ltd
16	UCO Bank	30	ICICI Bank
17	Union Bank of India	31	IndusInd Bank
18	United Bank of India	32	Yes Bank

Note:

- All BGs must be issued from BHEL consortium banks listed above.
- This list is subject to changes. Hence vendors are requested to check this list every time before issuing BGs.
- Bank Guarantees issued by Co-Operative Banks/Financial Institutions cannot to be accepted under any circumstance.

Annexure-VII

BANK GUARANTEE FOR PERFORMANCE SECURITY

Bank Guarantee No:

Date:

To

NAME

& ADDRESSES OF THE BENEFICIARY

Dear Sirs,

In consideration of Bharat Heavy Electricals Limited (hereinafter referred to as the 'Employer' which expression shall unless repugnant to the context or meaning thereof, include its successors and permitted assigns) incorporated under the Companies Act, 1956 and having its registered office at _____[1] through its Unit atŭ ŭ ŭ ŭ ŭ ŭ ŭ ..(name of the Unit) having awarded to (Name of the Vendor / Contractor / Supplier) with its registered office at_____[2] hereinafter referred to as the ' Vendor / Contractor / Supplier ', which expression shall unless repugnant to the context or meaning thereof, include its successors and permitted assigns), a contract Ref Noŭ ŭ ŭ ŭ ŭ ŭ ŭ ŭ dated ŭ ŭ ŭ ŭ ŭ ŭ ŭ ŭ ŭ ŭ ŭ ŭ ŭ .[3] valued at Rsŭ ŭ ŭ ŭ [4] (Rupees ----------)/FCŭ ŭ ŭ ŭ ŭ ŭ (in wordsŭ ŭ ŭ ..) for ŭ ŭ ŭ ŭ ŭ ŭ ŭ ŭ ŭ ŭ [5] (hereinafter called the 'Contract') and the Vendor / Contractor / Supplier having agreed to provide a Contract Performance Bank Guarantee, equivalent to ŭ ŭ % (ŭ . Percent) of the said value of the Contract to the Employer for the faithful performance of the Contract,

we, ŭ ŭ ŭ ŭ ŭ ŭ ŭ , (hereinafter referred to as the Bank), having registered/Head office at ŭ ŭ ŭ ŭ ŭ . and inter alia a branch at ŭ ŭ ŭ ŭ being the Guarantor under this Guarantee, hereby, irrevocably and unconditionally undertake to forthwith and immediately pay to the Employer any sum or sums upto a maximum amount of Rs ---------- [6] (Rupees ----------) without any demur, immediately on first demand from the Employer and without any reservation, protest, and recourse and without the Employer needing to prove or demonstrate reasons for its such demand.

Any such demand made on the Bank shall be conclusive as regards the amount due and payable by the Bank under this guarantee. However, our liability under this guarantee shall be restricted to an amount not exceeding Rs. _____.

We undertake to pay to the Employer any money so demanded notwithstanding any dispute or disputes raised by the Vendor / Contractor / Supplier in any suit or proceeding pending before any Court or Tribunal, Arbitrator or any other authority, our liability under this present being absolute and unequivocal.

The payment so made by us under this Guarantee shall be a valid discharge of our liability for payment thereunder and the Vendor / Contractor / Supplier shall have no claim against us for making such payment.

We the ŭ ŭ ŭ ŭ ŭ ŭ ŭ ŭ bank further agree that the guarantee herein contained shall remain in full force and effect during the period that would be taken for the performance of the said Contract/satisfactory completion of the performance guarantee period as per the terms of the Contract and that it shall continue to be enforceable till

all the dues of the Employer under or by virtue of the said Contract have been fully paid and its claims satisfied or discharged.

