

CLAUSE NO.	TECHNICAL REQUIREMENTS			
10.05.00	Bricks Bricks shall be table mounted/ machine made of uniform size, shape and sharp edges and shall have minimum compressive strength of 50kg/cm ² . Burnt clay fly ash bricks and fly ash lime bricks shall conform to IS:13757 and IS:12894 respectively. Minimum fly ash content in fly ash based bricks shall be minimum 25%. Common burnt clay bricks shall conform to IS:1077.			
10.06.00	Foundation Bolts Material and details of foundation bolts shall conform to IS:5624. Mild steel bars used for the fabrication of bolt assembly shall conform to grade 1of IS432 and/ or grade A of IS:2062. Hexagonal nuts and lock nuts shall conform to IS 1363 & IS1364 upto M36 diameter and IS 5624 for M42 to M150 diameter.			
10.07.00	Stainless steel The material specification for stainless steel plates are mentioned in the design concept area of Mill Bunker building.			
10.08.00	Water Water used for cement concrete, mortar, plaster, grout, curing, washing of coarse aggregate, soaking of bricks, etc. shall be clean and free from oil, acids, alkalis, organic matters or other harmful substances in such amounts that may impair the strength or durability of the structure. Potable water shall generally be considered satisfactory for all masonry and concrete works, including curing. When water from the proposed source is used for making the concrete, the maximum permissible impurities, development of strength and initial setting time of concrete shall meet the requirements of IS:456. All materials brought for incorporation in works shall be of best quality as per IS unless specified otherwise.			
10.08.00	Statutory Requirements Bidder shall comply with all the applicable statutory rules pertaining to Factories Act, Fire Safety Rules at Tariff Advisory Committee. Water Act for pollution control, Explosives Act, etc. Provisions of safety, health and welfare according to Factories Act shall be complied with. These shall include provision of continuous walkways along the crane - girder level on both sides of building, comfortable approach to EOT crane cabin, railing, fire escape, locker room for workmen, pantry, toilets, rest room etc. Provisions for fire proof doors, number of staircases, fire separation wall, lath plastering/encasing the structural members (in fire prone areas), type of glazing etc. shall be made according to the recommendations of Tarrif Advisory Committee. Statutory clearances and norms of State Pollution Control Board shall be followed. Bidder shall obtain approval of Civil/Architectural drawings from concerned authorities before taking up the construction work.			
EPC PACKAGE FOR PATRATU SUPER THERMAL POWER STATION EXPANSION PHASE-I (3X 800MW)		TECHNICAL SPECIFICATION SECTION-VI, PART-B BID DOC NO. CS--9585-001-2	SUB-SECTION-D-01 CIVIL WORKS	PAGE 179 OF 340

3X800 MW PVUNL PATRATU TPP PHASE-1

TECHNICAL SPECIFICATION FOR FUEL OIL HANDLING SYSTEM

SECTION- IA QUALITY ASSURANCE AND INSPECTION REQUIREMENT



**BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR PROJECT ENGINEERING MANAGEMENT
PPEI, NOIDA-INDIA**

STANDARD CHECL LIST FOR :Insulation & Cladding PACKAGE-FULE OIL SYSTEM PROJECT- CHECL LIST NO.:PE-QP-XXX-166-A801 REV.NO. 0								
DATE: 31/03/2012								
SL. No.	TESTS/CHECKS	QUANTUM OF CHECKS	REFERENCE DOC./ ACCEPTANCE NORMS	AGENCY				REMARKS
				M	C	N	D	
1.0	Review of Manufacturer's TC for Mineral wool	Sampling as per IS:8183	Appd.Data Sheet/ IS:8183	P	V	V	√	Ref, Note 1
2.0	Review of Material TC for Aluminium sheet	One/Lot	Appd.Data Sheet/ IS:737	P	V	V	√	Ref. Note 2
2.1	Dimensional Check	At random (10%)	-do-	P	V	V	√	
3.0	Packing & Marking	100%	IS:8183/Mfr's Std.	P	V	V	√	
Legend: Records identified with "√" shall be essentially included by contractor in QA documentation M= Manufacturer, C= Main Vendor N= BHEL/Customer P= Perform, W= Witness, V= Verification Note:1.MTC Will comprise the tests in line with IS:8183 2. MTC will Comprise of chemical & mechanical properties.								
MAIN VENDOR/SUB-VENDOR (SIGN WITH DATE & STAMP)				REVIEWING AGENCY (SIGN WITH DATE & STAMP)		APPROVING AGENCY (SIGN WITH DATE & STAMP)		



STANDARD CHECK LIST FOR: PRESSURE REDUCING VALVE

PACKAGE-FULE OIL SYSTEM

PROJECT-

CHECK LIST NO.:PE-QP-XXX-166-A802

REV.NO. 0

DATE: 31/03/2012

SL. No.	TESTS/CHECKS	QUANTUM OF CHECKS	REFERENCE DOC./ ACCEPTANCE NORMS	AGENCY				REMARKS
				M	C	N	D	
1	Review of Material TC for body & diaphragm	One/Lot	Appd.Data Sheet/ Relevant Std.	P	V	V	✓	
2	Hydro test of body	100%	Appd.Data Sheet	P	W	V	✓	
3	End Connection	100%	-do-	P	W	V	✓	
4	Check for IBR TC	100%	-do-	P	V	V	✓	

Legend:

Records identified with ' ✓ shall be essentially included by contractor in QA documentation

M= Manufacturer, C= Main vendor/Sub vendor

N= BHEL/Customer,

P= Perform, W= Witness, V= Verification

Note: 1.For IBR Valves, no physical inspection is carried out by contractor/customer.Material will be accepted based on review of IBR Test Certificates.

MAIN VENDOR/SUB-VENDOR
(SIGN WITH DATE & STAMP)

REVIEWING AGENCY
(SIGN WITH DATE & STAMP)

APPROVING AGENCY
(SIGN WITH DATE & STAMP)



QUALITY PLAN NO.:PE-QP-XXX-166-A804

PACKAGE-FULE OIL SYSTEM

PROJECT-

REV.NO.	0	DATE:	31/03/2012
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SHEET **1 OF 1**

* In case material is procured from dealer, and co-related TCs are not available, check test on identified sample will be carried out at testing laboratory.

** In case material is despatched directly from SAIL/TISCO plant/Stock yard to project site, the witnessing required is waived and material will be accepted on MTC of SAIL/TISCO

LEGEND

CR - Critical characteristics
MA - Major characteristics
MI - Minor characteristics

P - Agency Performing the Test.
W - Agency Witnessing the Test.
V - Agency Verifying the Test.

1 - BHEL 4-CUSTOMER
2 - Vendor
3 - Sub-vendor

MAIN VENDOR/SUB-VENDOR
(SIGN WITH DATE & STAMP)

**REVIEWING AGENCY
(SIGN WITH DATE & STAMP)**

APPROVING AGENCY
(SIGN WITH DATE & STAMP)

STANDARD CHECK LIST FOR: :Safety Relief Valve
 PACKAGE-FULE OIL SYSTEM
 PROJECT-
 CHECK LIST NO.:PE-QP-XXX-166-A805
 REV.NO.0
 DATE:31/03/2012



SL. No.	TESTS/CHECKS	QUANTUM OF CHECKS	REFERENCE DOC./ ACCEPTANCE NORMS	AGENCY				REMARKS
				M	C	CU	D	
1	Review of Material TC for body & stem	One/Lot	Appd.Data Sheet/ Relevant Std.	P	V	V	✓	
2	Hydro test of body	100%	Appd.Data Sheet	P	W	V	✓	
3	Set pressure	100%	-do-	P	W	V	✓	
4	Check for IBR TC	100%	-do-	P	V	V	✓	

Legend:

Records identified with ' ✓ shall be essentially included by contractor in QA documentation

M= Manufacturer, C= Main vendor

CU=BHEL/Customer

P= Perform, W= Witness, V= Verification

For IBR Valves, no physical inspection carried out by contractor/customer. Material will be accepted based on review of IBR test certificates.

MAIN VENDOR/SUB-VENDOR
 (SIGN WITH DATE & STAMP)

REVIEWING AGENCY
 (SIGN WITH DATE & STAMP)

APPROVING AGENCY
 (SIGN WITH DATE & STAMP)

			STANDARD QUALITY PLAN FOR SUMP PUMP				QUALITY PLAN NO.: PE-QP-XXX-166-A807 PACKAGE-FULE OIL SYSTEM PROJECT- REV.NO. 0 SHEET 1 OF 2 DATE: 31/03/2012						
SL. NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY				REMARKS
1	2	3	4	5	6	7	8	9	M	C	CU	D	11
1.0	RAW MATERIAL												
1.1	CASING/ROTOR(IMPELLER) HOUSING	i) SURFACE DEFECTS ii) DIMENSIONAL CONFORMITY iii) MECHANICAL & CHEMICAL TEST iv) HARDNESS TEST	MAJOR	VISUAL MEASUREMENT PHYSICAL PROPERTIES/ CHEM. ANALYSIS MEASUREMENT	100% 100% 1/HEAT 100%	APPD.DATA SHEET/ DRG./ MFR's DRG./IS:210 Gr. FG 200/RELEVANT STD.	APPD.DATA SHEET/ DRG./ MFR's DRG./IS:210 Gr. FG 200/RELEVANT STD.	IR & TC	P	V	-		
1.2	IMPELLER	i) SURFACE DEFECTS ii) DIMENSIONAL CONFORMITY ii) MECHANICAL & CHEMICAL TEST iv) HARDNESS v) DYPENETRATION TEST (AFTER MACHINING)	MAJOR	VISUAL MEASUREMENT PHYSICAL PROPERTIES/ CHEM. ANALYSIS MEASUREMENT DYPENETRATION TEST	100% 100% 1/HEAT 100% 100%	APPD.DATA SHEET/DRG. MFR's DRG./ RELEVANT STD.	APPD.DATA SHEET/DRG. MFR's DRG./ RELEVANT STD.	IR & TC	P	V	-		
1.3	SHAFT	i) DIMENSIONAL CONFORMITY ii) MECHANICAL & CHEMICAL TEST iii) UT DIA > 50MM **	MAJOR	MEASUREMENT PHYSICAL PROPERTIES/ CHEM. ANALYSIS UT	100% 1/HEAT 100%	MFR's DRG./ APPD. DATA SHEET/ MFR's CATALOGUE ASTM A388	MFR's DRG./ MFR's CATALOGUE/ RELEVANT STD. ASTM A388	IR & TC	P	V	-		
1.4	SHAFT SLEEVE	i) CHEMICAL ANALYSIS ii) HARDNESS	MAJOR	CHEMICAL MEASUREMENT	1/HEAT 100%	MFR's STD./MFR's CATALOGUE	RELEVANT STANDARD/ IS	IR & TC	P	V	-		
1.5	WEARING RINGS	i) MECHANICAL & CHEMICAL TEST ii) HARDNESS	MAJOR	PHYSICAL PROPERTIES/ CHEM. PROPERTIES MEASUREMENT	1/HEAT 100%	MFR's STD./MFR's CATALOGUE	RELEVANT STANDARD/ IS	IR & TC	P	V	-		
LEGEND: RECORDS IDENTIFIED WITH " ✓ " SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENT. M - MANUFACTURER C - MAIN VENDOR CU - BHEL/CUSTOMER INDICATE "P" PERFORM "W" WITNESS AND V. VERIFICATION IR - INSPECTION REPORT, MTC - MTRL/MFR'S TEST CERTIFICATES MAIN VENDOR/SUB-VENDOR (SIGN WITH DATE & STAMP)													
REVIEWING AGENCY (SIGN WITH DATE & STAMP)													
APPROVING AGENCY (SIGN WITH DATE & STAMP)													

		STANDARD QUALITY PLAN FOR SUMP PUMP				QUALITY PLAN NO.: PE-QP-XXX-166-A807 PACKAGE-FULE OIL SYSTEM PROJECT- REV.NO. 0 SHEET 2 OF 2				DATE: 31/03/2012			
SL. NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY				REMARKS
1	2	3	4	5	6	7	8	9	M	C	CU	D	11
2.0	INTERNAL TEST												
2.1	CASING	SOUNDNESS OF CASTING	MAJOR	HYDROSTATIC TEST	100%	HYDROSTATIC TEST AT 200% OF PUMP RATED HEAD OR 150% SHUT OFF HEAD WHICHEVER IS HIGHER FOR 30 MTS.	NO LEAKAGE	IR & TC	P	V	V	✓	
2.2	SHAFT	DP ON SHAFT	MAJOR	DPT	100%	ASME E165	NO LINEAR DEFECTS	IR & TC	P	V	V	✓	
2.3	IMPELLER	RESIDUAL UNBALANCE	MAJOR	DYNAMIC/STATIC BALANCING	100%	ISO 1940 GR.6.3	ISO 1940 GR.6.3	IR & TC	P	V	V	✓	
3.0	FINAL INSPECTION												
3.1	OVERALL DIMENSION	DIMENSIONAL	MAJOR	MEASUREMENT	100%	APPD. DRAWING/ MFR's DRAWING	APPD. DRAWING/ MFR's DRAWING	IR & TC	P	W	W	✓	
3.2	PERFORMANCE TEST WITH LAB MOTOR	i) Q V/s HEAD ii) Q V/s POWER iii) Q V/s EFFICIENCY iv) NOISE LEVEL & VIBRATION	CRITICAL	MEASUREMENT	100%	APPD.DRG./MFR's DRG./APPROVED. DATASHEET/HIS	APPD.DRG./MFR's DRG./APPROVED. DATASHEET/HIS	IR & TC	P	W	W	✓	
3.3	STRIP TEST	STRIP TEST	CRITICAL	VISUAL (WEAR & TEAR)		**	85 dBA MAX. AT 1Mtr, & 75 MICRON MAX. NO UNDUE WEAR	IR & TC	P	W	W	✓	
3.4	REVIEW OF DOCUMENTATIONS					APPD. QAP	APPD. QAP		V	V	V	✓	
3.5	PAINTING	VISUAL	MINOR	VISUAL	100%	SPECIFICATION/ PAINTING SCH-EDULE/Mfr's Std.	SPECIFICATION/ PAINTING SCH-EDULE/Mfr's Std.	IR	P	V	-		** STRIP DOWN TEST ON 100% BASIS SHALL BE DONE INCASE ABNORMAL PERFORMANCE OTHERWISE SAME SHALL BE RESTRICTED TO BEARING INSPECTION ONLY
NOTE: ALL MATERIAL OF CONSTRUCTION SHALL BE AS PER APPROVED DATA SHEET/DRAWING													
LEGEND: RECORDS IDENTIFIED WITH " ✓ " SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENT. M - MANUFACTURER C - MAIN VENDOR CU - BHEL/CUSTOMER INDICATE "P" PERFORM "W" WITNESS AND V VERIFICATION IR - INSPECTION REPORT, MTC - MTRL/MFR'S TEST CERTIFICATES													
MAIN VENDOR/SUB-VENDOR (SIGN WITH DATE & STAMP)				REVIEWING AGENCY (SIGN WITH DATE & STAMP)				APPROVING AGENCY (SIGN WITH DATE & STAMP)					

		STANDARD QUALITY PLAN FOR BALL VALVE					QUALITY PLAN NO.: PE-QP-XXX-166-A808 PACKAGE-FULE OIL SYSTEM PROJECT- REV.NO. 0 SHEET 1 OF 3							DATE: 31/03/2012	
SL. NO.	COMPONENT & OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY				REMARKS		
1	2	3	4	5	6	7	8	9	D	M	C	CU	10		
1.0	MATERIALS:														
1.1	BODY & END PIECE	CHEMICAL COMPOSITION	CRITICAL	CHEM. TEST	ONE/ HEAT	APPD.DRG./ DATA SHEET	APPD.DRG./ DATA SHEET/ RELEVANT STD.	MATRL. TC/ MFR'S TC	✓	P	V	V			
		MECHANICAL PROPERTIES	- DO -	MECH. TEST	ONE/HEAT/ HEAT TREAT- MENT BATCH	- DO -	- DO -	- DO -	✓	P	V	V			
		HEAT TREATMENT	- DO -	REVIEW OF HT CHART	100%	- DO -	- DO -	- DO -/HT CHART	✓	P	V	V			
		IDENTIFICATION & CORRELATION	MAJOR	VISUAL	100%	- DO -	- DO -	INTERNAL RECORD		P	V	-			
		SURFACE DEFECTS	- DO -	- DO -	100%	MSS-SP-55	FREE FROM DEFECTS	- DO -	✓	P	V	-			
		DIMENSIONAL	- DO -	MEASU- REMENT	100%	APPD. DRG./ RELEVANT STD.	APPD. DRG./ RELEVANT STD.	LOG BOOK		P	V	-			
LEGEND: RECORDS, IDENTIFIED WITH ✓ ' SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION. M: MANUFACTURER . C: MAIN VENDOR, CU: BHEL/CUSTOMER INDICATE "P" PERFORM, "W" WITNESS AND "V" VERIFICATION															
MAIN VENDOR/SUB-VENDOR (SIGN WITH DATE & STAMP)						REVIEWING AGENCY (SIGN WITH DATE & STAMP)				APPROVING AGENCY (SIGN WITH DATE & STAMP)					



STANDARD QUALITY PLAN FOR
BALL VALVE

QUALITY PLAN NO.: PE-QP-XXX-166-A808

PACKAGE-FULE OIL SYSTEM

PROJECT-

REV.NO.
SHEET

0
2 OF 3

DATE: 31/03/2012

SL. NO.	COMPONENT & OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY				REMARKS
									D	M	C	CU	
1	2	3	4	5	6	7	8	9	10				11
1.2	BALL, SPINDLE, GLAND, LEVER FASTENERS	CHEMICAL COMPOSITION	CRITICAL	CHEM. TEST	ONE/ HEAT	APPD.DRG./ DATA SHEET	APPD.DRG./ DATA SHEET/ RELEVANT STD.	TEST CERT.	✓	P	V	V	
		MECHANICAL PROPERTIES	- DO -	MECH. TEST	ONE/HEAT/ HEAT TREATMENT BATCH	- DO -	- DO -	- DO -	✓	P	V	V	
		HEAT TREATMENT (as applicable)	- DO -	REVIEW OF HT CHART	100%	- DO -	- DO -	- DO - / HT CHART	✓	P	V	V	
		SURFACE DEFECTS	MAJOR	- DO -	100%	MSS-SP-55	FREE FROM DEFECTS	- DO -	✓	P	V	-	
		DIMENSIONS	- DO -	MEASUREMENT	100%	APPD. DRG./ RELEVANT STD.	- DO -	LOG BOOK		P	V	-	
1.3	BODY SEAL, STEM SEAL, GLAND PACKING	DIMENSIONS	- DO -	- DO -	100%	- DO -	- DO -	INTERNAL RECORD		P	V	-	
		TEMPERATURE RESISTANCE	- DO -	TEMP. CHECK	100%	PTFE /RELEVANT STD.	RELEVANT STD.	TEST CERTIFICATE	✓	P	V	V	
2.0	IN-PROCESS INSPECTION:												
2.1	MACHINING OF BODY END-PIECE GLAND BALL, SPINDLE	DIMENSIONS	-DO-	MEASUREMENT	100%	MFG. DRG.	MFG. DRG.	LOG BOOK		P	V	-	
		SURFACE FINISH	- DO -	VISUAL	100%	- DO -	MFG. DRG./MFG. STD.	- DO -		P	V	-	
2.2	BALL, SPINDLE	HARDNESS	-DO -	HARDNESS TEST	100%	APPD. DRG./ DATA SHEET/ TECH.SPEC.	APPD. DRG./ DATA SHEET/ TECH.SPEC./MFG. STD.	TEST CERT.	✓	P	V	V	
		SURFACE DEFECTS	CRITICAL	DPT	100%	ASTM-E-165	NO LINEAR INDICATION	INTERNAL RECORD	✓	P	V	-	

LEGEND:

RECORDS, IDENTIFIED WITH ✓ ' SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION.