We ŭ ŭ ŭ ŭ ŭ ..BANK further agree with the Employer that the Employer shall have the fullest liberty without our consent and without affecting in any manner our obligations hereunder to vary any of the terms and conditions of the said Contract or to extend time of performance by the said Vendor / Contractor / Supplier from time to time or to postpone for any time or from time to time any of the powers exercisable by the Employer against the said Vendor / Contractor / Supplier and to forbear or enforce any of the terms and conditions relating to the said Contract and we shall not be relieved from our liability by reason of any such variation, or extension being granted to the said Vendor / Contractor / Supplier or for any forbearance, act or omission on the part of the Employer or any indulgence by the Employer to the said Vendor / Contractor / Supplier or by any such matter or thing whatsoever which under the law relating to sureties would but for this provision have effect of so relieving us.

The Bank also agrees that the Employer at its option shall be entitled to enforce this Guarantee against the Bank as a principal debtor, in the first instance without proceeding against the Vendor / Contractor / Supplier and notwithstanding any security or other guarantee that the Employer may have in relation to the Vendor / Contractor / Supplier 's liabilities.

This Guarantee shall remain in force upto and includingŭ ŭ ŭ ŭ ŭ ŭ ŭ ŭ ŭ ŭ .. [7] and shall be extended from time to time for such period as may be desired by Employer.

This Guarantee shall not be determined or affected by liquidation or winding up, dissolution or change of constitution or insolvency of the Vendor / Contractor / Supplier but shall in all respects and for all purposes be binding and operative until payment of all money payable to the Employer in terms thereof.

Unless a demand or claim under this guarantee is made on us in writing on or before the ŭ ŭ ŭ ŭ ŭ ŭ ŭ ŭ ŭ ŭ ŭ .[8]we shall be discharged from all liabilities under this guarantee thereafter.

We, ŭ ŭ ŭ ŭ ŭ ŭ BANK lastly undertake not to revoke this guarantee during its currency except with the previous consent of the Employer in writing.

Notwithstanding anything to the contrary contained hereinabove:

a) The liability of the Bank under this Guarantee shall not exceedŭ ŭ ŭ ŭ ŭ ŭ ŭ ŭ ŭ ŭ [6]
b) This Guarantee shall be valid up to ŭ ŭ ŭ ŭ ŭ ŭ [7]
c) Unless the Bank is served a written claim or demand on or before _____[8] all rights under this guarantee shall be forfeited and the Bank shall be relieved and discharged from all liabilities under this guarantee irrespective of whether or not the original bank guarantee is returned to the Bank.

We, _____ Bank, have power to issue this Guarantee under law and the undersigned as a duly authorized person has full powers to sign this Guarantee on behalf of the Bank.

For and on behalf of
(Name of the Bank)

Datedŭ ŭ ŭ ŭ ŭ .

Place of Issueŭ ŭ ŭ ŭ ŭ .

[1] *NAME AND ADDRESS OF EMPLOYER I.e Bharat Heavy Electricals Limited*

[2] *NAME AND ADDRESS OF THE VENDOR /CONTRACTOR / SUPPLIER.*

[3] *DETAILS ABOUT THE NOTICE OF AWARD/CONTRACT REFERENCE*

[4] *CONTRACT VALUE*

[5] *PROJECT/SUPPLY DETAILS*

[6] *BG AMOUNT IN FIGURES AND WORDS*

[7] *VALIDITY DATE*

[8] *DATE OF EXPIRY OF CLAIM PERIOD*

Annexure – VIII
(Applicable only for MSE suppliers)
Certificate by Chartered Accountant on Letter Head

This is to certify that M/s …….. …… ……(hereinafter referred to as `Company') having its registered office at ……. is registered under MSMED Act 2006, (Entrepreneur Memorandum No (Part-11 …… dtd ……, Category: …… (Micro/Small) (Copy enclosed).

Further verified from the Books of Accounts that the investment of the company as per the latest audited financial year**……..** as per MSMED Act 2006 is as follows:

1. **For Manufacturing Enterprises:** Investment in plant and machinery (i.e. original cost excluding land and building and the items specified by the Ministry of Small Scale Industries vide its notification No.S.O.1722 (E) dated October 5, 2006:
   Rs……..Lacs.

2. **For Service Enterprises:** Investment in equipment (original cost excluding land and building and furniture, fittings and other items not directly related to the service rendered or as may be notified under the MSMED Act, 2006:
   Rs. ……Lacs.

The above investment of Rs. ……Lacs in within permissible limit of Rs……Lacs for…….Micro / Small (Strike off which is not applicable) Category under MSMED Act 2006.

Or

The company has been graduated from its original category (Micro/ Small) (**Strike off which is not applicable**) and the date of graduation of such enterprise from its original category is …….. (dd/mm/yyyy) which is within the period of 3 years from the date of graduation of such enterprise from its original category as notified vide S.O. No. 3322(E) dated 01.11.2013 published in the gazette notification dated 04.11.2013 by Ministry of MSME.

Date:

(Signature)

Name:

Membership Number: Seal of Chartered Accountant

Annexure-IX

INTEGRITY PACT

Between

Bharat Heavy Electricals Ltd. (BHEL), a company registered under the Companies Act 1956 and having its registered office at "BHEL House", Siri Fort, New Delhi – 110049 (India) hereinafter referred to as "The Principal", which expression unless repugnant to the context or meaning hereof shall include its successors or assigns of the ONE PART

and

_____, (description of the party along with address), hereinafter referred to as "The Bidder/ Contractor" which expression unless repugnant to the context or meaning hereof shall include its successors or assigns of the OTHER PART

Preamble

The Principal intends to award, under laid-down organizational procedures, contract/s for _____

_____

_____. The Principal values full compliance with all relevant laws of the land, rules and regulations, and the principles of economic use of resources, and of fairness and transparency in its relations with its Bidder(s)/ Contractor(s).

In order to achieve these goals, the Principal will appoint Independent External Monitor(s), who will monitor the tender process and the execution of the contract for compliance with the principles mentioned above.

Section 1 – Commitments of the Principal

1.1 The Principal commits itself to take all measures necessary to prevent corruption and to observe the following principles:-

1.1.1 No employee of the Principal, personally or through family members, will in connection with the tender for, or the execution of a contract, demand, take a promise for or accept, for self or third person, any material or immaterial benefit which the person is not legally entitled to.

1.1.2 The Principal will, during the tender process treat all Bidder(s) with equity and reason. The Principal will in particular, before and during the tender process, provide to all Bidder(s) the same information and will not provide to any Bidder(s) confidential / additional information through which the Bidder(s) could obtain an advantage in relation to the tender process or the contract execution.

1.1.3 The Principal will exclude from the process all known prejudiced persons.

1.2 If the Principal obtains information on the conduct of any of its employees which is a penal offence under the Indian Penal Code 1860 and Prevention of Corruption Act 1988 or any other statutory penal enactment, or if there be a substantive suspicion in this regard, the Principal will inform its Vigilance Office and in addition can initiate disciplinary actions.

Section 2 – Commitments of the Bidder(s)/ Contractor(s)

2.1 The Bidder(s)/ Contractor(s) commit himself to take all measures necessary to prevent corruption. He commits himself to observe the following principles during his participation in the tender process and during the contract execution.

2.1.1 The Bidder(s)/ Contractor(s) will not, directly or through any other person or firm, offer, promise or give to the Principal or to any of the Principal's employees involved in the tender process or the execution of the contract or to any third person any material, immaterial or any other benefit which he / she is not legally entitled to, in

order to obtain in exchange any advantage of any kind whatsoever during the tender process or during the execution of the contract.

2.1.2 The Bidder(s)/ Contractor(s) will not enter with other Bidder(s) into any illegal or undisclosed agreement or understanding, whether formal or informal. This applies in particular to prices, specifications, certifications, subsidiary contracts, submission or non-submission of bids or any other actions to restrict competitiveness or to introduce cartelization in the bidding process.