M: MANUFACTURER .
C: MAIN VENDOR, CU: BHEL/CUSTOMER
INDICATE "P" PERFORM, "W" WITNESS AND "V" VERIFICATION

MAIN VENDOR/SUB-VENDOR
(SIGN WITH DATE & STAMP)

REVIEWING AGENCY
(SIGN WITH DATE & STAMP)

APPROVING AGENCY
(SIGN WITH DATE & STAMP)

		STANDARD QUALITY PLAN FOR BALL VALVE					QUALITY PLAN NO.:PE-QP-XXX-166-A808 PACKAGE-FULE OIL SYSTEM PROJECT- REV.NO. 0 SHEET 3 OF 3 DATE: 31/03/2012							
SL NO.	COMPONENT & OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY				REMARKS	
									D	M	C	CU		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
2.3	BALL & SEAT	BLUE MATCH	CRITICAL	BLUE MATCHING	100%	THE SURFACE WILL BE SMOOTH & WILL HAVE UNIFORM METAL TO METAL CONTACT	SAME AS COL.7	LOG BOOK	✓	P	V	V		
3.0	<u>ASSEMBLY</u>	DIMENSIONS	MAJOR	MEASUREMENT	*AS PER NOTE-1 BELOW	APPD. DRG./RELEVANT STD.	APPD. DRG./RELEVANT STD.	INTERNAL RECORD	✓	P	W	W		
		OPENING & CLOSING	- DO -	OPERATION	- DO -	SMOOTH OPERATION OF VALVE	- DO -	- DO -	✓	P	W	W		
4.0	<u>TESTING:</u>													
4.1	SHELL	LEAKAGE	CRITICAL	HYDRO-STATIC	*AS PER NOTE-1 BELOW	APPD. DRG./DATA SHEET	NO LEAKAGE	TEST CERTIFICATE	✓	P	W	W		
4.2	SEAT	- DO -	- DO -	- DO -	- DO -	- DO -	- DO -	- DO -	✓	P	W	W		
4.3	SEAT	- DO -	- DO -	AIR	- DO -	- DO -	- DO -	- DO -	✓	P	W	W		
4.4	FIRE SAFE TEST REPORT WITNESSED BY LLOYD/BV SHALL BE FURNISHED FOR REVIEW													
4.5	REVIEW OF QA DOCUMENTATION AS PER APPD. QP													
5.0	<u>PAINTING:</u>	QUALITY & THICKNESS OF PAINT	MAJOR	VISUAL & MEASUREMENT	100%	TECH. SPEC./DATA SHEET/MFG. STD.	SAME AS COL.7	INTERNAL RECORD		P	V	-		
6.0	<u>PACKING:</u>		MAJOR	VISUAL	100%			INTERNAL RECORD		P	-	-		
NOTE-1: 100% BY MANUFACTURER 10% BY TECHNO For Actuator operating valves - Actuator test certificate shall be furnished to BHEL for review. For Fire safe valves - valves are to be accepted based on fire test certificates														
LEGEND: RECORDS, IDENTIFIED WITH ' ' SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION. M: MANUFACTURER . C: MAIN VENDOR, CU: BHEL/CUSTOMER INDICATE "P" PERFORM, "W" WITNESS AND "V" VERIFICATION														
MAIN VENDOR/SUB-VENDOR (SIGN WITH DATE & STAMP)					REVIEWING AGENCY (SIGN WITH DATE & STAMP)					APPROVING AGENCY (SIGN WITH DATE & STAMP)				

STANDARD QUALITY PLAN FOR CS PIPE -ERW								QUALITY PLAN NO.:PE-QP-XXX-166-A809 PACKAGE-FULE OIL SYSTEM PROJECT- REV.NO. 0 SHEET 1 OF 1					DATE: 31/03/2012	
SL. NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY				REMARKS	
1	2	3	4	5	6	7	8	9	D	M	C	CU	11	
1.0	ERW PIPE	a) Physical & Chemical test	M	Physical & Chemical Properties	Sample	IS:1239 Pt.1/ API 5L Gr. B/ Appd. Data sheet	IS:1239 Pt.1/ API 5L Gr. B/ Appd. Data sheet	MTC/ Mfr's TC	✓	P	V	V	Refer Note-1	
		b) Dimensional conformity	M	Measurement	At random	-do-	-do-	MTC/ Mfr's TC	✓	P	V	V		
		c) Hydro test	M	Leak test	100%	-do-	-do-	MTC/ Mfr's TC	✓	P	V	V		
Note-1: In case material is procured from dealer, and co-related Mfr's TCs are not available, check test on identified sample will be carried out at testing laboratory and hydro test at pressure 1.5 times of design pressure on 10% of total quantity will be witnessed by BHEL.														
LEGEND: RECORDS IDENTIFIED WITH " " SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENT. M - MANUFACTURER C - MAIN VENDOR CU - BHEL/CUSTOMER "P" PERFORM, "W" WITNESS AND V VERIFICATION														
MAIN VENDOR/SUB-VENDOR (SIGN WITH DATE & STAMP)						REVIEWING AGENCY (SIGN WITH DATE & STAMP)				APPROVING AGENCY (SIGN WITH DATE & STAMP)				



STANDARD QUALITY PLAN FOR
CCS /CFS GATE,GLOBE & CHECK VALVE
(UP TO 50 NB-FCS #800 & 1 NO. 50 NB GLOBE
VALVE #600) (65 NB & ABOVE CCS # 150)

QUALITY PLAN NO.:PE-QP-XXX-166-A810

PACKAGE-FULE OIL SYSTEM

PROJECT-

REV.NO. 0

DATE: 31/03/2012

SHEET 1 OF 2

SL. NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY				REMARKS
									D	M	C	N	
1	2	3	4	5	6	7	8	9	10	11	12	13	11
1	Raw Material:												
	Body, bonet, gld.,Flange, Disc, / wedge	Chem. & mech. Test Dimensions Surface quality	CR MR MR	Chem.& mech.Test Measurement Visual	Per Heat 100% 100%	Appd.Drg./ Mfg. Drg./ Data Sheet Mfg. Drg./ Data Sheet	Relevant Standard Mfg. Drg./ Data Sheet Defect Free	MTC IR IR	✓ ✓ ✓	P P P	V V V	V V V	Body will carry the heat mark for co-relation with CMT
1.1	Stem,body seat ring,gland.	Chem. & mech. Test	CR	Chem.& mech.Test	Per Heat	Appd.Drg./Relevant Std.	Appd.Drg./Relevant Std.	MTC	✓	P	V	V	
1.2	Fasteners	Chem. & mech. Test	MR	Chem.& mech.Test	Per Heat	Appd.Drg./Relevant Std.	Appd.Drg./Relevant Std.	IR	✓	P	V	V	
1.3	Gasket & gland packing	Compliance to PO	MR	Measurement	100%	Appd.Drg./Relevant Std.	Appd.Drg./Relevant Std.	IR	✓	P	V	V	
2.0	In Process Inspection												
2.1	Machining of valves components	Surface quality Dimension	MR MR	Visual Measurement	100% 100%	Mfg. Drg. Mfg. Drg.	Mfg. Drg. Mfg. Drg.	IR IR	✓ ✓	P P	V V	V V	
2.2	Spindle	Surface finish	MR	Measurement	100%	Mfg. Drg.	Mfg. Drg.	IR	✓	P	V	V	
2.3	Wedge / disc , seatring, stem & back seat	Lapping	MR	Blue Matching	100%	100% metal to metal contact	100% metal to metal contact	IR	✓	P	V	V	

LEGEND:
 RECORDS IDENTIFIED WITH " ✓ " SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENT.

M MANUFACTURER/SUB-CONTRACTOR
 C CONTRACTOR/NOMINATED INSPECTION AGENCY,
 N CUSTOMER. INDICATE "P" PERFORM "W" WITNESS AND
 V VERIFICATION AS APPROPRIATE CHP
 SHALL IDENTIFIED IN COLUMN "N"
 IR - INSPECTION REPORT, CMT-CERTIFICATE OF MATERIAL &TEST

MAIN VENDOR/SUB-VENDOR
 (SIGN WITH DATE & STAMP)

REVIEWING AGENCY
 (SIGN WITH DATE & STAMP)

APPROVING AGENCY
 (SIGN WITH DATE & STAMP)



STANDARD QUALITY PLAN FOR
CCS /CFS GATE,GLOBE & CHECK VALVE
(UP TO 50 NB-FCS #800
(65 NB & ABOVE CCS # 150)

QUALITY PLAN NO.:PE-QP-XXX-166-A810

PACKAGE-FULE OIL SYSTEM

PROJECT-

REV.NO. 0

DATE: 31/03/2012

SHEET 2 OF 2

SL. NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY				REMARKS
									D	M	C	N	
1	2	3	4	5	6	7	8	9			10		11
3.0	Testing & Final Inspection												
3.1	Performance	Operation	CR	Manual	100%	Appd. Drg./Data Sheet	Should be smooth	IR	✓	P	W	W*	
3.2	Shell &Sheet / backseat	Pr. Testing	CR	Hyd. Testing	100%	Appd. Drg./Data Sheet	Relevant Standard / Data Sheet	CMT	✓	P	W	W*	
3.3	Seat	Pr. Testing	CR	Pneumatic Testing	100%	Appd. Drg./Data Sheet	Relevant Standard / Data Sheet	CMT	✓	P	W	W*	Not Applicable for Check Valve
3.4	Valve Assembly	1. Chk. For completeness/ Visual Inspection	MR	Visual	100%	Appd. Drg. / Tech. Spec. / Data Sheet	Appd. Drg./Data Sheet	IR	✓	P	W	W*	
		2. Dimention	MR	Measurement	10%	Appd. Drg./Data Sheet	Appd. Drg./Data Sheet	IR	✓	P	W	W*	
		3. Wear Travel / valve lift	MR	Manual	100%	Appd. Drg.	Appd. Drg.	IR	✓	P	W	W*	*RANDOM 10% BY CUSTOMER
4.0	Painting & Packaging												
		1. Painting & Packaging	MR	Manual	100%	Appd. Drg. / Tech. Spec.	Appd. Drg. / Tech. Spec.	IR		P	V		
		2. Tagging	MR	Manual	100%	Appd. Drg. / Tech. Spec.	Appd. Drg. / Tech. Spec.	PS / RS		P	V		

LEGEND:

RECORDS INDENTIFIED WITH " ✓ " SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENT.

M MANUFACTURER/SUB-CONTRACTOR

C CONTRACTOR/NOMINATED INSPECTION AGENCY,

N CUSTOMER. INDICATE "P" PERFORM "W" WITNESS AND

V VERIFICATION AS APPROPRIATE CHP

SHALL INDENTIFIED IN COLUMN "N"

IR - INSPECTION REPORT, CMT-CERTIFICATE OF MATERIAL &TEST

MAIN VENDOR/SUB-VENDOR
(SIGN WITH DATE & STAMP)

REVIEWING AGENCY
(SIGN WITH DATE & STAMP)

APPROVING AGENCY
(SIGN WITH DATE & STAMP)



**STANDARD QUALITY PLAN FOR
OIL STRAINER**

QUALITY PLAN NO.: PE-QP-XXX-166-A811
PACKAGE-FULE OIL SYSTEM

PROJECT-

REV.NO. 0 **DATE:** 31/03/2012
SHEET 1 OF 2

SL. NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY				REMARKS
									D	M	C	CU	
1	2	3	4	5	6	7	8	9	10				11
1.0	Raw Material												
1.1	Body, flange, dished end	Physical & Chemical Properties	MA	Physical & Chemical Test	1/Sample	Appd. Drg.	Appd. Drg./ Mfg.Std.	Mtrl.TC	✓	P	V	V	
1.2	Screen	1. Chem. composition	MA	Chem. Test	1/Sheet	- do -	- do -	- do -	✓	P	V	V	
		2. Dimension, Mesh Size	MA	Meas.	100%	- do -	- do -	log book		P	V	V	
2.0	In Process												
2.1	Welding Procedure Specification	Parameter	MA	Verification	100%	ASME-IX	ASME-IX	QW-482	✓	P	V	V	BHEL approved WPS & PQR Shall be furnished for review.
2.2	Procedure Qualification Record & Welder Qualification	Weld Soundness/ Qualification	MA	Qualification test RT	100%	ASME-IX	ASME-IX	QW-483/484	✓	P	V	V	
3.0	Weld fit up	Dimension alignment orientation	MA	Meas./ Visual	100%	Appd. WPS	Appd. WPS	log book		P	V	V	
4.0	Weldments - Final Run (all welds)	Surface Defect	MA	Penetration Test	10%	ASTME-165	No defects	- do -	✓	P	V	V	
4.1	Root run (butt welds & back gauged welds)	-do-	MA	-do-	100%	-do-	-do-	-do-	✓	P	V	V	

LEGEND:
RECORDS IDENTIFIED WITH ✓ " SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENT.

"M" MANUFACTURER
"C" MAIN VENDOR
CU - BHEL/CUSTOMER
INDICATE "P" PERFORM "W" WITNESS AND"
V" VERIFICATION

**MAIN VENDOR/SUB-VENDOR
(SIGN WITH DATE & STAMP)**

**REVIEWING AGENCY
(SIGN WITH DATE & STAMP)**

**APPROVING AGENCY
(SIGN WITH DATE & STAMP)**



**STANDARD QUALITY PLAN FOR
OIL STRAINER**

QUALITY PLAN NO.: PE-QP-XXX-166-A811
PACKAGE-FULE OIL SYSTEM

PROJECT-

REV.NO. 0 **DATE:** 31/03/2012

SHEET 2 OF 2

SL. NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY				REMARKS
									D	M	C	CU	
1	2	3	4	5	6	7	8	9	10				11
5.0	Assembly of Internal Fittings Basket placement	Orientation Location of Tapping Points & fitting of Internals	MA	Visual & Meas.	100%	Appd. Drg.	Appd. Drg./ Mfg.Std.	log book		P	V	V	
6.0	Final Assembly												
6.1	Final Inspection	Completeness Cleanliness Dimension	MA	Visual & Meas.	100%	- do -	Appd. Drg./ Data Sheet	Inspection Report		P	W	W	
		Leak tightness	CR	Hyd. Test at 1.5 times of design pr. for 30 min.	100%	- do -	No leakage	Test Record	✓	P	W	W	
7.0	Review of QA Documents as per QP												

LEGEND:
RECORDS IDENTIFIED WITH "✓" SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENT.

"M" MANUFACTURER
"C" MAIN VENDOR
CU - BHEL/CUSTOMER
INDICATE "P" PERFORM "W" WITNESS AND
V" VERIFICATION

MAIN VENDOR/SUB-VENDOR
(SIGN WITH DATE & STAMP)

REVIEWING AGENCY
(SIGN WITH DATE & STAMP)

APPROVING AGENCY
(SIGN WITH DATE & STAMP)



**STANDARD QUALITY PLAN FOR
POSITIVE DISPLACEMENT PUMP
(SINGLE/TWIN SCREW PUMP)**

QUALITY PLAN NO.:PE-QP-XXX-166-A812

PACKAGE-FULE OIL SYSTEM

PROJECT-

REV.NO.

0

DATE: 31/03/2012

SHEET

1 OF 2

SL. NO. 1	COMPONENT & OPERATIONS 2	CHARACTERISTICS 3	CLASS 4	TYPE OF CHECK 5	QUANTUM OF CHECK 6	REFERENCE DOCUMENT 7	ACCEPTANCE NORMS 8	FORMAT OF RECORD 9	AGENCY				REMARKS 11
									D	M	C	CU	
1.0	Raw Material & Bought Out Items												
1.1	Casing, stuffing box & end cover	i) Chemical test	MA	Chemical Analysis	Sample/ heat	Appd. Data Sheet/ Appd. Drg./ IS:210 FG260	Same as Cl.7	Material TC	✓	P	V	V	
		ii) Physical test	MA	Physical Properties	Sample/ heat	- do -	Same as Cl.7	Material TC	✓	P	V	V	
		iii) Hardness	MA	Meas.	At random	As per Appd. Data Sheet	- do -	Material TC	✓	P	V	V	
1.2	Shaft, Rotor, Step-up gear, Timing gear	i) Chemical test	MA	Chemical Analysis	Sample/ heat	As per Appd. Data Sheet/ Drg.	Same as Cl.7	Material TC	✓	P	V	V	
		ii) Physical test	MA	Physical Properties	- do -	- do -	Same as Cl.7	Material TC	✓	P	V	V	
		iii) Heat treatment	MA	Heat treatment	100%	- do -	- do -	HT Chart	✓	P	V	V	
		iv) Hardness	MA	Meas.	- do -	- do -	- do -	- do -	✓	P	V	V	
1.3	Bearing	Make, size & bearing No.	MA	Visual	100%	Mfg. Drawing/ Mfg. Catalogue	- do -	Log Book		P	-	-	
2.0	In Process Control												
2.1	Machining of all Components	i) Dimension	MA	Meas.	100%	- do -	- do -	- do -		P	V	V	
		ii) Surface finish	MA	Visual	100%	- do -	- do -	- do -		P	-	-	
2.2	Casing	Pressure test	MA	Hyd. Test with water	100%	1.5 x max. discharge pr. for 15 minutes. ASTM A388	No leakage/Seepage	Test Report	✓	P	V	V	
2.3	Shaft, Rotor/Screw, Step-up gear, timing gear	1. Internal Defects	CR	UT(after skin - machining)	100%	ASTM A388	Refer Note.1 (page2)	Test Report	✓	P	V	V	
		2. Surface Defects	CR	DPT(after - final machining)	100%	ASTM E:165	No linear indication >1.6mm	Test Report	✓	P	V	V	
		3. Case Hardness of timing gear	CR	Hardness	100%	EN-36 to BS970/ As per data sheet	After case carburising, hardened & tempered to have tooth hardness of 56 to 59 HRC	H T report	✓	P	V	V	NA
2.4	Balancing of Rotor Assly.	Static & Dynamic	CR	Balancing	100%	VDI 2060 Cl. 6.3/ ISO 1940 Gr.6.3	ISO 1940 Gr.6.3	Test Report	✓	P	V	V	only in case of Twin Screw Pump

LEGEND:
RECORDS IDENTIFIED WITH ✓ " SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENT.