2.1.3 The Bidder(s)/ Contractor(s) will not commit any penal offence under the relevant IPC/ PC Act; further the Bidder(s)/ Contractor(s) will not use improperly, for purposes of competition or personal gain, or pass on to others, any information or document provided by the Principal as part of the business relationship, regarding plans, technical proposals and business details, including information contained or transmitted electronically.

2.1.4 The Bidder(s)/ Contractor(s) will, when presenting his bid, disclose any and all payments he has made, and is committed to or intends to make to agents, brokers or any other intermediaries in connection with the award of the contract.

2.2 The Bidder(s)/ Contractor(s) will not instigate third persons to commit offences outlined above or be an accessory to such offences.

Section 3 – Disqualification from tender process and exclusion from future contracts

If the Bidder(s)/ Contractor(s), before award or during execution has committed a transgression through a violation of Section 2 above, or acts in any other manner such as to put his reliability or credibility in question, the Principal is entitled to disqualify the Bidders(s)/ Contractor(s) from the tender process or take action as per the separate "Guidelines for Suspension of Business Dealings with Suppliers/ Contractors" framed by the Principal.

Section 4 – Compensation for Damages

4.1 If the Principal has disqualified the Bidder(s) from the tender process prior to the award according to Section 3, the Principal is entitled to demand and recover the damages equivalent to Earnest Money Deposit/ Bid Security.

4.2 If the Principal has terminated the contract according to Section 3, or if the Principal is entitled to terminate the contract according to section 3, the Principal shall be entitled to demand and recover from the Contractor liquidated damages equivalent to 5% of the contract value or the amount equivalent to Security Deposit/Performance Bank Guarantee, whichever is higher.

Section 5 – Previous Transgression

5.1 The Bidder declares that no previous transgressions occurred in the last 3 years with any other company in any country conforming to the anti-corruption approach or with any other Public Sector Enterprise in India that could justify his exclusion from the tender process.

5.2 If the Bidder makes incorrect statement on this subject, he can be disqualified from the tender process or the contract, if already awarded, can be terminated for such reason.

Section 6 – Equal treatment of all Bidders/ Contractors/ Sub-contractors

6.1 The Bidder(s)/ Contractor(s) undertake(s) to demand from his sub-contractors a commitment consistent with this Integrity Pact. This commitment shall be taken only from those sub-contractors whose contract value is more than 20% of Bidder's/ Contractor's contract value with the Principal.

6.2 The Principal will enter into agreements with identical conditions as this one with all Bidders and Contractors.

6.3 The Principal will disqualify from the tender process all bidders who do not sign this pact or violate its provisions.

Section 7 – Criminal Charges against violating Bidders/ Contractors /Sub-contractors

If the Principal obtains knowledge of conduct of a Bidder, Contractor or Subcontractor, or of an employee or a representative or an associate of a Bidder, Contractor or Subcontractor which constitutes corruption, or if the Principal has substantive suspicion in this regard, the Principal will inform the Vigilance Office.

Section 8 –Independent External Monitor(s)

8.1 The Principal appoints competent and credible Independent External Monitor for this Pact. The task of the Monitor is to review independently and objectively, whether and to what extent the parties comply with the obligations under this agreement.

8.2 The Monitor is not subject to instructions by the representatives of the parties and performs his functions neutrally and independently. He reports to the CMD, BHEL.

8.3 The Bidder(s)/ Contractor(s) accepts that the Monitor has the right to access without restriction to all contract documentation of the Principal including that provided by the Bidder(s)/ Contractor(s). The Bidder(s)/ Contractor(s) will grant the monitor, upon his request and demonstration of a valid interest, unrestricted and unconditional access to his contract documentation. The same is applicable to Sub-contractor(s). The Monitor is under contractual obligation to treat the information and documents of the Bidder(s)/ Contractor(s) / Sub-contractor(s) with confidentiality.

8.4 The Principal will provide to the Monitor sufficient information about all meetings among the parties related to the contract provided such meetings could have an impact on the contractual relations between the Principal and the Contractor. The parties offer to the Monitor the option to participate in such meetings.

8.5 As soon as the Monitor notices, or believes to notice, a violation of this agreement, he will so inform the Management of the Principal and request the Management to discontinue or

take corrective action, or heal the situation, or to take other relevant action. The Monitor can in this regard submit non-binding recommendations. Beyond this, the Monitor has no right to demand from the parties that they act in a specific manner, refrain from action or tolerate action.

8.6 The Monitor will submit a written report to the CMD, BHEL within 8 to 10 weeks from the date of reference or intimation to him by the Principal and, should the occasion arise, submit proposals for correcting problematic situations.

8.7 The CMD, BHEL shall decide the compensation to be paid to the Monitor and its terms and conditions.

8.8 If the Monitor has reported to the CMD, BHEL, a substantiated suspicion of an offence under relevant IPC / PC Act, and the CMD, BHEL has not, within reasonable time, taken visible action to proceed against such offence or reported it to the Vigilance Office, the Monitor may also transmit this information directly to the Central Vigilance Commissioner, Government of India.

8.9 The number of Independent External Monitor(s) shall be decided by the CMD, BHEL.

8.10 The word 'Monitor' would include both singular and plural.

Section 9 – Pact Duration

9.1 This Pact begins when both parties have legally signed it. It expires for the Contractor 12 months after the last payment under the respective contract and for all other Bidders 6 months after the contract has been awarded.

9.2 If any claim is made / lodged during this time, the same shall be binding and continue to be valid despite the lapse of this pact as specified as above, unless it is discharged/ determined by the CMD, BHEL.

Section 10 – Other Provisions

10.1 This agreement is subject to Indian Laws and jurisdiction shall be registered office of the Principal, i.e. New Delhi.

10.2 Changes and supplements as well as termination notices need to be made in writing. Side agreements have not been made.

10.3 If the Contractor is a partnership or a consortium, this agreement must be signed by all partners or consortium members.

10.4 Should one or several provisions of this agreement turn out to be invalid, the remainder of this agreement remains valid. In this case, the parties will strive to come to an agreement to their original intentions.

10.5 Only those bidders/ contractors who have entered into this agreement with the Principal would be competent to participate in the bidding. In other words, entering into this agreement would be a preliminary qualification.

----------	----------
For & On behalf of the Principal	For & On behalf of the Bidder/ Contractor
(Office Seal)	(Office Seal)

Place----------

Date----------

Witness: _____	Witness: _____
(Name & Address) _____	(Name & Address)_____
_____	_____

Registration of Suppliers

unregistered Supplier: Supplier visits EPS at https://bheleps.buyjunction.in

a. Supplier visits EPS at https://bheleps.buyjunction.in
b. Clicks "REGISTER" for registration
c. Fills up the Registration Page form
d. MJ will ensure Authentication of Registration [1]
e. Supplier logs in with the ID and password
f. Supplier Maps the signing Certificate
g. MJ will ensure the authentication the signing certificate [1].
h. Supplier Logs in to the system again and views the RFQ
i. Supplier Attaches himself to the RFQ by clicking the Interested button
j. Supplier fills the bid template and makes necessary attachments
k. Supplier submits his bid by clicking CONFIRM.

NB:-

[1] -- BHEL Administrator or user will have no role for approving Registration and Open Tenders and DSC for Any supplier who has registered himself from the front END which is in case of OT.

- ***For registered Supplier***:
  - Supplier visits EPS home page
  - Supplier signs in with his/her user id and password
  - Selects the RFQ Code and views it.
  - Attaches himself to the RFQ by clicking the Interested button
  - Supplier fills the bid template and makes necessary attachments
  - Supplier submits his bid by clicking CONFIRM.