"M" MANUFACTURER
"C" MAIN VENDOR
"CU" BHEL/CUSTOMER..
"P" PERFORM "W" WITNESS AND
"V" VERIFICATION

**MAIN VENDOR/SUB-VENDOR
(SIGN WITH DATE & STAMP)**

**REVIEWING AGENCY
(SIGN WITH DATE & STAMP)**

**APPROVING AGENCY
(SIGN WITH DATE & STAMP)**



**STANDARD QUALITY PLAN FOR
POSITIVE DISPLACEMENT PUMP
(SINGLE/TWIN SCREW PUMP)**

QUALITY PLAN NO.:PE-QP-XXX-166-A812

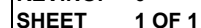
PACKAGE-FULE OIL SYSTEM

PROJECT-

REV.NO. 0
SHEET 2 OF 2

DATE: 31/03/2012

SL. NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	D	AGENCY			REMARKS
										M	C	CU	
1	2	3	4	5	6	7	8	9		10	11		
3.0	Assembly Control Final Inspection & Testing:												
3.1	Pump Assembly	i) Completeness, correctness, overall dimension	MA	Visual & Meas.	100%	Appd. Drg.	Same as Cl.7	Log Book	✓	P	W	W	
3.2	Performance Test - with test bed motor	1.Performance for capacity, head,power consp., speed, efficiency.	CR	Performance Test	100%	VDMA/ HIS/Appd. Data sheet	Appd. Data sheet/curves/ VDMA/HIS	Test Report	✓	P	W	W	
		2. NPSHR for twin Screw pump	CR	- do -	10%	-do-	Appd. Data sheet/curves Appd. Document	- do -	✓	P	W	W	
		3. Vibration/Noise	CR	- do -	100%	Appd. Data Sheet/ Value given in Cl.8	75 micron at bearings 85 dbA measured at a distance of 1 mtr.	- do -	✓	P	W	W	Noise & vibration value measured at shop is for reference only.
		4. Relief valve set pr.	CR	- do -	100%	Appd. Data Sheet	Same as Cl.7	- do -	✓	P	W	W	
3.3	Review of QA Documentation as per approved QP			-	-	-	-	-		V	V	V	
3.4	Painting	Surface Preparation & shade of painting	MA	Visual	100%	As per Mfg. Std.	Same as Cl.7	-		P	V	-	
Note: 1. Defect giving echo height more than 20% on total CRT Screen height shall be treated as unacceptable.. Defect causing reduction in backwall echo less than 80% of Screen height shall be treated as unacceptable. Frequency 2 MHz min. 2. In case of mismatch in material in QP with Data Sheet, the material indicated in approved data sheet will be final.													
LEGEND: RECORDS IDENTIFIED WITH ✓ " SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENT. "M" MANUFACTURER "C" MAIN VENDOR "CU" BHEL/CUSTOMER.. "P" PERFORM "W" WITNESS AND "V" VERIFICATION													
MAIN VENDOR/SUB-VENDOR (SIGN WITH DATE & STAMP)				REVIEWING AGENCY (SIGN WITH DATE & STAMP)				APPROVING AGENCY (SIGN WITH DATE & STAMP)					



MAIN VENDOR/SUB-VENDOR (SIGN WITH DATE & STAMP)	REVIEWING AGENCY (SIGN WITH DATE & STAMP)	APPROVING AGENCY (SIGN WITH DATE & STAMP)
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		STANDARD QUALITY PLAN FOR IB TYPE & TD TYPE STEAM TRAP 25NB & 15NB						QUALITY PLAN NO.: PE-QP-XXX-166-A814 PACKAGE-FULE OIL SYSTEM PROJECT- REV.NO. 0 DATE: 31/03/2012 SHEET 1 OF 1						
SL. NO. 1	COMPONENT & OPERATIONS 2	CHARACTERISTICS 3	CLASS 4	TYPE OF CHECK 5	QUANTUM OF CHECK 6	REFERENCE DOCUMENT 7	ACCEPTANCE NORMS 8	FORMAT OF RECORD 9	AGENCY				REMARKS 11	
									D	M	C	CU		
1	Raw Material Body, Filter cap, Disc, Cover & Filter screen	i) Chemical Composition	Major	Chemical Analysis	Sample Check	As per Appd. Drg./ Data Sheet	As per Appd. Drg./ Data Sheet	MTC	✓	P	V	V		
		ii) Mechanical Test	Major	Physical properties	- do -	- do -	- do -	- do -		P	V	V		
2	Final Inspection	i) Visual	Major	Visual Inspn.	100%	As per Appd. Drg.	As per Appd. Drg.	Inspn. Report		P	W	V		
		ii) Dimension	Major	Meas.	100%	- do -	- do -	- do -		P	W	V		
		iii) Hyd. Test	Major	Leak Test	100%	As per Appd. Drg./ Data sheet	As per Appd. Drg./ Data sheet	Test Report	✓	P	W	V		
3	Review of QA Documents as per approved QP									V	V	V		IBR certificate as applicable shall be furnished as part of QA documentation.
LEGEND: RECORDS IDENTIFIED WITH " ✓ " SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENT. M - MANUFACTURER C - MAIN VENDOR CU - BHEL/CUSTOMER. INDICATE "P" PERFORM "W" WITNESS AND V VERIFICATION IR - INSPECTION REPORT, MTC - MTRL./MFR'S TEST CERTIFICATES														
MAIN VENDOR/SUB-VENDOR (SIGN WITH DATE & STAMP)				REVIEWING AGENCY (SIGN WITH DATE & STAMP)				APPROVING AGENCY (SIGN WITH DATE & STAMP)						

STANDARD QUALITY PLAN FOR SUCTION HEATER (HEAT EXCHANGER)								QUALITY PLAN NO.: PE-QP-XXX-166-A815 PACKAGE-FULE OIL SYSTEM PROJECT- REV.NO. 0 DATE: 31/03/2012 SHEET 1 OF 1					
SL. NO. 1	COMPONENT & OPERATIONS 2	CHARACTERISTICS 3	CLASS 4	TYPE OF CHECK 5	QUANTUM OF CHECK 6	REFERENCE DOCUMENT 7	ACCEPTANCE NORMS 8	FORMAT OF RECORD 9	AGENCY				REMARKS 11
									D	M	C	N	
									10				
1.	<u>Materials</u>												
	a) Shell, plates for tube sheet, & Dished end	i) Chemical Composition	Major	Chemical Analysis	Sample	Appd.Drg./ASME SEC-II	Same as Cl.7	Material Test Cert.	✓	P	V	V	
		ii) Mechanical Test	Major	Physical Properties	- do -	- do -	- do -	- do -	✓	P	V	V	
	b) Tubes	i) Chemical Composition	Major	Chemical Analysis	- do -	- do -	- do -	- do -	✓	P	V	V	
		ii) Mechanical Test	Major	Physical Properties	- do -	- do -	- do -	- do -	✓	P	V	V	
2.	<u>In Process Inspection</u>												
A.	U-Tube	i) Thinning Test on tubes	Major	By Destruction test	Sample	TEMA' C/Appd. Drg.	17% thinning	Inspn. Report	✓	P	V	V	
		ii) Mock-up Test on tube to tube sheet joint	Major	- do -	100%	- do -	- do -	- do -	✓	P	V	V	
		iii) Dimensional Check	Major	By Meas.	100%	Appd. Drg.	- do -	- do -		P	V	-	
		iv) Hydraulic Test (for tube bundle)	Major	Hydraulic	100%	Appd. Drg.	No Leakage	- do -	✓	P	V	V	
B.	Shell	a) Welding Procedure	Major	WPS	100%	ASME-Sec.IX	Same as Cl.7	QW-482	✓	P	V	V	
		b) Welder Procedure Qualification Test	Major	PQR	100%	- do -	- do -	QW-483	✓	P	V	V	WPS to be approved by BHEL/ NTPC. Qualified welders only to be employed.
LEGEND: RECORDS IDENTIFIED WITH "TICK" SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENT. "M" MANUFACTURER/SUB-CONTRACTOR "C" CONTRACTOR/NOMINATED INSPECTION AGENCY. "N" CUSTOMER. INDICATE "P" PERFORM "W" WITNESS AND "V" VERIFICATION AS APPROPRIATE CHP SHALL IDENTIFIED IN COLUMN "N"													
MAIN VENDOR/SUB-VENDOR (SIGN WITH DATE & STAMP)				REVIEWING AGENCY (SIGN WITH DATE & STAMP)				APPROVING AGENCY (SIGN WITH DATE & STAMP)					

		STANDARD QUALITY PLAN FOR SUCTION HEATER (HEAT EXCHANGER)						QUALITY PLAN NO.:PE-QP-XXX-166-A815 PACKAGE-FULE OIL SYSTEM PROJECT-REV.NO. 0 DATE: 31/03/2012 SHEET 1 OF 1					
SL. NO.	COMPONENT & OPERATIONS	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY				REMARKS
1	2	3	4	5	6	7	8	9	D	M	C	N	11
3.	Tube Sheets	c) Dimensional Check	Major	Meas.	100%	Appd. Drg.	Same as Cl.7	Inspn. Report		P	V	-	
	Final Inspection Finished Product after completion	a) Dimensional Check	Major	Meas.	100%	- do -	- do -	- do -		P	V	-	
		b) Assembly Check	Major	Visual	100%	- do -	- do -	- do -		P	V	-	
		i) Welding	Major	Visual	100%	Appd. WPS	- do -	- do -		P	V	V	
		ii) NDT for Shell fabrication	Major	DP test	100%	ASME SEC-V	- do -	- do -		P	V	V	
		iii) NDT for Dished end to Shell joint	Major	Spot Radiography	10%	- do -	- do -	Radiography Report	✓	P	V	V	
		iv) NDT for Shell to Tube sheet joint	Major	DP test	100%	- do -	- do -	Inspn. Report		P	V	V	
		v) NDT for Dish fabrication	Major	DP test on Knuckle	100%	- do -	- do -	- do -		P	V	V	
		vi) Dimensional Check	Major	Meas.	100%	Appd. Drg.	- do -	- do -	✓	P	W	W	
		vii) Hydraulic Test for Shell side and tube side	Critical	Hydrostatic	100%	Appd. Drg./ 1.5 x Design Pr.	No Leakage	- do -	✓	P	W	W	
viii) Review of QA Document as per approved QP	-	-	-	-	-	-	-	-	-	-			
ix) Painting	Major	Visual	100%	Mfg. Std.	Same as Cl.7	-		P	-	-			
LEGEND: RECORDS IDENTIFIED WITH "TICK" SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENT. "M" MANUFACTURER/SUB-CONTRACTOR "C" CONTRACTOR/NOMINATED INSPECTION AGENCY, "N" CUSTOMER. INDICATE "P" PERFORM "W" WITNESS AND "V" VERIFICATION AS APPROPRIATE CHP SHALL IDENTIFIED IN COLUMN "N"													
MAIN VENDOR/SUB-VENDOR (SIGN WITH DATE & STAMP)				REVIEWING AGENCY (SIGN WITH DATE & STAMP)				APPROVING AGENCY (SIGN WITH DATE & STAMP)					



STANDARD CHECK LIST FOR OIL HOSE

CHECK LIST NO.:PE-QP-XXX-166-A816

PACKAGE-FULE OIL SYSTEM

PROJECT-

REV.NO. 0

SHEET 1 OF 1

REV.NO. 0

DATE: 31/03/2012

SL. NO.	COMPONENT & NO.	CHARACTERISTICS	TYPE OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY			REMARKS
							M	C	N	
							8			
1	Material for									
1.1	Synthetic Rubber	Polymer Confirmation	Chemical Analysis	Appd.data sheet/ Relavent Code	Same as Cl.7	Lab Test Certificate	P	V	V	
1.2	Canvas	Mechanical Test	Tensile	-do-	-do-	- do -	P	V	V	
1.3	Bonding Agents	Bonding Strength	Properties	-do-	-do-	- do -	P	V	V	
1.4	End Fittings	Chem. & Mech. Test	Chem.& Mech properties	-do-	-do-	- do -	P	V	V	
2	In Process Inspection									
2.1	Compound									
	Oil Resistance	i) Oil Resistance test	Oil Resistance check	-do-	-do-	Lab Test Report	P	V	V	
		ii) Heat Resistance	Heat Resistance check	-do-	-do-	Lab Test	P	V	V	
2.2	Sheeting	i) Visual Inspection	Visual	Mfg. Drg.	Mfg. Drg.	Inspn. Report	P	-	-	
		ii) Dimension	Meas.	- do -	- do -	- do -	P	-	-	
2.3	Hose Making	i) Visual Inspection	Visual	- do -	- do -	- do -	P	-	-	
		ii) Dimensional	Meas.	- do -	- do -	- do -	P	-	-	
2.4	Wrapping	Tightening	Visual	- do -	- do -	- do -	P	-	-	
2.5	Flange	Dimension	Meas.	- do -	- do -	- do -	P	-	-	

LEGEND:

"M" MANUFACTURER/SUB-CONTRACTOR
 "C" CONTRACTOR/NOMINATED INSPECTION AGENCY,
 "N" CUSTOMER. INDICATE "P" PERFORM "W" WITNESS AND
 "V" VERIFICATION AS APPROPRIATE CHP
 SHALL IDENTIFIED IN COLUMN "N"

MAIN VENDOR/SUB-VENDOR
(SIGN WITH DATE & STAMP)

REVIEWING AGENCY
(SIGN WITH DATE & STAMP)

APPROVING AGENCY
(SIGN WITH DATE & STAMP)

MANUFACTURERS NAME & ADDRESS				MANUFACTURING QUALITY PLAN				PROJECT: PACKAGE: CONTRACT: CONTRACT: DOC NO. P						
				ITEM : QAP FOR OIL HOSE.		PAGE 1 OF 1								
SL. NO.	COMPONENT & OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTAM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	FORMAT OF RECORD	AGENCY				REMARKS	
1	2	3	4	5	6	7	8	9	D	M	C	N	10	11
A	RAW MATERIALS													
1.0	NEOPRENE & NITRILE	POLYMER IDENTIFICATION	MAJOR	CHEMICAL	SAMPLE	ASTM -D297	ASTM - D297	LAB CERT./ QC REPORT		P	V	V		
B	END FITTINGS													
1.1	FLANGE	CHEMICAL COMPOSITION	MAJOR	CHEMICAL	SAMPLE	IS-2062 GR.B	IS-2062 GR.B	- DO -		P	V	V		
1.2	PIPE	PHYSICAL & CHEMICAL	MAJOR	PHYSICAL & CHEMICAL	SAMPLE	ASTM A 106 GR.B	ASTM A 106 GR.B	- DO -		P	V	V		
C	IN PROCESS CHECKS													
1.3	RUBBER TEST SLAB	a). TENSILE STRENGTH	MAJOR	BEFORE & AFTER AGEING	SAMPLE	IS-10733/83 TYPE-2B	IS-10733/83 TYPE- 2B	- DO -		P	V	V		
		b). ELONGATION AT BREAK	MAJOR	- DO -	SAMPLE	- DO -	- DO -	- DO -		P	V	V		
		c). ADHESION TEST	MAJOR	ADHESION	SAMPLE	- DO -	- DO -	- DO -		P	V	V		
		d). OIL RESISTANCE TEST	MAJOR	OIL RESISTANCE COMPOUND	SAMPLE	- DO -	- DO -	- DO -		P	V	V		
D	FINAL INSPECTION													
1.4	FINISHED PRODUCT CHECK FOR COMPLETENESS	a). VISUAL & DIMENSIONAL	MAJOR	VISUAL & DIMENSIONS	100%	APP. DRG./BS-1435/75	APP. DRG./BS-1435/75	- DO -		P	W	V		10% QUANTITY
		b). HYDRAULIC TEST	MAJOR	PRESSURE TEST	100%	EN-1765/2004	- DO-	- DO -		P	W	V		MAY BE
		c). ELONGATION CHECK	MAJOR	ELONGATION MEASURE	100%	- DO-	- DO-	- DO -		P	W	V		SELECTED AT
		d). BENDING RADIUS CHECK	MAJOR	BEND RADIUS CHECK	100%	- DO-	- DO-	- DO -		P	W	V		RANDOM FOR
		e). VACUUM TEST	MAJOR	VACUUM CHECK	100%	- DO-	- DO-	- DO -		P	W	V		WITNESS
		f). MARKING CHECK	MAJOR	VISUAL	100%	- DO-	- DO-	- DO -		P	W	V		
CLIENT		LEGEND :					FOR BHEL USE						REV.	
		* RECORDS IDENTIFIED WITH 'TICK' SHALL BE ESSENTIALLY DETERMINED BY CONTRACTOR IN QA DOCUMENTATION "M" MANUFACTURER												
CONTRACTOR		C' CONTRACTOR, 'P' PERFORM, 'W' WITNESS, 'V' VERIFICATION AS APPROPRIATE CHP												
MANUFACTURE		BHEL SHALL IDENTIFIED IN COLUMN 'N' BHEL.												
SIGNATURE							REVIEWED BY		NAME & SIGN OF APPROVING AUTHORITY & SEAL					



STANDARD CHECK LIST
STANDARD CHECK LIST FOR: CS-FITTINGS (FORGED/SEAMLESS)
PACKAGE-FULE OIL SYSTEM
PROJECT-
CHECK LIST NO.:PE-QP-XXX-166-A817
REV.NO. 0
DATE: 31/03/2012 **Sheet 1 of 1**

SL. NO.	TESTS/CHECKS	QUANTUM OF CHECKS	REFERENCE DOCUMENT./ ACCEPTANCE NORMS	AGENCY				REMARKS
1	2	3	4	M	C	N	D	6
1	Visual and Dimensional Checks for each size and type	100% by Manufacturer and 10% by BHEL	Appd. Data Sheet/ Relevant Standard	P	W	W	✓	Inspn. Report shall be furnished
2	Check for Logo mark & Specification	-do-	-do-	P	V	V		
3	Check for TC of mother pipe/forgings	100%	-do-	P	V	V	✓	Manufacturer's TCs of mother pipe/forgings shall be furnished
4	Cross check for Mech/Chem properties of mother pipe/forging	One/Heat	-do-	P	V	V	✓	-do-

LEGEND:

RECORDS IDENTIFIED WITH "TICK" SHALL BE ESSENTIALLY INCLUDED BY CONTRACTOR IN QA DOCUMENTATION.

M= MANUFACTURER/SUB-CONTRACTOR

C= CONTRACTOR/NOMINATED INSPECTION AGENCY,

N= CUSTOMER

P= PERFORM; W= WITNESS; V= VERIFICATION

MAIN VENDOR/SUB-VENDOR
(SIGN WITH DATE & STAMP)

REVIEWING AGENCY
(SIGN WITH DATE & STAMP)

APPROVING AGENCY
(SIGN WITH DATE & STAMP)

CHECK LIST

Check list for item : Dished-end for Flash Tank
 Check list No. :
 Project :
 Package : Fuel Oil Handling
 Contract No. :
 Contractor : BHEL
 Sub-Contractor :

SL. NO.	TESTS/CHECKS	QUANTUM OF CHECKS	REFERENCE DOCUMENT/ ACCEPTANCE NORMS	FORMAT OF RECORDS	AGENCY				REMARKS
					D	S	C	N	
A.	<u>RAW MATERIAL</u>								
	Plate - conforming to IS 2002 Gr.A								
	Chemical Composition & Physical Properties	1 sample/heat	IS:2002 Gr.A	Material TC	√	V	V	V	
B	<u>IN PROCESS INSPECTION</u>								
	UT on Plate	100%	ASTM A388 (Defect giving echo height more than 20% on total CRT Screen height shall be treated unacceptable. Defect causing reduction in backwall echo less than 80% of Screen height shall be treated as unacceptable)	UT Report	√	P	V	V	
C.	<u>FINAL INSPECTION</u>								
	1 Visual Exam.	100%	Appd.Drg.	Inspn. Report	√	P	V	V	
	2 Dimensional Check	100%	Appd.Drg.	-do-	√	P	V	V	
	3 DP on Knuckle	100%	ASTM E165	-do-	√	P	V	V	

Legend

S = SUB-CONTRACTOR
 C= CONTRACTOR
 N= CUSTOMER
 P= PERFORM; W= WITNESS; V= VERIFICATION
 " √ " Marked document to be furnished along with QA Doc. Pkg.

Manufacturer's Name & Address :			QUALITY ASSURANCE PLAN Item : Plug Valve Sub-System : Fuel Oil System Page No.: 1 OF 4				Project :					
							Contract					
							Contractor					
							Sub-Contractor					
Sl. No.	Components & Operations	Characteristic/Item	Class	Type of check	Extent of Check	Reference Document	Acceptance Norm	Format of Record	Agency			Remarks
1	2	3	4	5	6	7	8	9	10	11	12	13
A RAW MATERIAL												
1	Castings (Body, Cover, Plug)	a) Verification	MA	Material TC	100%	Appr. Drg. Tech. Specs.	Tech. Specs.	Material TC	✓	3	3	1,2
		b) Size/Class	MA	Material TC	100%	Appr. Drg. Tech. Specs.	Tech. Specs.	Material TC	✓	3	3	1,2
		c) Material Id.	MA	Material TC	100%	Appr. Drg. Tech. Specs.	Tech. Specs.	Material TC	✓	3	3	1,2
		d) Heat No.	MA	Material TC	100%	Appr. Drg. Tech. Specs.	Tech. Specs.	Material TC	✓	3	3	1,2
		e) Surface Defect	MA	Visual	100%	MSS-SP-55	No crack acceptable	Inspection Report		3	3	1,2
		f) Dimension	MA	Vernier scale	100%	Mfg. Drg.	Mfg. drg.	Mfg. drg.		3	3	1,2
		g) RT on body	MA	Physical	100%	NDT Report	ANSI B16.34 ANNEX-I	NDT REPORT	✓	3	3	1,2
		h) Tensile Properties	MA	Verification of foundry TC	100%	Tech. Specs.	Relevant Standard			3	3	1,2
		i) Chemical Properties	MA	Verification of foundry TC	100%	Tech. Specs.	Relevant Standard			3	3	1,2
		j) Heat Treatment	MA	Verification of foundry TC	100%	Tech. Specs.	Relevant Standard			3	3	1,2
		BHEL		LEGEND :								
				Records identified with "✓" shall essentially be included by Contractor in QA Documents				CLIENT NO				
				1 - BHEL 2 - PACKAGE SUPPLIER 3 - Manufacturer				P - Agency Performing the Test W - Agency Witnessing the Test V - Agency Verifying the Test				
				CR - Critical Characteristics MA - Major Characteristics MI - Minor Characteristics				REV. CAT.				
				IR - Inspection Report, MTC - Material/Manufacturer's Test Certificate				REVIEWED BY				
								NAME & SIGNATURE OF APPROVING AUTHORITY				
SIGNATURE												

Manufacturer's Name & Address :			QUALITY ASSURANCE PLAN Item : Plug Valve Sub-System : Fuel Oil System Page No.: 2 of 4				Project Contract Contract Sub-Cont					
Sl. No.	Components & Operations	Characteristic/Item	Class	Type of check	Extent of Check	Reference Document	Acceptance Norm	Format of Record	Agency			Remarks
1	2	3	4	5	6	7	8	9	D	10	V	11
2	Fastners	a) Dimension	MA	Dimensional	1/Lot/Size	Appr. Drg	Appr. Drg	...		3	3	1,2
		b) Tensile Properties	MA	Verification of Supplier TC	100%	Appr. Drg	Relevant Std	Mfg. TC	✓	3	3	1,2
		c) Chemical Properties	MA	Verification of Supplier TC	100%	Appr. Drg	Relevant Std	Mfg. TC	✓	3	3	1,2
		d) Heat Treatment	MA	Verification of Supplier TC	100%	Appr. Drg	Relevant Std	Mfg. TC	✓	3	3	1,2
3	Limit Switch	a) Dimension	MA	Dimensional	1/Lot/Size	PO	Mfg. Drg	Mfg. TC	✓	3	3	3
		b) Chemical properties	MA	Mfg. TC	1/Lot/Size	Relevant Std	Relevant Std	...		3	3	3
4	Hand Wheel	a) Dimension		Dimensional	1/Lot/Size	PO	Mfg. Drg	GRR		3	3	1,2
		b) Surface Defect	MA	Visual	100%	PO	Mfg. Drg	No crack acceptable		3	3	1,2
SUB-CONTRACTOR SIGNATURE		BHEL CONTRACTOR	LEGEND : Records identified with " ✓ " shall essentially be included by Contractor in QA Documents 1 - BHEL 2 - PACKAGE SUPPLIER 3 - Manufacturer CR - Critical Characteristics MA - Major Characteristics MI - Minor Characteristics IR - Inspection Report, MTC - Material/Manufacturer's Test Certificate					CLIENT NO.				
			P - Agency Performing the Test W - Agency Witnessing the Test V - Agency Verifying the Test					REV. 00 CAT.				
							REVIEWED BY		NAME & SIGNATURE OF APPROVING AUTHORITY			

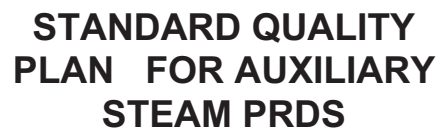
Manufacturer's Name & Address :			QUALITY ASSURANCE PLAN				Project : Contract I Contracto Sub-Contr							
			Item : Plug Valve		Sub-System : Fuel Oil System							Page No.: 3 of 4		
Sl. No.	Components & Operations	Characteristic/Item	Class	Type of check	Extent of Check	Reference Document	Acceptance Norm	Format of Record	Agency			Remarks		
1	2	3	4	5	6	7	8	9	D	P	W	V	11	
IN PROCESS INSPECTION														
1	Body / Cover	a) Mechined surface	MA	Visual	100%	Mfg. Drg.	No blow holes are acceptable	...		3	3	3		
		b) Dimension	MA	Dimensional	100%	Mfg. Drg.	Mfg. Drg	...		3	3	3		
2	Plug	Mechined surface	MA	Visual	100%	Mfg. Drg.	No blow holes are acceptable	...		3	3	3		
3	Component	Dimension	MA	Dimensional	100%	Mfg. Drg.	Mfg. Std.	...		3	3	3		
4	Assembly	Operational Test	MA	Ful opening / closing test	100%	GA Drg	Mfg. Std.	...		3	3	3		
				Min. Stem Projection	100%	...	Mfg. Drg	...		3	3	3		
				Smooth operation	100%	...	Mfg. Std.	...		3	3	3		
BHEL CONTRACTOR			LEGEND : Records identified with "√" shall essentially be included by Contractor in QA Documents				CLIENT NO.							
			1 - BHEL /DVC 2 - PACKAGE SUPPLIER 3 - Manufacturer				P - Agency Performing the Test W - Agency Witnessing the Test V - Agency Verifying the Test				REV. 00 CAT.			
MANUFACTURE SUB-CONTRACTOR			CR - Critical Characteristics MA - Major Characteristics MI - Minor Characteristics IR - Inspection Report, MTC - Material/Manufacturer's Test Certificate				REVIEWED BY NAME & SIGNATURE OF APPROVING AUTHORITY							
SIGNATURE														

Manufacturer's Name & Address :			QUALITY ASSURANCE PLAN Item : Plug Valve Sub-System : Fuel Oil System Page No.: 4 of 4				Project : Contract Contractor Sub-Contractor						
Sl. No.	Components & Operations	Characteristic/Item	Class	Type of check	Extent of Check	Reference Document	Acceptance Norm	Format of Record	Agency			Remarks	
									P	W	V		
1	2	3	4	5	6	7	8	9	10	11	12	13	
FINAL INSPECTION (Before Painting)													
1	Complete valve	a) Dimension	MA	Fig. Drilling face to face	100%	Relevant Std	Relevant Std	Dimensional Report	✓	3	1, 2	1, 2	100% Inspection by Manufacturer & 10% by Inspection Agency
		b) Operational Test	MA	Full opening / closing test	100%	Relevant Std	PO	Testing Register	✓	3	1, 2	1, 2	
		c) Pressure testing	MA	i) Hydro shell	100%	Relevant Std	Relevant Std	Testing Register	✓	3	1, 2	1, 2	
				ii) Hydro seat	100%	Relevant Std	Relevant Std	Testing Register	✓	3	1, 2	1, 2	
		Fire Safe Testing	MA	Fire Safe	1/prototype	API 607 / BS 6755 P-II	Relevant Std	Testing Register	✓	3	3	1, 2	
2	Paint & Packing	Surface	MA	Visual	Dryness	PO	PO	Testing Register		3	3	3	
				Visual	Two coats of red oxide	PO	PO	Testing Register		3	3	3	
				Visual	One coat of hammer tone dark grey	PO	PO	Testing Register		3	3	3	
				Visual	Anti rust layer at machined surface	PO	PO	Testing Register		3	3	3	
				Visual	Fixing of wooden/plastic end protector	PO	PO	Testing Register		3	3	3	
			LEGEND : Records identified with "✓" Documents by Contractor in QA										
			1 - BHEL 2 - PACKAGE SUPPLIER 3 - Manufacturer				P - Agency Performing the Test W - Agency Witnessing the Test V - Agency Verifying the Test				CLIENT NO.		
CONTRACTOR			CR - Critical Characteristics MA - Major Characteristics MI - Minor Characteristics IR - Inspection Report, MTC - Material/Manufacturer's Test Certificate				REV. 00 CAT.				REVIEWED BY		
SIGNATURE							NAME & SIGNATURE OF APPROVING AUTHORITY						

		STANDARD QUALITY PLAN FOR AUXILIARY STEAM PRDS		CUSTOMER :				SPECIFICATION NUMBR		
				BIDDER/ : AS PER APPROVED VENDOR LIST		SPECIFICATION TITLE : AUXILIARY STEAM P.R.D.S				
		SHEET 1 of 2		SYSTEM ITEM : STEAM DESUPERHEATER		QUALITY PLAN NUMBR		SECTION VOLUME		
SL. NO.	COMPONENT/ OPERATION	CHARACT-ERISTIC CHECK	CAT.	TYPE METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY P W V	REMARKS
1	2	3	4	5	6	7	8	9	10	11

1.0	Raw Materials											
1.1	Pipes	Mechanical & Chemical Prop.		Mechanical & Chemical	100%	Appd Specn./ Data Sheet/Drg.	Appd Specn./ Data Sheet/Drg.	TC	3/2	-	1	Correlation required
		Leakproofness		Hydraulic test	100%	-do-	-do-	TC	3/2	-	1	
		Dimensions		Measurement	100%	-do-	-do-	IR	3/2	-	1	
1.2	Forging	Physical & Chemical Prop.		Physical & Chemical Prop.	1/heat	Appd Specn./ Data Sheet/Drg.	Appd Specn./ Data Sheet/Drg.	TC	3/2	-	1	Correlation required
		Dimensions		Measurement	100%	-do-	-do-	IR	3/2	-	1	
		Heat Treatment		Scrutiny	100%	-do-	-do-	HT/SR Chart	3/2	-	1	Correlation required
2.0	In Process											
2.1	Forgings	Internal defects		U.T	100%	ASTMA 435	ASTMA 435	IR	3/2	-	1	
2.2	Machining Body Internals	Dimensions		Measurement	100%	Appd.Drg.	Appd.Drg.	IR	3/2	-	1	Correlation required
2.3	Body	Surface Defects		D.P. Check	100%	ASTME165	ASME-B 16.34 ,Appendix-III	TC	3/2	-	1	

PARTICULARS	CUSTOMER/CONSULTANT	BHEL	BIDDER / VENDOR	
NAME				
SIGNATURE				
DATE				
				BIDDER'S/ VENDOR'S COMPANY SEALS



CUSTOMER :

SPECIFICATION
NUMBR

BIDDER/ : AS PER APPROVED
VENDOR LIST

SPECIFICATION TITLE:

AUXILIARY STEAM P.R.D.S

SHEET 2 of 2

SYSTEM ITEM :
STEAM DESUPERHEATER

QUALITY PLAN
NUMBR

SECTION VOLUME

SL. NO.	COMPONENT/ OPERATION	CHARACT-ERISTIC CHECK	CAT.	TYPE METHOD OF CHECK	EXTENT OF CHECK	REFERENCE DOCUMENT	ACCEPTANCE NORM	FORMAT OF RECORD	AGENCY			REMARKS
									P	W	V	
1	2	3	4	5	6	7	8	9	10			11

[illegible]

LEGEND P – PERFORM

W – WITNESS

V – VERIFICATION

1 – BHEL, CUSTOMER/CONSULTANT 2 – VENDOR

3 – SUB VENDOR

PARTICULARS	CUSTOMER/CONSULTANT	BHEL	BIDDER / VENDOR	
NAME				
SIGNATURE				
DATE				
Page 291 of 606				BIDDER'S/ VENDOR'S COMPANY SEALS

QAP OF LEVEL INDICATOR

Manufacturer's Name:			QUALITY ASSURANCE PLAN				PROJECT: PACKAGE: Misc. Tanks (Site Fabricated) LOI No. : Customer : BHEL		BHEL Doc. No.: Rev. No. : 0 Date: SHEET 1 OF 1			
			QAP OF LEVEL INDICATOR									
Sl. No.	Components and Operation	Characteristic/ Item	Class	Type of Check	Extent of Check	Reference Document	Acceptance Norm	Format of Record (D*)	Agency			Remarks
									M	B	C	
1	2	3	4	5	6	7	8	9	10			11
1	Level Indicator	Check for Type, Model No., Tag No.	MA	Visual	100%	Approved Data Sheet	Approved Data Sheet	Mfgr. TC	P	V	V	
2		Float Leakage Test	CR	Mechanical	100%	Approved Data Sheet	Approved Data Sheet	Mfgr. TC	P	V	V	
3		Review of TC for Material	CR	Visual	For Lot	MTC	MTC	Mfgr. TC	P	V	V	
		C: BHEL B : Vendor M. : Manufacturer					P - Perform W - Witness V - Verification					
Manufacturer / Contractor / Sub contractor		CR-Critical Characteristics MA - Major Characteristics MI- Minor Characteristics			FOR BHEL			FOR CUSTOMER	APRD. BY			
Signature												

SUB-SECTION–E-30

FUEL OIL HANDLING SYSTEM

**EPC PACKAGE FOR
PATRATU SUPER THERMAL POWER STATION
EXPANSION PHASE–I (3X 800MW)**

**TECHNICAL SPECIFICATION
SECTION-VI, PART-B
BID DOC NO.:CS-9585-001-2**

CLAUSE NO.	QUALITY ASSURANCE			
	<u>FUEL OIL HANDLING SYSTEM</u> <u>TANKS AND VESSELS</u> 1. Material Tests (Chemical Analysis, Mechanical Tests & other tests) as per applicable material standard of all components (plates, forgings etc) 2. Only Qualified welders as per approved WPS and PQR shall be deployed for fabrication of tanks. 3. Dimensional checks, during in-process and final inspection, shall be carried out for alignments, circularity, verticality, orientation of connections, slope of bottom plate etc. 4. NDT on weld joints shall be done as per relevant / applicable standard. However, minimum requirement of NDT , as given below, shall be complied : a. 100% DPT on root run (butt welds / back-gouged welds). b. 100% DPT on all finished welds. c. RT on butt welded seams (which shall cover all 'T' / Cross joints) as per design code / Standard.. 5. All tanks shall be subjected to hydraulic test. Other tests, (as per relevant design standard), given below shall be applicable : a. Vacuum test for bottom plate seam testing and annular plate. b. Air / vacuum test for roof testing. <u>FUEL OIL PUMPS/DRAIN OIL PUMP</u> 1. Material Tests (Chemical Analysis, Mechanical Tests & other tests) as per applicable material standard of all components (plates, forgings etc) 2. All forged / rolled bars (for pump rotors / screws) shall be subjected to Ultrasonic Test (for diameter$\geq$ 50mm) at proof machine condition and DPT / MPI after finish machining. 3. Rotating parts i.e. Screws / Rotors, Impellers shall be statically and dynamically balanced as per requirements of code ISO: 1940 Gr. 6.3 or better. 4. The machined surfaces of castings shall be subjected to DP Test. 5. Pump casing shall be hydraulically tested at a pressure 150% of specified shut off head or 2 times working pressure (whichever is higher) for leak tightness. 6. All pumps shall be performance tested as per relevant / applicable code. <u>PIPING, VALVES, STRAINERS AND FITTINGS:</u> 1. Material Tests (Chemical Analysis, Mechanical Tests & other tests) as per applicable material standard of all components (plates, forgings, castings etc) 2. All pipes and fittings shall be tested as per applicable code. Welds of Steam Pipe joints shall be 10% radio graphed and 100% DP tested.			
EPC PACKAGE FOR PATRATU SUPER THERMAL POWER STATION EXPANSION PHASE-I (3X 800MW)	TECHNICAL SPECIFICATION SECTION-VI, PART-B BID DOC NO.:CS-9585-001-2	SUB-SECTION-E-30 FUEL OIL HANDLING SYSTEM	Page 1 of 3	

CLAUSE NO.	QUALITY ASSURANCE		एनटीपीसी NTPC
3	Followings are the testing requirements for fabrication of pipes at site		
	<u>TESTS</u>	<u>QUANTUM OF CHECKS</u>	
	WPS, PQR, Welder Qualification Test	100%	
	DPT on root run	100% for pipes up to 1200 mm diameter	
	DPT after back gauging	100% for pipes above 1200 mm diameter	
	RT	5%	
	DPT on finished butt weld joints	10%	
	Hydraulic Test	100%, 1.5 times the design pressure or 2 times the working-pressure whichever is higher.	
	100% RT of that field butt weld joint shall be carried out which could not be covered in hydraulic test		
4.	All valves shall be hydraulically tested for body, seat and back seat (as applicable) as per relevant standard. Check valves shall also be tested for leak tightness test at 25% of the specified seat test pressure.		
5.	Valves shall be offered in unpainted condition.		
6.	Functional checks of the valves for smooth operation, valve travel, opening and closing time shall be checked. Current drawn by actuators shall also be checked.		
7.	Fire safe test for ball/Plug valves shall also be done as per applicable codes/standard.		
8.	All fabricated strainers shall be subjected to Welding Checks & NDT checks as per design standard requirements. Strainer body shall be hydraulically tested and Pressure drop v/s flow rate test shall be done for Strainers. Weld joints are to be DP tested.		
	<u>MONORAIL HOISTS</u>		
1.	Material Tests (Chemical Analysis, Mechanical Tests & other tests) as per applicable material standard of all components (plates, pipes, tubes, forgings, castings etc)		
2.	Plates of thickness ≥ 25 mm shall be subjected to Ultrasonic Test.		
3.	For fabricated items, only qualified welders shall be deployed as per approved and qualified procedure.		
4.	NDT requirements on weldments shall be as follows: i. ii. iii. iv. Butt weld joints in Tension – 100% RT, 100% DPT Butt Weld Joint in Compression – 10% RT, 100% DPT Butt Weld Joint in Rope Drum – 100% RT, 100% DPT Fillet Weld – 10% DPT.		
5.	UT shall be carried out on forgings of diameter ≥ 50 mm in proof machined condition.		
6.	Chain pulley block shall be tested as per IS:3832		
7.	Deflection, load, overload and travel check as per IS: 3177 shall be done on assembled HOT.		
EPC PACKAGE FOR PATRATU SUPER THERMAL POWER STATION EXPANSION PHASE-I (3X 800MW)		TECHNICAL SPECIFICATION SECTION-VI, PART-B BID DOC NO.:CS-9585-001-2	SUB-SECTION-E-30 FUEL OIL HANDLING SYSTEM
Page 2 of 3			

CLAUSE NO.	QUALITY ASSURANCE			
	<u>FLEX HOSES</u> Tests such as Adhesion, Property before and after aging, swelling, tensile, elongation at break for rubber and vacuum test, pressure test, burst/proof pressure test, dimension of finished hose shall be carried out as per relevant standard.			
EPC PACKAGE FOR PATRATU SUPER THERMAL POWER STATION EXPANSION PHASE-I (3X 800MW)	TECHNICAL SPECIFICATION SECTION-VI, PART-B BID DOC NO.:CS-9585-001-2	SUB-SECTION-E-30 FUEL OIL HANDLING SYSTEM	Page 3 of 3	

AMENDMENT NO. 4 TO TECHNICAL SPECIFICATION (SECTION VI)

SL. NO.	SPECIFICATION REFERENCE				EXISTING	READ AS
	SEC/ PART	SUB SEC.	PAGE NO.	CLAUSE NO.		
375	VI / PART B	SUB-SECTION E-30 Fuel oil Handling system	Page 1	3	Rotating parts i.e. Screws / Rotors, Impellers shall be statically and dynamically balanced as per requirements of code ISO: 1940 Gr. 6.3 or better.	Rotating parts i.e. Screws / Rotors, Impellers (other than single screw) shall be statically and dynamically balanced as per requirements of code ISO: 1940 Gr. 6.3 or better.
376	SECTION-VI, PART-B	SUB-SECTION-E-23 COOLING TOWER	Page 2	Clause 15e	UV test for demonstrating the compliance to the clause no. – 4.13.00 sub section – IIIA-01, Part – B, Section – VI, Sl. No. – 3	‘Clause no 4.13.00 , sub section IIIA-01 Part B Section –VI, S No. -3” may be read as “ The Carbon Fiber Composite material shall be UV ray stabilized”.

EPC PACKAGE FOR PATRATU SUPER THERMAL POWER STATION EXPANSION PHASE-I (3X800 MW) BID DOCUMENT NO.: CS-9585-001-2	AMENDMENT NO. CS-9585-001-2-AMDT-18	Page 165 of 196
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**TECHNICAL SPECIFICATION FOR
FUEL OIL HANDLING SYSTEM
3X800 MW PVUNL PATRATU TPP PHASE-1**

SPECIFICATION NO. PE-TS-434-166-A001

SECTION 'I-A'

REVISION 00

DATE: 15.06.2018

PAGE 1 of 1

SECTION: I-A

**FUNCTIONAL / PERFORMANCE / DEMONSTRATION / GUARANTEE
TESTS**

SUB-SECTION-IV

FUNCTIONAL GUARANTEES

**EPC PACKAGE FOR
PATRATU SUPER THERMAL POWER STATION
EXPANSION PHASE-1 (3x800 MW)**

**TECHNICAL SPECIFICATION
SECTION-VI, PART-A
BID DOC NO: CS-9585-001-2**

CLAUSE NO.	FUNCTIONAL GUARANTEES, LIQUIDATED DAMAGES			एनटीपीसी NTPC
	FUNCTIONAL GUARANTEES, LIQUIDATED DAMAGES FOR SHORTFALL IN PERFORMANCE AND GUARANTEE TESTS The term "Performance Guarantees" wherever appears in this Sub-Section shall have the same meaning and shall be synonymous to "Functional Guarantees". Similarly the term "Performance Tests" wherever appears in this Sub-Section shall have the same meaning and shall be synonymous to "Guarantee Test(s)". The term "BMCR" (Boiler Maximum Continuous Rating) appearing in the Technical Specification shall mean the maximum continuous steam output of Steam Generator (as defined Cl. No. 1.02.00 Sub-section A-02, Part-B) at super heater outlet at rated parameters. The term "TMCR" (Turbine maximum continuous rating) appearing in the technical specification shall mean 800 MW electrical power output at generator terminals (power at generator terminals as per clause indicated in this sub-section) under rated steam parameters, 0% cycle make-up and 160 mmHg (abs) condenser pressure unless used in conjunction with a different cycle make-up and/or a different condenser pressure and /or a different throttle steam pressure.			
1.00.00	PERFORMANCE GUARANTEES			
1.00.01	General Requirements			
	a) The Contractor shall guarantee that the equipment offered shall meet the ratings and performance requirements stipulated for various equipment covered in these specifications. b) The guaranteed performance parameters furnished by the bidder in his offer, shall be without any tolerance values whatsoever and all margins required for instrument inaccuracies and other uncertainties shall be deemed to have been included in the guaranteed figures. c) The Contractor shall conduct performance test and demonstrate all the guarantees covered herein, during performance guarantee/acceptance test. The various tests which are to be carried out during performance guarantee/acceptance test are listed in this Sub-section. The guarantee tests shall be conducted by the Contractor at site in presence of Employer on each unit individually. d) All costs associated with the tests including cost associated with the supply, calibration, installation and removal of the test instrumentation, shall be included in the bid price. e) It is the responsibility of the contractor to perform the Performance			
EPC PACKAGE FOR PATRATU SUPER THERMAL POWER STATION EXPANSION PHASE-1 (3X800 MW)		TECHNICAL SPECIFICATIONS SECTION – VI, PART-A BID Doc. No.- CS-9585-001-2	SUB-SECTION-IV FUNCTIONAL GUARANTEES	PAGE 1 OF 98

CLAUSE NO.	FUNCTIONAL GUARANTEES, LIQUIDATED DAMAGES	एनटीपीसी NTPC		
	Guarantee/Acceptance test as specified in this subsection. The performance tests will be performed using only the normal number of Employer supplied operating staff. Contractor, vendor or other subcontractor personnel shall only be used for instructional purposes or data collection. At all times during the Performance Tests the emissions and effluents from the Plant shall not exceed the Guaranteed Emission and Effluent Limits. f) The Contractor shall make the plant ready for the performance guarantee tests. g) All instruments required for performance testing shall be of the type and accuracy required by the code and prior to the test, the contractor shall get these instruments calibrated in an independent test Institute approved by the Employer. All test instrumentation required for performance tests shall be supplied by the contractor and shall be retained by him upon satisfactory completion of all such tests at site. All calibration procedures and standards shall be subjected to the approval of the Employer. The protecting tubes, pressure connections and other test connections required for conducting guarantee test shall conform to the relevant codes. h) Tools and tackles, thermowells (both screwed and welded) instruments/devices including flow devices, matching flanges, impulse piping & valves etc. and any special equipment, required for the successful completion of the tests, shall be provided by the contractor free of cost. i) The Performance / Acceptance test shall be carried out as per the agreed procedure. The PG test procedure including demonstration tests shall be submitted within 90 days of the date of Notification of Award and finalization of the PG test procedure shall be done within 180 days from the date of Notification of Award. After the conductance of Performance test, the contractor shall submit the test evaluation report of Performance test results to Employer promptly but not later than one months from the date of conductance of Performance test. However, preliminary test reports shall be submitted to the Employer after completing each test run. The P&G test procedures shall be submitted for equipments/ system & subsystem under Contractor's scope for all Guarantees under category I, II & III as mentioned below, as per latest International codes / standard including correction curves, meeting the specification requirements along with sample calculations & detailed activity plan of preparation (including test instrumentation), conductance and evaluation of Guarantees. j) The contractor shall submit for Employer's approval the detailed Performance Test procedure containing the following:			
EPC PACKAGE FOR PATRATU SUPER THERMAL POWER STATION EXPANSION PHASE-1 (3X800 MW)	TECHNICAL SPECIFICATIONS SECTION – VI, PART-A BID Doc. No.- CS-9585-001-2	SUB-SECTION-IV FUNCTIONAL GUARANTEES	PAGE 2 OF 98	

CLAUSE NO.	FUNCTIONAL GUARANTEES, LIQUIDATED DAMAGES	एनटीपीसी NTPC		
	a) Object of the test. b) Various guaranteed parameters & tests as per contract. c) Method of conductance of test and test code. d) Duration of test, frequency of readings & number of test runs. e) Method of calculation. f) Correction curves. g) Instrument list consisting of range, accuracy, least count, and location of instruments. h) Scheme showing measurement points. i) Sample calculation. j) Acceptance criteria. k) Any other information required for conducting the test. k) In case during performance guarantee tests it is found that the equipment/system has failed to meet the guarantees, the Contractor shall carry out all necessary modifications and/or replacements to make the equipment/system comply with the guaranteed requirements at no extra cost to the Employer and re-conduct the performance guarantee test(s) with Employer's consent. However if the specified performance guarantee(s) are still not met but are achieved within the Acceptable Shortfall Limit specified at clause 1.01.02 of this subsection, Employer will accept the equipment/system/plant after levying liquidated damages as per clause 1.01.02 of this sub-section. If, however, the demonstrated guarantee(s) continue to be more than the stipulated Acceptable Shortfall Limit, even after the above modifications/replacements within ninety (90) days or a reasonable period allowed by the Employer, after the tests have been completed, the Employer will have the right to either of the following: i) For Category-I Guarantees Reject the equipment/system/plant and recover from the Contractor the payments already made OR			
EPC PACKAGE FOR PATRATU SUPER THERMAL POWER STATION EXPANSION PHASE-1 (3X800 MW)		TECHNICAL SPECIFICATIONS SECTION – VI, PART-A BID Doc. No.- CS-9585-001-2	SUB-SECTION-IV FUNCTIONAL GUARANTEES	PAGE 3 OF 98

CLAUSE NO.	FUNCTIONAL GUARANTEES, LIQUIDATED DAMAGES	एनटीपीसी NTPC		
1.01.00 1.01.01	Accept the equipment/system/plant after levying Liquidated Damages as specified hereunder. The liquidated damages, for shortfall in performance indicated in clause 1.01.02 for this sub-section are on per unit basis and shall be levied separately for each unit, except for the rate indicated for auxiliary power consumption for station auxiliaries which is on station basis. The liquidated damages shall be prorated for the fractional parts of the deficiencies. The performance guarantees coming under this category shall be called 'Category - I' Guarantees. ii) For Category-II Guarantees Reject the equipment/plant/system and recover from the Contractor the payments already made. The performance guarantees under this category shall be called 'Category - II ' Guarantees. Conformance to the performance requirements under Category -II is mandatory. iii) For Category-III Guarantees Reject the equipment / system/plant & recover from the Contractor the payments already made. OR Accept the equipment/system after assessing the deficiency in respect of the various ratings, performance parameters and capabilities and recover from the contract price an amount equivalent to the damages as determined by the EMPLOYER. Such damages shall, however be limited to the cost of replacement of the equipment(s) / system(s) replacement of which shall remove the deficiency so as to achieve the guarantee performance. These parameters/capacities shall be termed as category - III, guarantees.	GUARANTEES UNDER CATEGORY - I The performance guarantees which attract liquidated damages (LD) are as follows: i) Unit Heat Rate a) Unit Heat rate in kcal/kWhr under rated steam conditions at 160 mm Hg (abs) condenser pressure with zero (0%) make up at 800 MW unit load (i.e. 100% of rated load). b) Unit Heat rate in kcal/kWhr under turbine throttle main steam pressure of 210 Kg/cm2 (abs) and turbine throttle main steam temperature / reheat steam temp. at turbine inlet of 600 deg C / 600 deg C at 160 mm Hg (abs) condenser pressure with zero make up at 600 MW unit load (i.e. 75% of rated load) .		
	EPC PACKAGE FOR PATRATU SUPER THERMAL POWER STATION EXPANSION PHASE-1 (3X800 MW)	TECHNICAL SPECIFICATIONS SECTION – VI, PART-A BID Doc. No.- CS-9585-001-2	SUB-SECTION-IV FUNCTIONAL GUARANTEES	PAGE 4 OF 98

CLAUSE NO.	FUNCTIONAL GUARANTEES, LIQUIDATED DAMAGES 		
1.03.07	2) Capacity and static pressure of AHU fans at its rated duty point. B. Following shall be demonstrated at Site 1) Capacity (TR) of Water cooled chillers for A/C system of Main Plant Area & A/C system of Service Building, Administrative building Capacity, (TR) of Air cooled chillers for A/C system of Ash handling control room, Ash handling VFD room , FGD control room & ESP control room of Unit#1,2 & 3. 2) Capacity (TR) of Air cooled condensing (D-X) unit for A/C system of ESP, FGD, Switchyard (GIS), Water system control room Building, 3) Guaranteed room conditions during summer for all the Air conditioned areas. 4) Parallel operation of chilled water and condenser water pumps. 5) Vibration and noise level of chillers, condensing units, centrifugal fans of AHUs and all pumps. (ii) Ventilation System A. Following shall be demonstrated at Shop 1) Capacity and discharge pressure of pumps of air washer units and UAF units at its rated duty point of Ventilation system. 2) Capacity and static pressure of Air washer fans, roof exhausters of TG building and UAF fans at its rated duty point of Ventilation system. B. Following shall be demonstrated at Site 1) Parallel operation, Vibration & Noise level of centrifugal fans & pumps of Air washer fans and UAF units.		
	Fuel Oil Handling Plant a) All pumps shall be guaranteed for capacity, total dynamic head either in isolation or during parallel operation. b) Each storage tank shall be guaranteed for capacity and stability. c) Entire piping and supports for smooth operation.		
EPC PACKAGE FOR PATRATU SUPER THERMAL POWER STATION EXPANSION PHASE-1 (3X800 MW)		TECHNICAL SPECIFICATIONS SECTION – VI, PART-A BID Doc. No.- CS-9585-001-2	SUB-SECTION-IV FUNCTIONAL GUARANTEES PAGE 41 OF 98

PATRATU VIDYUT UTPADAN NIGAM LIMITED

3X800MW PVUNL PATRATU TPP PHASE-1

TECHNICAL SPECIFICATION
FOR
FUEL OIL HANDLING SYSTEM

ANNEXURE - I
(SUB-VENDOR LIST)



BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR PROJECT ENGINEERING MANAGEMENT
PPEI, NOIDA-INDIA



Project : PVUNL PATRATU TPP PHASE 1(3 X 800 MW)
Contract No.: 9585-001
Package : FUEL OIL HANDLING SYSTEM
Main Contractor: BHEL
Sub Contractor:

LIST OF ITEMS REQUIRING
QUALITY PLAN AND SUB SUPPLIER
APPROVAL.

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SL. NO	ITEM	QP/ Insp. Cat.	SUB-VENDORS	PLACE	SS Appl status/ cat	TECHNICAL LIMIT
MECHANICAL						
1	GATE, GLOBE AND CHECK (CARBON STEEL / GM VALVES) (Size upto 600 NB & Pr Class upto 300)	III	BHEL Apporved Source			
2A	CS BALL VALVES upto 100 mm & Class 800	III	BHEL Apporved Source			
			WEIR BDK	HUBLI	A	SS Ball valves up to 500MM and class #600, CS Ball Valves up to 250 MM and class# 900, CS/ SS Ball valves up to 100 MM and class # 1500.
			MICRO FINISH VALVES PVT. LTD.	HUBLI		400NB CLASS#600 AND UP TO 600NB CLASS#300
			FLOW CHEM INDUSTRIES	KALOL		100NB CLASS#600,200NB CLASS#300, 50 NB CLASS#800
			L&T VALVES LIMITED	COIMBATORE		UPTO 150NB, CLASS #150/300, AND UPTO 50NB, CLASS #800
			PRECISSION ENGG CO VALVES PVT LTD	NASIK		FCS UP TO 50NB CLASS 800, CCS UP TO 400NB CLASS 150.
			BELGAUM AQUA VALVE PVT LTD	BELGAON		FCS UP TO 50NB CLASS 800, CCS UP TO 200NB CLASS 150.
			G M ENGINEERING PRIVATE LTD	RAJKOT		UP TO 400 NB AND CLASS #600
			FLOW CHEM	AHMEDABAD		UPTO 350 NB CLASS 150, 100NB CLASS#600,200NB CLASS#300, 50 NB CLASS#800
3A	CS PLUG VALVES upto 100 mm & Class 800	II	BHEL Apporved Source			
3B	CS PLUG VALVES > 100 mm or Class > 800	I	FLOWSERVE (AUDCO)	CHENNAI	A	METALLIC SEATED 400NB CLASS#150, 300NB CLASS #300, 50NB CLASS #800

FORMAT NO.: QS-01-QAI-P-1/F3-R0

Engg. Div. / QA&I

		Project : PVUNL PATRATU TPP PHASE 1(3 X 800 MW) Contract No.: 9585-001 Package : FUEL OIL HANDLING SYSTEM Main Contractor: BHEL Sub Contractor:			LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB SUPPLIER APPROVAL.		DOC. NO. :
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						DATE: 11.07.2019	
						PAGE : 2 OF 4	
			WEIR BDK	HUBLI			SOFT SEATED 400MM AND CLASS #150, 300NB CLASS#300
4	SUMP PUMP < 30KW (VERTICAL CENTRIFUGAL)	II	BHEL Approved Source				
5	SCREW PUMPS	I	ROTO PUMPS	NOIDA	A		Single / Twin 100 CMH, 25 KSC
			ALLWEILER INDIA PVT. LTD. (TUSHACO)	DAMAN			Screw from Allweiler Germany
			UT PUMPS	FARIDABAD			Tripple Screw, 300 LPM, 60 KSC Screw from KRAI, Austria
6	API 5L ERW PIPE	II	BHEL Approved source (BIS / API marked, with valid license)				
7	ASTM A 106, CS SEAMLESS PIPE	II	ISMT	AHMED NAGAR	A		UP TO 150 NB
			MSL	RAIGAD			UP TO 500 NB
			JINDAL SAW LTD	NASHIK			UP TO 200 NB
			REMI METAL GUJRAT LTD	BHARUCH			UP TO 150 NB HOT FINISH & UPTO 100NB COLD FINISH
			ISMT	BARAMATI			UP TO 200 NB
8	MS PIPE (Black / GI) (IS 1239 / 3589)	II	BHEL Approved source (BIS Marked, manufacturers with valid BIS license)				
9	SUCTION HEATER	III	BHEL Approved source				
10	STRAINERS (DUPLEX / SIMPLEX BASKET TYPE)	III	BHEL Approved source				
11	STEAM TRAP	III	BHEL Approved source				
12	THERMAL INSULATION	III	BHEL Approved source				
13	STRUCTURAL STEEL / MS-PLATE	III	SAIL / JSPL / ESSAR / JSW / RINL / TISCO / LLOYD (UTTAM VALUE STEEL)				A) MATERIAL WILL BE DELIVERED DIRECTLY FROM MANUFACTURER PLANT / STOCK

FORMAT NO.: QS-01-QA1-P-1/F3-R0

Engg. Div. / QA&I



Project : PVUNL PATRATU TPP PHASE 1(3 X 800 MW)
Contract No.: 9585-001
Package : FUEL OIL HANDLING SYSTEM
Main Contractor: BHEL
Sub Contractor:

**LIST OF ITEMS REQUIRING
QUALITY PLAN AND SUB SUPPLIER
APPROVAL.**

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					YARD GODOWN TO PROJECT SITE. B) CORELATION OF MATERIAL WITH MTC WILL BE DONE BY BHEL / SUB-CONTRACTOR BEFORE DELIVERY. C) CORELATED MTC ALONG WITH DELIVERY CHALLAN WILL BE SUBMITTED TO NTPC.
14	SAFETY RELIEF VALVE	III	BHEL Approved source		
15	PAINT	III	BHEL Approved source		
16	FITTINGS (MS/GI/SS)	III	BHEL Approved source		
17	OIL HOSE	III	BHEL Approved source		
18	STEAM AND CONDENSATE HOSE	III	BHEL Approved source		
19	ALUMINUM CLADDING	III	BHEL Approved source		
20	METALLIC EXPANSION BELLOWS	I	AEROSUN TOLA EXPANSION JOINT CO. LTD.	CHINA	
			FLEXICAN BELLOWS AND HOSES PVT. LTD.	BARODRA	
			LONESTAR INDUSTRIES	CHENNAI	
			MB METALLIC BELLOWS PVT LTD	CHENNAI	
			METALLIC BELLOWS INDIA PVT LTD	CHENNAI	
21	DRAIN OIL TANK	III	BHEL Approved source		
22	FLAME ARRESTOR	III	BHEL Approved source		

LEGEND:

1. QP/INSPNCATEGORY:

CAT-I: For these items the Quality Plans are approved by Owner and the final acceptance will be on physical inspection witness by Owner.

FORMAT NO.: QS-01-QAI-P-1/F3-R0

11/07/19 Engg. Div. / QA&I



Project : PVUNL PATRATU TPP PHASE I(3 X 800 MW)
Contract No.: 9585-001
Package : FUEL OIL HANDLING SYSTEM
Main Contractor: BHEL
Sub Contractor:

**LIST OF ITEMS REQUIRING
QUALITY PLAN AND SUB SUPPLIER
APPROVAL.**

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CAT-II: For these items the Quality Plans are approved by Owner, however no final inspection shall be done by owner. Final acceptance by Owner shall be on the basis of review of documentation as per approved QP.

CAT-III: For these items Quality control to be exercised as per Main Contractor Quality Assurance System. The final acceptance by NTPC shall be on the basis of Certificate of Conformance (COC) by Main Contractor.

2. SYSTEM SUPPLIER / SUB-SUPPLIER APPROVAL STATUS CATEGORY

A- For these proposed vendor is acceptable to NTPC/PVUN. To be indicated with letter 'A' in the list along with the condition of approval, if any.

DR- For these items "Detailed Required" for NTPC/PVUN review. To be indicated with letter 'DR' in the list.

Amit
(Amit K. Garg)
BHEL

Kamlesh Singh
11/07/19
(Kamlesh Singh)
PVUNL

	Project : Patratu STPP 3X800 MW		Sub-Vendor List Control & Instrumentation and Electrical Items		Doc No	QA-C&I and Elect -FOH-00
	Package : Fuel oil handling System				Rev No	1
	Main Contractor : BHEL				Date	25.07.2019
	Sub Contractor : New Fire Engineers Pvt. Ltd.					1 of 9
	Contract No. : 9585-001-130					
SI No.	Item	QPI Insp. Cat.	Acceptable Supplier As Per Database	Place of Manufacturing	Approval Status	Remarks
Control and Instrumentation Item list - Controlled items						
1	Electrical Actuator (With Gear Box, If Applicable)	II	Antrieb Technik Pvt Ltd	Chennai	A	for low torque application
			Auma	Bangalore	A	
			Limitorque	Faridabad	A	
			Rotork	Chennai /Banglore	A	
2	Instrument Cables (F, G & T/C Cables)	I (Refer - Note - 1)	Paramount Communication Ltd	Khushkhera	A	PVC, FRLS type
			Polycab	Daman	A	PVC, FRLS type
			Delton	Faridabad	A	PVC, FRLS type
			Kei	Bhiwadi	A	PVC, FRLS type
			Elkey Telelinks	Faridabad	A	PVC, FRLS type
			Cords	Kaharani	A	PVC, FRLS type
			Cords	Bhiwadi	A	PVC, FRLS type
			Nicco	Kolkata	A	PVC, FRLS type
			Universal Cable	Satna	A	PVC, FRLS type
			Thermocables	Hyderabad	A	PVC, FRLS type
			Gupta Power Infrastruicture Ltd.	Khurdha	A	PVC, FRLS type
			Cmi	Faridabad	A	PVC, FRLS type
			Advance Cables Pvt Ltd	Banglore	A	PVC, FRLS type
			Gemscab Industries Ltd	Bhiwadi	A	PVC, FRLS type
			Apar Industries Limited	Valsad	A	PVC, FRLS type
3	Terminal Block (Cage And Clamp Type)	III	Weidmuller	Germany	A	
			Phoenix	Germany / India	A	
			Wago	Germany / India	A	
			Elmex	Vadodara	A	Model should have CE Marking
4	Radar Type Level Transmitter	III	Emerson Process Management Pvt Ltd	Pawane	A	Basic Intrument Transmitter & Probe to be procured from Emerson Singapore , only intergration & configuration at daman works
			Endress & Houser	Aurangabad	A	
			Supreme Technology	Thane	A	Transmitter procured from Siemens Canada with Co-related TC Vaild Authorisation from M /s Siemens
			B M Technology	Italy	A	Non Contact type Radar level Transmitter
			Magnetrol	Belgium	A	
			ABB(K-Tech)	USA	A	Liquid like Oil & Water

	Project : Patratu STPP 3X800 MW		Sub-Vendor List Control & Instrumentation and Electrical Items		Doc No	QA-C&I and Elect -FOH-00
	Package : Fuel oil handling System				Rev No	1
	Main Contractor : BHEL				Date	25.07.2019
	Sub Contractor : New Fire Engineers Pvt. Ltd.					2 of 9
	Contract No. : 9585-001-130					
SI No.	Item	QP/ Insp. Cat.	Acceptable Supplier As Per Database	Place of Manufacturing	Approval Status	Remarks
5	Temperature Transmitter	III	Endress & Houser	Aurangabad	A	
			Yokogawa	Bangalore	A	Make Yokogawa Japan & calibration at Yokogawa Banglore
			Emerson Process Management Pvt Ltd	Pawane	A	Dual input & multiinput imported from Singapore but tagged & configured at Pawane works .
			ABB	Bangalore	A	Din Rail, Dual I/P field mounted type (make M/S ABB Germany)
			Wika Instruments India Pvt Ltd	Pune	A	Model no T-32 sourced from Wika Germany & calibration at Wika Pune is acceptable
			Yokogawa	Japan	A	Calibration at Yokogawa Banglore is also acceptable.
			Moore	USA	A	
			M System Co Ltd	Japan	A	Model No-B3HU-0
6	Control Valve (Pneumatic Type) up to 600 class, Pneumatic operated	II	CCI	Sricity	A	
			KSB Mil	Thrissur	A	
			Emerson Process Management Ltd	Chennai	A	
			Dressor	Coimbatore	A	
			Flow Serve India Controls Pvt Ltd	Bangalore	A	
			Forbes Marshal Arca Pvt. Ltd.	Pune	A	
			Instrumentation Limited	Palakkad	A	
			7	Transmitter (Electronic) (Pressure, DP, Flow, Level Application)	III	ABB Ltd
Emerson Process Management Pvt Ltd	Pawane	A				
Siemens Ltd	Thane	A				Model:-SITRANS P
Honeywell Automation India Ltd	Pune	A				
Baldota Control And Equipment Pvt Ltd	Navi Mumbai	A				PT & DPT of LD 301 Series (SMAR)
Yokogawa India Limited	Bangalore	A				EJA-E 110,430,530 SERIES & all raw material and BOI under knocked down condotion (sensor assembly as a single unit) shall be sourced from M /S Yokogawa Japan
M/S Endress + Hauser India Automation Instrument Pvt Ltd	Aurangabad	A				
Fuji Electric	France	A				FCX -AIII Series

	Project : Patratu STPP 3X800 MW		Sub-Vendor List Control & Instrumentation and Electrical Items		Doc No	QA-C&I and Elect -FOH-00
	Package : Fuel oil handling System				Rev No	1
	Main Contractor : BHEL				Date	25.07.2019
	Sub Contractor : New Fire Engineers Pvt. Ltd.					3 of 9
	Contract No. : 9585-001-130					
SI No.	Item	QPI Insp. Cat.	Acceptable Supplier As Per Database	Place of Manufacturing	Approval Status	Remarks
8	Level Transmitter (Ultrasonic Type)	II	EIP ENVIRO	Noida	A	Ultrasonic level Tx shall be BM TECHNOLOGY ITALY MAKE.REQUIRED MOUNTING ARRANGEMENT,TESTING ,CALIBRATION SHALL BE CARRIED OUT AT M/S EIP WORKS.AUTHORIZATION LETTER ALONG WITH VALIDITY DATE ALONGWITH QP.
		III	E & H	Aurangabad	A	
		III	Emerson Process Management Ltd	Pawane		Complete Intrument Transmitter & Probe to be procured from Mobrey UK , only intergration & configuration at Pawane works
		III	BM Technology	Italy	A	
		III	SIEMENS MILTRONICS	Canada	A	
		III	Nivelco Process Control	Hungary	A	Manufactured ,assembled CALIBRATED AND TESTED in hungARY Flange,EXTERNAL CAGES,MOUNTING BRACKETS PANELS ETC ,configured AND SUPPLIED BY NIVELCO PUNEIn pune
		III	E & H	Germany	A	APPROVED FOR GUIDED WAVE RADAR TYPE TRANSMITTER
		III	HAWK Measurement PTY Ltd	Australia	A	

	Project : Patratu STPP 3X800 MW		Sub-Vendor List Control & Instrumentation and Electrical Items		Doc No	QA-C&I and Elect -FOH-00
	Package : Fuel oil handling System				Rev No	1
	Main Contractor : BHEL				Date	25.07.2019
	Sub Contractor : New Fire Engineers Pvt. Ltd.					4 of 9
	Contract No. : 9585-001-130					
SI No.	Item	QPI Insp. Cat.	Acceptable Supplier As Per Database	Place of Manufacturing	Approval Status	Remarks
	Following C&I items to be supplied as per main contractor approved sources meeting the NTPC Specification requirement					
1	Compression Fittings(Ss)	III	Main Contractor approved sources		A	
2	Conduits / Pipe (Gi)	III	Main Contractor approved sources		A	
3	Conduits Lead Coated (Flexible)	III	Main Contractor approved sources		A	
4	Flow indicator cum totaliser / Flow Gauge	III	Main Contractor approved sources		A	
5	Flow Switch	III	Main Contractor approved sources		A	
6	Coreloius type flow meter					
7	FRP Junction Box	III	Main Contractor approved sources		A	
8	Hand Held Calibrator	III	Main Contractor approved sources		A	
9	Instrument Tube Fittings (Air) / Copper / Brass connectors	III	Main Contractor approved sources		A	
10	Instrument Valve	III	Main Contractor approved sources		A	
11	Level Gauge (Transperent & Reflex, Tubular Type)	III	Main Contractor approved sources		A	
12	Level Indicator (Float & Board Type)	III	Main Contractor approved sources		A	
13	Level Switch - Float / Displacer Type/Paddle	III	Main Contractor approved sources		A	
14	Limit Swtch	III	Main Contractor approved sources		A	
15	Pr./ Vacuum/ Dp Gauges	III	Main Contractor approved sources		A	
16	Press, Dp, Vaccum Switch	III	Main Contractor approved sources		A	
17	Solenoid Valve	III	Main Contractor approved sources		A	
18	Temperature Gauge(With Thermowell if applicable)	III	Main Contractor approved sources		A	
19	Temperature Switch	III	Main Contractor approved sources		A	
20	Valve Manifolds	III	Main Contractor approved sources		A	
21	Thermocouple, RTD and Thermowell	III	Main Contractor approved sources		A	
22	Air Filter regulator					
23	Smart Positioner / E to P converter					
24	Pneumatic Actuator for Control Valve					

	Project : Patratu STPP 3X800 MW		Sub-Vendor List Control & Instrumentation and Electrical Items		Doc No	QA-C&I and Elect -FOH-00
	Package : Fuel oil handling System				Rev No	1
	Main Contractor : BHEL				Date	25.07.2019
	Sub Contractor : New Fire Engineers Pvt. Ltd.					5 of 9
	Contract No. : 9585-001-130					
SI No.	Item	QP/ Insp. Cat.	Acceptable Supplier As Per Database	Place of Manufacturing	Approval Status	Remarks
Electrical Item list - Controlled items						
1	LT Motors	Refer Note 4	ABB	Faridabad / Bangalore	A	Faridabad upto 55 kW, Bangalore above 55-200 KW kW
			Marathon	Kolkata	A	Also for flame proof motor
			KEC	Hubli / Bangalore	A	Hubli Upto 90kW, also for flame proof motor
			Bharat Bijlee	Mumbai	A	RQP, For Flamd proof also
			NGEF	Bangalore	A	Upto 15 kW
			TMEIC	Japan	A	
			Jyoti	Vadodara	A	
			LHP	Sholapur	A	Upto 200 kW
			Siemens	Mumbai	A	
2	LT VFD Panel	I	Powertech	Narela	A	Up to 415 V-18.5 KW, VVFD Drive: Schneider France
			Danfoss	Chennai	A	Upto 415V, 11kW, VFD drives with VFD sourced from Danfoss-Denmark / USA and Panel sourced from Rittal
			Yaskawa	Japan	DR	
			Rockwell Automation	Sahibabad	A	VFD from Rockwell (Allen Bradley)- USA, (Upto 415 V, 600 KW), VVF Drive RA / AB-USA, Authorised System integrator: M /s Saitech, Vadodara
			ABB	Bangalore	A	Up to 415 V -750 KW, VVVF Drive from ABB Finland / ABB Bangalore (UP to 2.2 KW), Authorised system integrator M/s Switching Circuit Kolkata.
			Siemens	Nasik	A	Up to 415 V-132 KW, VVVF Drive from Siemens Germany, Proposed System integrator Cot mac Pune- DR category
			CG Power & Industrial Solutions	Mandideep	A	Upto 50 HP (37KW)
			Vacon	Bangalore	A	VFD (NXP model) from VACON Finland, upto 400KW,415V and upto 900KW, 690V

	Project : Patratu STPP 3X800 MW		Sub-Vendor List Control & Instrumentation and Electrical Items		Doc No	QA-C&I and Elect -FOH-00
	Package : Fuel oil handling System				Rev No	1
	Main Contractor : BHEL				Date	25.07.2019
	Sub Contractor : New Fire Engineers Pvt. Ltd.					6 of 9
	Contract No. : 9585-001-130					
SI No.	Item	QPI Insp. Cat.	Acceptable Supplier As Per Database	Place of Manufacturing	Approval Status	Remarks
3	1.1KV Control Cable	CAT-I Refer Note 3	NICCO	Shamnagar, Kolkata	A	
			Torrent Cable Ltd	Nadiad	A	
			Incab	Pune	A	
			Polycab Wires Pvt Ltd	Daman	A	
			Hindustan Vidhut Product Ltd	Faridabad	A	
			KEI Industries	Bhiwadi	A	
			Delton	Faridabad	A	
			Paramount Cable	Khushkhhera	A	
			Gemscab Industries	Bhiwadi	A	
			Radiant	Hyderabad	A	
			Universal Cables	Satna	A	
			Cords Cable	Bhiwadi	A	
			Elkay Telelink	Faridabad	A	
			Havells India Ltd	Alwar	A	
			R.R. kabel	Silvasa	A	
			Ravin Cables	Pune	A	
			Gupta Power Cable	Khurda	A	
			Thermocables	Hyderabad	A	
			Finolex	Pune	A	
			Sbee Cable	Bangalore	A	
			Suyog Cable	Vadodara	A	
4	Galvanized Cable Tray	Refer Note 5 II	M J Engg.	Okhla / Bhiwadi	A	
			Steelite Engg.	Mumbai	A	
			Amtech	Pune	A	Galvanizing at B.G. Shirke - Pune
			Inar Profile	Enkapalli	A	GALVANISATION AT VISHAKHA STEELS ALLIED-ANKAPALLI
			Indiana Gratings	Pune	A	
			TRG	Chennai	A	Galvanization at TM Radhakrishna Chetty & Co-Chennai
			Industrial Peforation	Kolkata	A	
			Kannade Anand Udg	Mumbai	A	Fabrication at their units: Plot No. 42, Morivali, MIDC, District Thane & Plot No.: D-35, Anand Nagar MIDC, Addl. Ambernath, Dist..Thane Galvanization and offer the galvanized cable trays for inspection at D-34 Anand Nagar MIDC, Addl. Ambernath, Dist.Thane.

	Project : Patratu STPP 3X800 MW		Sub-Vendor List Control & Instrumentation and Electrical Items		Doc No	QA-C&I and Elect -FOH-00
	Package : Fuel oil handling System				Rev No	1
	Main Contractor : BHEL				Date	25.07.2019
	Sub Contractor : New Fire Engineers Pvt. Ltd.					7 of 9
	Contract No. : 9585-001-130					
SI No.	Item	QPI Insp. Cat.	Acceptable Supplier As Per Database	Place of Manufacturing	Approval Status	Remarks
			Unitech Fabricators	Howrah / Hoogly	A	
			Patny Systems	Hyderabad	A	Galvanisation at Gurpreet Galvaniser, Hydrabad
			India Electric Syndicate	Kolkata	A	Galvanization at BMW Industries/B.P Projects- Howrah
			Premier Power Products	Howrah	A	Galvanizing at Neha Galvanizer - Howrah
			VATCO	Mumbai	A	Galvanising at Sigma Mumbai
			Rukmani	Raipur	A	Ladder type cable trays only
			Rukmani	Hoogly	DR	
5	Cable Tray Flexible Support Structure (GI)	II	Ratan Projects AND ENGG. PVT LTD .	Howrah	A	
			Steelite Engg.	Mumbai	A	
			Vatco	Mumbai	A	Galvanizing at M/s. Sigma- Mumbai
			Premier Power Products	Howrah	A	Galvanizing at Neha Galvanizer - Howrah
			Ratan Projects	Howrah	A	Galvanisation at NTPC approved sources.
			Amtech Engg. Services	Pune	A	Galvanizing at M/s. B.G. Shirke-Pune
			Inar Profiles	Enkapalli	A	
6	Cable Lugs/ Ferrules	III	Indiana Gratings	Pune	A	Galvanising from Poona Galvaniser
			Industrial Peforation	Kolkata	A	
			Dowell	Mumbai	A	Refer Note 6
			3D	Umbergaon	A	
			Chetna	Nasik	A	
7	FQP of C & I and Electrical Equipment - Receipt, Storage & Erection	I				
8	DCDB, ACDB, MLDB, WRDB,WDB AFCB, UPSDB, DCFB, LIGHTING PANEL, LOCAL PANEL, CONTROL PANEL (NON PLC), SOLENOID BOARD, PUSH BUTTON, NON MOSAIC TYPE, LOCAL MOTOR STARTER, POWER JB, LOCAL CONTROL STATIONS, REMOTE PANEL, OIL FILTRATION PANEL, HT JUNCTION BOX ETC	I (All wall mounted fixed type indoor /outdoor or LT switchgear shall be treated as inspection CAT-III)	Switching Circuits	Kolkata	A	
			Jakson	Greater Noida	A	
			Pyrotech	Udaipur	A	
			Positronics	Vadodara	A	
			Control Devices	Kolkata	A	
			Jolly Engineering	Kolkata	DR	

	Project : Patratu STPP 3X800 MW		Sub-Vendor List Control & Instrumentation and Electrical Items		Doc No	QA-C&I and Elect -FOH-00
	Package : Fuel oil handling System				Rev No	1
	Main Contractor : BHEL				Date	25.07.2019
	Sub Contractor : New Fire Engineers Pvt. Ltd.					8 of 9
	Contract No. : 9585-001-130					
SI No.	Item	QPI Insp. Cat.	Acceptable Supplier As Per Database	Place of Manufacturing	Approval Status	Remarks
Following Electrical items to be supplied as per main contractor approved sources meeting the NTPC Specification requirement						
1	Cable Glands (Flame proof and Non Flame proof)	III	Main contractor approved sources		A	Refer Note 6
2	PVC conduit/ Hume pipe / Lighting wire / GI pipes / HDPE pipe/ GI steel rigid conduit / Epoxy conduit	III	Main Contractor Approved Sources / BIS Approved Sources		A	1-Refer Note 6 2 Galvanising wherever applicable to be done at NTPC approved sources or from Note 7
3	Galvanized JB, Switch Box, Link Boxes, Adopter Boxes, Industrial Receptacales, M.S. Rod, G.S. Flat G.I. Wire, Earth Wire & Lightning Protection, Trifoil, Cable Clamps, Ferrules	III	Main Contractor Approved Sources		A	Galvanising wherever applicable to be done at NTPC approved sources or from Note 7

LEGENDS :

1.0 SYSTEM SUPPLIER / SUB SUPPLIER APPROVAL STATUS CATEGORY	
A - For those items proposed vendor is acceptable to Customer. To be indicated with letter "A" in the list along with the condition of approval, if any.	
DR - For those items "Detailed Required" for Customer review. To be identified with letter "DR" in the list. For these items, vendor shall be proposed for owner acceptance with-in the agreed contract schedule of the package	
SQP-Standard Quality Plan	RQP-Reference Quality Plan
2.0 QP INSPECTION CATEGORY :	
CAT - I : For those items the Quality Plans are approved by Customer and final acceptance will be on physical inspection witness by Customer	
CAT - II : For those items the Quality Plans are approved by Customer. However no physical inspection shall be done by Customer. The final acceptance by Customer shall be on the basis of review of documents.	
CAT - III : For those items Main supplier approves Quality Plans. The final acceptance by Customer shall be on the basis of Certificate of Conformance by main supplier.	

	Project : Patratu STPP 3X800 MW		Sub-Vendor List Control & Instrumentation and Electrical Items		Doc No	QA-C&I and Elect -FOH-00
	Package : Fuel oil handling System				Rev No	1
	Main Contractor : BHEL				Date	25.07.2019
	Sub Contractor : New Fire Engineers Pvt. Ltd.					9 of 9
	Contract No. : 9585-001-130					
SI No.	Item	QPI/ Insp. Cat.	Acceptable Supplier As Per Database	Place of Manufacturing	Approval Status	Remarks
UNITS/WORKS : Place of manufacturing- Place of main supplier of multi units/works.						
* - Inspection category will be decided during vendor evaluation.						
NOTES: As applicable (if required)						
Note 1 :	For Insrument cable up to 1 KM inspection category CAT - III, For 1 KM to 10 KM Inspecton category CAT - II.					
Note 2 :	For the C & I instrumnts mounted on the skid of the main item or supplied as a integral part of the main item, instrument to be supplied as per proven practice of the manufacturer meeting the Customer technical specification requirement.					
Note 3 :	For C and I items, mandatory Spares to be treated as NTPC inspection category CAT - III.					
Note 4 :	For LT Motors:					
	a) Up to 50 KW(CAT-III): Acceptance is based on COC of the manufacturer & the contractor confirming as follows:					
	It is hereby confirmed that the above mentioned motor / motors was/ were manufactured taking care of NTPC specific requirements regarding ambient temp., voltage & frequency variation, hot starts, pull out					
	b) for 50 KW to 75KW(CAT-III) for manufacturers who have already supplied this range of motors to NTPC which have been commissioned and no adverse feedback has been reported from RIO/Project-site					
	It is hereby confirmed that the above mentioned motor / motors was/ were manufactured taking care of NTPC specific requirements regarding ambient temp., voltage & frequency variation, hot starts, pull out					
	c) <u>Above 75 KW(CAT-I):</u> as per NTPC approved Quality Plan					
Note 5:	Category of inspection for LT Cables and Cable Trays:					
	For Total Contract Quantity per Size				Category of Inspection	
	Less ≤ 2.5 KM				Cat-III - For the manufacturers having successfully supplied to NTPC Project-site through cor porate contract s at least 2 years back	
	For cable total quantity above 2.5 km & up to 10 km per size				Cat-II	
	For cable total quantity above 10 km per size / type				Cat-I	
Note 6:	VDE / CE / UL / CSA Marking Certification preferably from Third Party Agency or BIS Approval Letter shall be submitted for NTPC's Verification / Information.					
Note 7:	List of Galvanisers					
	1. M/s M J Engg, Delhi				15. M /s Sigma, Mumbai	
	2. M/s Rukmani Fab& Gal- Howrah				16. M /s Radhakrishnan Shetty, Chennai	
	3. M/s A.V. Engg, Kolkata				17. Karamtara Mumbai	
	4. M/s Inar Profiles, Vishakapatnam				18. Poona Galvanizers Pune	
	5. M/s Anand Udyog, Mumbai				19. Neha Galvanizer- Kolkata	
	6. M/s Techno Engg, Chandigarh				20. Unitech Fabricators & Galvanizers- Hoogly	
	7. M/S Steelite Engg, Mumbai					
Note 8:	List of sub-vendors is to be submitted along with QP for all the items identified as inspection category- I & II by the equipment Sub-Supplier.					
Note 9 :	For the items not appearing in the preaward list and falls in the scope of supply of the bidder, bidder and Customer will mutually discussed in future.					



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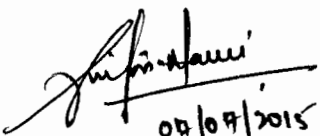
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**ANNEXURE-I
LIST OF MAKES OF SUB-VENDOR ITEMS
FUEL OIL UNLOADING AND STORAGE SYSTEM**


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VIPIN NAUNI
PEM-MAUX



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SL. NO	ITEM	SUB-VENDORS	PLACE	TECHNICAL LIMIT
MECHANICAL				
1	GATE, GLOBE AND CHECK (CARBON STEEL VALVES)	A.V. VALVES LTD	AGRA	
		ATAM VALVES PVT. LTD.	JALANDHAR	
		FLUIDLINE VALVES COMPANY PVT.LTD.	GHAZIABAD	
		M/S GM ENGINEERING	RAJKOT	
		INTERVALVE (INDIA) LTD.	PUNE	A) STEEL GATE VALVES: UPTO 50NB, #800 AND 65NB TO 150NB, #150 B) STEEL GLOBE VALVES: UPTO 50NB, #800 AND 65NB TO 100NB, #150 C) SUPPLIER NOT REGISTERED FOR NR VALVES
		LEADER VALVES LTD.	JALANDHAR	
		NITON VALVE INDUSTRIES PVT LTD	MUMBAI	
		NSSL LIMITED.	NAGPUR	
		STEEL STRONG VALVES (I) PVT.LTD.	MUMBAI	LIMIT AS PER VD FILE AS ATTACHED IN SHEET 2
		VENUS PUMPS AND ENGG. WORKS	KOLKATA	CC/CSS-GATE-BBT-UPTO600NB CL UPTO300,GATE-PSBT UPTO250NB CL 1500,GLV-BBT-UPTO300NB CL UPTO600,SCNRV-BBT-UPTO600NB CL UPTO150,SCNRV-BBT-UPTO300NB CL 300,SCNRV-PSBT-UPTO150NB CL UPTO900
		VALTECH INDUSTRIES	MUMBAI	CAST CARBON & ALLOY STEEL - VALVE/RATING/SIZE- GV/150/900,GV/300/400, GV/600/300, GV/GLV/NRV/900/250, GLV/300/300,GLV/150/350/, SCNRV/150/700, SCNRV/300/350, SCNRV/600/250.
		V.K. VALVES PVT. LTD.,	JALANDHAR	
		WEIR BDK VALVES	NEW DELHI	
		AUDCO -L&T	CHENNAI / COIMBATORE	
		OSWAL INDUSTRIES		
		HITECH	AHMEDABAD	
		KSB WATER PUMPS / VALVES	COIMBATORE	
		KBL	KONDHAPURI	
		HAWA ENGINEERS	AHMEDABAD	
		BHEL	GOINDWAL	
		FOURESS ENGG	MUMBAI	UPTO 600 NB, CL-300 & 300NB CL-600
		FOURESS ENGG	AURANGABAD	



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2	CS BALL VALVES	A.V. VALVES LTD	AGRA	
		AKAY INDUSTRIES PVT.LTD.	DHARWAD	
		BELGAUM AQUA VALVES PVT. LTD.	BELGAUN	
		ASIAN INDUSTRIAL VALVES & INSTRUMENTS.	CHENNAI	
		ATAM VALVES PVT. LTD.	JALANDHAR	(1) BALL VALVES: FCS/FSS - 1/2" TO 2" #800 & CCS/CSS - 2.1/2" TO 4" # 150 (2) BALL VALVES: GUN METAL VALVES SIZE 15 NB TO 80 NB - UPTO PN16.0
		DEMBLA VALVES LTD.	THANE	
		M/S GM ENGINEERING	RAJKOT	
		HAWA VALVES (INDIA) PVT. LTD.	THANE	SIZE UP TO 2" & #800 WITH MOC AS FCS & FSS AND FOR SIZE FROM 65 NB TO 150 NB & #150 WITH MOC AS CCS AND CSS.
		INTERVALVE (INDIA) LTD.	PUNE	STEEL BALL VALVES UPTO 50NB, #800 AND 65NB TO 150NB. #150
		LEADER VALVES LTD.	JALANDHAR	CAST STEEL UPTO 200 MM, CLASS 150/300.
		MICROFINISH VALVES PVT LTD.	HUBLI	
		NILON VALVES PRIVATE LIMITED	AHMEDABAD	
		SURYA VALVES AND INSTRUMENTS MFG CO.	CHENNAI	FOR CARBON STEEL/STAINLESS STEEL UPTO SIZE 200NB.
		UNIFLOW	CHENNAI	
		VALTECH INDUSTRIES	MUMBAI	FORGED CARBON & ALLOY STEEL BALL VALVES, SCREWED TYPE BALL VALVES RATING 800, SIZES UPTO 50 & CC& ALLOY STEEL BALL VALVES RATING 150 , SIZES 65 TO 200 FLANGED TYPE.
		VAAS AUTOMATION PVT. LTD.	DELHI	
		WEIR BDK VALVES- A UNIT OF WEIR INDIA PVT. LTD.	DELHI	
		PEC	NASHIK	(UPTO 400 NB CLASS 150)
		L&T VALVES	COIMBATORE	
		L&T VALVES (AUDCO)	CHENNAI	
3	CS PLUG VALVES	FLOW CHEM	AHMEDABAD	(UPTO 350 NB CLASS 150)
		BELGUAM AQUA VALVES	BELGAUM	UPTO 200 NB, CL 150
		FLOWSERVE (AUDCO)	CHENNAI	
		MICROFINISH	HUBLI	
		WEIR BDK	HUBLI	UPTO 150 NB CLASS 300 & UPTO 400 NB CLASS 150
4	SUMP PUMP (VERTICAL	FISHER XOMOX	CHENNAI	
		LEADER VALVES LTD.	JALANDHAR	
		DARLING PUMPS PVT. LTD	INDORE	
		FLOWMORE LTD.	GURGAON	



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	CENTRIFUGAL)	SU MOTORS PVT. LTD.	MUMBAI	
		VARAT PUMP AND MACHINERY PVT. LTD.	KOLKATA	
		WPIL LIMITED	KOLKATA	
		SAM TURBO INDUSTRY LTD	COIMBATORE	
		KISHORE	PUNE	
		AQUA MACHINERY	AHMEDABAD	
		FLOWMORE PUMP	GHAZIABAD	
		M&P	PUNE	
		B & C ENGG(BECON WEIR)	CHENNAI	
5	SCREW PUMPS	ROTO PUMPS	NOIDA	
		TUSHACO	MUMBAI	
		UT PUMPS	FARIDABAD	
6	API 5L ERW PIPE	TISCO	JAMSHEDPUR	
		SURYA ROSHNI	BAHADURGARH	UP TO 400 NB
		JINDAL	GHAZIABAD	UP TO 350 NB
		MSL	RAIGAD	200 TO 500 NB
		SAIL	ROURKELA	
		RATNAMANI	KUTCH	UP TO 400 NB
7	ASTM A 106, CS SEAMLESS PIPE	ISMT	AHMED NAGAR	UP TO 150 NB
		MSL	RAIGAD	UP TO 350 NB
		JINDAL SAW LTD	NASHIK	
		REMI METAL GUJRAT LTD	BHARUCH	UP TO 150 NB HOT FINISH & UPTO 100NB COLD FINISH
		ISMT	BARAMATI	UP TO 200 NB
8	CS ERW PIPE (IS 1239 / 3589)	SURYA ROSHNI	BAHADURGARH	UPTO 400 NB ERW PIPES AS PER IS 1239/3589 AND SAW AS PER IS 3589
		JINDAL	GHAZIABAD/HISSA R	UP TO 350 NB
		MSL	RAIGAD	200-500 NB ERW PIPES AS PER IS 3589
		SAIL	ROURKELA	
		WELSPUN	ANJAR/BHARUCH	UPTO 400 NB ERW PIPES AS PER IS 1239/3589 AND SAW AS PER IS 3589
		INDUS TUBE	GAUTAM BUDDH NAGAR	UP TO 300 NB
		RATNAMANI	KUTCH /AHMEDABAD / CHHATRAL	UPTO 400 NB ERW PIPES AS PER IS 3589 AND SAW AS PER IS 3589
		TATA TUBE	JAMSHEDPUR	UPTO 150 NB ERW PIPES AS PER IS 1239
		PSL	CHENNAI/VIZAG/ KUTCH/DAMAN	SPIRAL WELD SAW AS PER IS 3589
		LALIT PROFILE	THANE	SPIRAL WELD SAW AS PER IS 3589
		SAMSHI PIPES INDUSTRIES	VADODARA	SPIRAL WELD SAW AS PER IS 3589



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		MUKUT PIPES	RAJPURA	LONGITUDINAL SAW (SINGLE SIDE WELD) AS PER IS 3589
		INDUS TUBES	G B NAGAR	UPTO 300 NB ERW PIPES AS PER IS 1239/3589
		MANN IND	INDORE	SPIRAL WELD SAW AS PER IS 3589
		SURENDRA ENGG	RAJPURA	SPIRAL WELD SAW AS PER IS 3589
		PRATIBHA PIPES & STRUCTURE PVT LTD	THANE	SPIRAL WELD SAW AS PER IS 3589
		JCO GAS PIPE	CHINDWARA	SPIRAL WELD SAW AS PER IS 3589
		NUKAT TANKS AND VESSELS	TARAPUR	LONGITUDINAL SAW (SINGLE SIDE WELD) AS PER IS 3589
		DADU PIPES	SIKRANDRABAD	UPTO 300 NB ERW PIPES AS PER IS 1239/3589
		APL APOLLO TUBES LTD	SIKRANDRABAD	IS3589 UPTO 250 NB
9	SUCTION HEATER	PARKAIRE	DELHI	
		MVS	DELHI	
		MELCON	DELHI	
		GASO ENERGY	PUNE	
		INDCON	DELHI	
		TEMASME	NOIDA	
10	PRESSURE REDUCING VALVE & DESUPERHEATER	CIRCOR (EARLIER MAZDA)	AHMEDABAD	
		SPIRAX MARSHALL	PUNE	
		LEADER VALVES LTD.	JALANDHAR	
		SPX CORPORATION, USA	M/S SPX FLOW TECHNOLOGY INDIA PVT. LTD, GUJARAT	
		CONTROL COMPONENT INDIA PVT. LTD.	NOIDA	
		DAUME REGELARMATUREN GMBH,	GERMANY	
		HOLTER REGELARMATUREN GMBH & CO.	GERMANY	
		INSTRUMENTATION LTD.	PALAKKAD	
11	STRAINERS (DUPLEX / SIMPLEX BASKET TYPE)	GENERAL MECHANICAL WORKS PVT LTD	VADODARA	
		GRAND PRIX	FARIDABAD	
		GUJARAT OTOFILT	VATVA , AHMEDABAD	
		FILTRATION ENGRS	MUMBAI	
		JAYPEE INDUSTRIES PVT. LTD.	NEW DELHI	
		MULTITEX FILTRATION ENGINEERS LIMITED,	NEW DELHI	
		OTOKLIN GLOBAL BUSINESS LIMITED	MUMBAI	
		BHATIA ENGINEERING CO.	NEW DELHI	SIMPLEX ONLY
		FILTRATION ENGINEERS (I) PVT. LTD.	MUMBAI	SIMPLEX ONLY
		SUNGOV ENGINEERING PVT. LTD.	CHENNAI	



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12	CONTROL VALVE	SAROJINI ENTERPRISE	HOWRA	SIMPLEX ONLY
		SPX CORPORATION, USA	M/S SPX FLOW TECHNOLOGY INDIA PVT. LTD. (AHMEDABAD)	
		CONTROL COMPONENT INC.	USA	
		DRESSER VALVE INDIA PVT. LTD	COIMBATORE	
		DAUME REGELARMATUREN GMBH,	GERMANY	
		EMERSON PROCESS MANAGEMENT CHENNAI LIMITED	CHENNAI	
		FORBES MARSHALL ARCA PVT.LTD.	PUNE	
		WEIR VALVES & CONTROLS UK LTD.	UK	
		HOLTER REGELARMATUREN GMBH & CO.KG	GERMANY	
		INSTRUMENTATION LTD.	PALAKKAD	
		KOSO INDIA PRIVATE LIMITED,	NASHIK	
		LESLIE CONTROLS, INC	USA	
		MIL CONTROLS LTD.	THRISSUR	
		METSO SINGAPORE PTE. LTD.,	SINGAPORE	
		PARCOL S.P.A	ITALY	
		R.K.CONTROL INSTRUMENTS PVT. LTD.	THANE	
		RINGO VALVULAS S.L,	SPAIN	
		SEVERN GLOCON INDIA PVT. LTD.	CHENNAI	
		SHENJIANG VALVE CO. LTD.	CHINA	
		VALVITALIA S.P.A. ,	ITALY	
13	STEAM TRAP	WALDEMAR PRUSS ARMATURENFABRIK GMBH	GERMANY	
		SPIRAX MARSHALL	PUNE	MAIN CONTRACTOR COC +MANUFACTURER STANDARD TC SHALL BE SUBMITTED FOR ISSUING DESPATCH CLEARANCE
		UNIKLINGER	PUNE	
		LEADER	JULLANDHAR	
		CRECENT VALVE MFG CO LTD	MUMBAI	
14	THERMAL INSULATION	PENNANT ENGINEERING	PUNE	
		GOENKA ROCKWOOL (INDIA) PVT.LTD.	RAIPUR	
		LLOYD INSULATIONS (INDIA) LTD.	NEW DELHI	
		MINWOOL ROCK FIBRES LTD.	RAJNANDGAON	
		POLYBOND INSULATION PRIVATE LIMITED,	BHILAI	
		ROCKWOOL (INDIA) PVT. LTD.	HYDERABAD	
		SHREERAM EQUITECH PRIVATE LIMITED	DURG	
		THERMOCARE ROCKWOOL INDIA PRIVATE LTD.	CHATTISGARH	



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		LOPINUS ROCKWOOL	GWALIOR	
15	STRUCTURAL STEEL / MS-PLATE	SAIL		
		ESSAR STEEL		
		TISCO		
		RINL		
		JINDAL		
		M/S UTTAM VALUE STEEL (LLOYDS)		
		ISPAT		
		JSW		
		INDIAN IRON & STEEL CO. LTD		
16	SAFETY RELIEF VALVE	SPIRAX MARSHALL	PUNE	
		FISCHER SANMAR	CHENNAI	
		BHEL	TRICHY	
		KEYSTONE	BARODA	
		LEADER	JULLANDHAR	
17	PAINT	ASIAN PAINT		
		BERGER		
		KANSAI NEROLAC		
		JOTUN		
		SHALIMAR		
		JENSON & NICHOLSON (I) LTD		
		CDC CARBOLINE (I) LTD.		
		ADDISON PAINTS LTD		
		GRAND POLYCOAT		
		BOMBAY PAINTS		
		HEMPLE PAINTS (SINGAPORE)		
		AKZONOBEL COATINGS		
18	FITTINGS (MS/SS)	PIPE FIT ENGINEERS	VADODARA	
		GUJRAT INFRA PIPES	VADODARA	
		MS FITTINGS	KOLKATA	
		TUBE PRODUCT	VADODARA	
		SIDDARTH & GAUTAM	FARIDABAD	
		EBY	MUMBAI	
		NL HAZRA	KOLKATA	
		EXCEL METAL		
		INTERTECH		
		FITTECH		
		METAL LLOYDS	MUMBAI	
		TRUE FORGE	FARIDABAD	
19	OIL HOSE	D WREN & CO	KOLKATA	
		SUDEEP INDUSTRIES	KOLKATA	
		HYDROKRIMP	MUMBAI	
		PRESIDENCY RUBBER	KOLKATA	



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20	STEAM AND CONDENSATE HOSE	ALLZFLEX ENGINEERS	VADODARA	
		SUDEEP INDUSTRIES	KOLKATA	
21	FLOWMETER (CORIOLIS TYPE)	EMERSON PROCESS MANAGEMENT	CHENNAI	
		E&H	CHENNAI	
		KROHNE MARSHALL	PUNE	
22	ALUMINUM CLADDING	BHARAT ALUMINIUM COMPANY LTD	DELHI	
		CHONGQING LANREN ALUMINIUM CO. LTD., CHINA	CHINA	
		HINDALCO INDUSTRIES LTD	MUMBAI	
		NATIONAL ALUMINIUM COMPANY LTD.	ODISHA	
23	METALLIC EXPANSION BELLOWS	AEROSUN TOLA EXPANSION JOINT CO. LTD.,	CHINA	
		B. D. ENGINEERS	AHMEDABAD	
		FLEXICAN BELLOWS AND HOSES PVT. LTD.	BARODA	
		FLEXATHERM EXPANLLOW PVT. LTD.	VADODARA	
		LONESTAR INDUSTRIES	CHENNAI	
		MB METALLIC BELLOWS PVT. LTD.	CHENNAI	
		METALLIC BELOWS INDIA PVT. LTD.	CHENNAI	
		QINHUANGDAO NORTH METAL HOSE CO. LTD.,	CHINA	
		TEDDINGTON ENGINEERED SOLUTIONS LTD.	UK	
ELECTRICAL AND C&I				
24	LEVEL TRANSMITTER (RADAR AND ULTRASONIC TYPE)	K TEK (ABB)	FARIDABAD	
		E & H	AURANGABAD	
		MEGNETROL	BELGIUM	ONLY RADAR TYPE
		EMERSON PROCESS MGT	PAWANE	
		MOORE INDUSTRIES INTERNATIONAL INC.	USA	
		SIEMENS LIMITED	MUMBAI	
		SMART INSTRUMENTS LTD, BRAZIL	MUMBAI	LD-301 & T-301 TRANSMITTER FROM M/S SMART EQUIPMENTS BRAZIL.
		HONEYWELL AUTOMATION INDIA LIMITED	DELHI	
		TOSHNIWAL INDUSTRIES PVT. LTD.,	AJMER	
		V. AUTOMAT & INSTRUMENTS (P) LTD.	DELHI	
		YOKOGAWA INDIA LIMITED,	BANGALORE	
		SIEMENS MILTRONICS	CANADA	ONLY RADAR TYPE
		NIVELCO	HUNGARY	ONLY RADAR TYPE
		HAWK	AUSTRALIA	ONLY RADAR TYPE
25	LT MOTORS	CROMPTON GREAVES LIMITED	AHMEDNAGAR	
		KIRLOSKAR ELECTRIC COMPANY	BANGALORE /	

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	LT MOTORS		HUBLI	
		SIEMENS	MUMBAI	
		ABB	BANGALORE / FARADABAD	
		BHARAT BIJLEE	MUMBAI	
		JYOTI	VADODARA	
		MARATHON	KOLKATA	
		NGEF	BANDALORE / HUBLI	
		BHARAT ELECTRIC (BHEL)		
		LHP	SOLAPUR	
26	PRESSURE / DP / TEMP.SWITCH	SOR	USA	
		GIC(GAUGES BOURDON)	PANVEL	
		HERION	GERMANY	
		ITT BARTON	USA	
		DELTA CONTROL	UK	
		ASHCROFT	USA / GERMANY	
		TRAFAG	RANIPET	
		INDFOSS	GHAZIABAD	
		ASHCROFT	GANDHINAGAR	
		SWITZER	CHENNAI	EXCEPT 9000 SERIES
27	LEVEL INDIATOR FLOAT AND BOARD TYPE	FLOW STAR	FARIDABAD	
		SCIENTIFIC DEVICES	MUMBAI	
		GAUGES BOURDEN	PANVEL	
		PUNE TECH TROL	PUNE	
		SBEM	PUNE	
		LEVCON	KOLKATA	
		SIGMA	MUMBAI	
		CHEMTROL		
		DK INSTRUMENT	KOLKATA	
		V AUTOMAT	DELHI	
28	PRESSURER / DP GAUGE / TEMPERATURE GAUGE (DIAL TYPE)	H GURU (SI)	BANGALORE	
		H GURU INDUSTRIES	MUZAFFARPUR / RISHRA	
		AN INSTRUMENT	KOLKATA	
		GOA THERMOSTATIC	GOA	
		WAAREE	VAPI	
		MANOMETER	MUMBAI	
		GLUCK	MUMBAI	
		FORBES MARSHALL	HYDERABAD	
		ASHCROFT	GANDHINAGAR	
		WIKA	PUNE	
		GAGES BOURDON	MUMBAI / GOA	
		BAUMER TECHNOLOGIES INDIA PVT. LTD.	MUMBAI	



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		BOSE PANDA INSTRUMENTS PVT.LTD.	KOLKARA	ONLY PRESSURE AND DP GAUGE
		BUDENBERG GUAGE CO.LTD.	UK	ONLY TEMPERATURE GAUGE
		GOA INSTRUMENTS INDUSTRIES PVT.LTD.,	GOA	
29	RTD /THERMOCOUPLE ASSEMBLY	PYROELECTRIC	GOA	
		GIC(THERMAL INSTRUMENTS)	MAHARASHTRA	
		TEMPSENS	UDAIPUR	
		DETRIVE	MUMBAI	
		TECHNO INSTRUMENTS	GUJRAT	
		TEMPSENS INSTRUMENT (I) PVT LTD	UDAIPUR	
		TM TECNOMATIC SPA	ITALY	
		TOSHNIWAL INDUSTRIES PVT. LTD.,	AJMER	
		THERMAL INSTRUMENT INDIA PVT. LTD.	MUMBAI	
		BAUMER TECHNOLOGIES INDIA PVT. LTD.	MUMBAI	
		GOA INSTRUMENTS INDUSTRIES PVT.LTD.,	GOA	
30	ELECTRICAL ACTUATORS	ROTORK	BANGALORE	
		ROTORK	CHENNAI	
		AUMA	BANGALORE	
		LIMITORK	FARIDABAD	
31	LEVEL SWITCH (FLOAT AND DISPLACER TYPE)	TRAC	HYDERABAD	
		LEVCON	KOLKATA	
		DK INSTRUMENTS	KOLKATA	
		SBEM	PUNE	
		SBEM	PUNE	
		FLOW STAR	FARIDABAD	
		SIGMA	MUMBAI	
		V AUTOMAT	DELHI	
32	TEMPERATURE TRANSMITTER	EMERSON PROCESS MGT	PAWANE	
		MOORE	USA	
		ABB	FARIDABAD	
		YOKOGAWA	BANGLORE	MAKE YOKOGAWA, JAPAN
		ABB LIMITED	FARIDABAD	
		ENDRESS + HAUSER (INDIA) PVT. LTD.,	DELHI	
		MOORE INDUSTRIES INTERNATIONAL INC.	USA	
		SIEMENS LIMITED	MUMBAI	
		SMART INSTRUMENTS LTD, BRAZIL	MUMBAI	
		HONEYWELL AUTOMATION INDIA LIMITED	DELHI	
		TOSHNIWAL INDUSTRIES PVT. LTD.,	AJMER	
		YOKOGAWA INDIA LIMITED,	BANGALORE	



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33	AIR FILTER REGULATOR	PLACKA INSTRUMENT	CHENNAI	
		SHAVO NORGEN	MUMBAI	
		FISHER SANMAR	CHENNAI	
34	SOLENOID VALVE	AVCON	MUMBAI	
		ROTEX	BARODA/VV NAGAR	
		SMC	NOIDA	
		NUCON	HYDERABAD	
		ASCO	CHENNAI	
35	LOCAL CONTROL PANEL	PYROTECH	UDAIPUR	
		POSITRONICS	VADODARA	
		JACKSON	NOIDA	
		CONTROL DEVICE	KOLKATA	
		ROCKWELL AUTOMATION INDIA LTD	GHAZIABAD	
		SIEMENS LIMITED	DELHI	
		SCHNEIDER ELECTRIC INDIA PVT.LTD.	DELHI	
		JOSPER	NOIDA	
		I C A	MUMBAI	
		INDIAN SWITCH GEAR	VADODARA	
		SWITCHING CKT	KOLKATA	
36	JUNCTION BOX	PYROTECH	UDAIPUR	
		POSITRONICS	VADODARA	
		JACKSON	NOIDA	
		CONTROL DEVICE	KOLKATA	
		JOSPER	NOIDA	
		I C A	MUMBAI	
		AJMERA INDUSTRIAL & ENGINEERING WORKS	MUMBAI	
		FLEXPRO ELECTRICALS PVT. LTD.	GUJARAT	
		K.S.INSTRUMENTS PVT.LTD.	BANGALORE	
		SUCHITRA INDUSTRIES	BANGALORE	
		SHRENIK & COMPANY,	AHMEDABAD	
		HOFFMAN	BANGALORE	
		RITTAL	BANGALORE	
		SWITCHING CKT	KOLKATA	
37	CABLE LUGS (NON FLAME PROOF)	3D	UMERGAON	
		DOWELL	MUMBAI	
		CHITRA	NASIK	
38	CABLE GLANDS (NON FLAME PROOF)	ARUP	KOLKATA	
		SUNIL	KOLKATA	
		QPIE	KOLKATA	
		COMMET	MUMBAI	
39	CABLE GLAND,	AJMERA	MUMBAI	



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	LUGS, JB (FLAME PROOF)	BALIGA	CHENNAI	
		FLEXPRO	NAVSARI	
40	BATTERY CHARGER FOR PLC	CHLORIDE POWER	KOLKATA	
		CHABBI	JALGAON	
		AMAR RAJA	TIRUPATI	
		STATCON	NOIDA	
		HBL POWER SYSTEM	HYDERABAD	
		JEMA ENERGY	SPAIN	
		MASS-TECH CONTROLS PVT.LTD.	MUMBAI	
		DUBAS	BANGALORE	
		CALDYNE	KOLKATA	
41	DC LEAD ACID / NI- CD BATTERIES	AMCO SAFT INDIA LTD	BANGALORE	NI-CD BATTERIES ONLY
		EXIDE INDUSTRIES LTD	DELHI	LEAD ACID BATTERIES ONLY.
		HBL POWER SYSTEMS LTD	HYDERABAD	NI/CD AND TUBULAR TYPE FOR LEAD ACID
		HOPPECKE BATTERIEN GMBH & CO.KG,	GERMANY	
		AMAR RAJA	TIRUPATI	
		SAFT	FRANCE/SWEDEN	
42	CONTROL / POWER CABLE	CORDS CABLE	BHIWADI	
		RADIANT CABLES	HYDERABAD	
		POLYCAB	DAMAN	
		KEI	BHIWADI	
		NICCO	KOLKATA	
		RAVIN CABLES	PUNE	
		INCAB	PUNE	
		HVPL	FARIDABAD	
		TORRENT CABLE	NADIAD	
		HAVELLS	ALWAR	
		PARAMOUNT	KHUSHKHERA	
		SRI RAM CABLES	BHIWADI	
		THERMOCABLES	HYDERABAD	
		TORRENT CABLE	NADIAD	
		UNIVERSAL CABLES	SATNA	
		GEMSCAB	BHIWADI	
		DELTON	FARIDABAD	
43	PLC BASED PANELS	SIEMENS	NASIK	
		SCHNEIDER	NASIK	
		ROCKWELL	SAHIBABAD	
		GE INTELLIGENT PLATFORM	BANGALORE	
		HONEYWELL AUTOMATION INDIA LIMITED ,	PUNE	
		ABB	BANGALORE	
44	OWS/PC	HP/COMPAQ /DELL/HCL/IBM/LENOVO		



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45	PRINTER	HP/CANNON/EPSON/XEROX/IBM/L EXMARK		
6	INSTRUMENT FITTINGS	AURA INCORPORATED	DELHI	
		ASTEC VALVES & FITTINGS PVT. LTD.,	MUMBAI	
		ARYA CRAFTS & ENGINEERING PVT. LTD.	MUMBAI	
		COMFIT & VALVE PVT. LTD.	NANDASAN	
		FLUIDFIT ENGINEERS PVT. LTD.	MUMBAI	REGISTERED AS PER 22ND ELECTRICAL AND C&I MISCC MEETING DTD. 15.01.2014
		FLUID CONTROLS PVT. LTD.	MUMBAI	NAME CHANGED FROM M/S HYD- AIR VALVES PVT. LTD. TO M/S FLUID CONTROLS PVT. LTD. AS PER 25TH MISCC-ELECTRICAL AND C&I DTD. 20.02.2014
		HP VALVES & FITTINGS INDIA PVT. LTD.	CHENNAI	
		PRECISION ENGINEERING INDUSTRIES	MUMBAI	
		PANAM ENGINEERS,	MUMBAI	
		PERFECT INSTRUMENTATION CONTROL (INDIA) PVT. LTD.	MUMBAI	
47	CABLE TRAY SUPPORT SYSTEM - BOLTABLE	VIKAS INDUSTRIAL PRODUCTS	NOIDA	FINANCIAL LIMIT REVIEWED ON 05.06.2014
		AM-TECH ENGG.SERVICES	PUNE	
		INDUSTRIAL PERFORATION (I) PVT.LTD.	KOLKATA	
		INDMARK FORMTECH PVT. LTD.	PUNE	
		PREMIER POWER PRODUCTS (CAL) PVT. LTD.	KOLKATA	GALVANISATION TO BE DONE AT ITS OWN PLANT OR FROM BHEL- PEM APPROVED GALVANIZERS.
		RATAN PROJECTS & ENGINEERING CO. PVT.LTD.	KOLKATA	
48	CABLE TRAY SUPPORT SYSTEM- WELDED(GALV)	STEELITE ENGINEERING LTD.	MUMBAI	
		ASSOCIATED POWER STRUCTURES PVT. LTD.	G. I. D. C., MAKARPURA, VADODARA- GUJARAT	WORKS ADDRESSES ARE APPLICABLE FOR MANUFACTURING AND GALVANISING.
		INDUSTRIAL PERFORATION (I) PVT.LTD.	DUM DUM KOLKATA-WEST BENGAL	
		INDMARK FORMTECH PVT. LTD.	MIDC BHOSARI PUNE- MAHARASHTRA	GALVANIZING UNIT LOCATED AT PHAS-3, E-11/1, MIDC, PUNE ,
		JAMNA METAL COMPANY	DSIDC, NARLA INDL. AREA DELHI	
		PREMIER POWER PRODUCTS (CAL) PVT. LTD.	KOLKATA,-WEST BENGAL	GALVANISATION TO BE DONE AT ITS OWN PLANT OR FROM BHEL- PEM APPROVED GALVANIZERS.
		PATNY SYSTEMS (P) LTD	SARDAR PATEL	



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	CABLE TRAY SUPPORT SYSTEM- WELDED(GALV)		ROAD SEUNDRABAD	
		PASSIVE INFRA PROJECTS PVT. LTD.	VAISHALI, PITAMPURA DELHI-	
		RUKMANI ELECTRICAL & COMPONENTS PVT LTD	KOLKATA-WEST BENGAL-INDIA	GALVANISATION TO BE DONE AT ITS OWN PLANT OR FROM BHEL- PEM APPROVED GALVANIZERS.
		RATAN PROJECTS & ENGINEERING CO. PVT.LTD.	P.K. TAGORE STREET, MAIN BUILDING KOLKATA-WEST BENGAL	GALVANISATION TO BE DONE AT ITS OWN PLANT OR FROM BHEL- PEM APPROVED GALVANIZERS. ADDITIONAL WORKS AT "SANKRAIL INDUSTRIAL PARK, BHAGABATIPUR MAUJA, DHULAGARH, HOWRAH- 711302" APPROVED
		RABI ENGINEERING WORKS PVT. LTD.	R.N. GUHA ROAD, DUM DUM, KOLKATA- WEST BENGAL	GALVANISATION TO BE DONE AT ITS OWN PLANT OR FROM BHEL- PEM APPROVED GALVANIZERS.
		SARAL INDUSTRIES	INDUSTRIAL AREA-1 SULTANPUR ROAD RAE BARELI-UTTAR PRADESH	REGISTERED IN PERMANENT CATEGORY ALONG WITH GALVANIZER M/S SARAL PROJECTS AND PROCESSORS , ,
		UNITECH FABRICATORS AND ENGINEERS PVT LTD	M.B. RAOD , BIRATI KALABAGAN KOLKATA KOLKATA-WEST BENGAL	GALVANISATION TO BE DONE AT ITS OWN PLANT OR FROM BHEL- PEM APPROVED GALVANIZERS.
49	CABLE TRAY SUPPORT SYSTEM- WELDED(UNGALV)	RASHTRIYA ISPAT NIGAM LIMITED	AMBAWADI AHMEDABAD-	
		STEEL AUTHORITY OF INDIA LTD.	ISPAT BHAWAN LODI ROAD NEW DELHI-	
50	CABLE TERM.& JOINT KITS	3M ELECTRO AND COMMUNICATION INDIA P.LTD	RAJENDRA PLACE, DELHI	HEAT SHRINKABLE TYPE ONLY.
		HARI CONSOLIDATED PVT.LTD.,NEW DELHI	JHANDEWALAN, NEW DELHI-DELHI	
		RAYCHEM RPG PRIVATE LIMITED	JANAKPURI NEW DELHI	
		YAMUNA CABLE ACCESSORIES PVT. LTD.	AMBALA ROAD, JAGADHRI YAMUNANAGAR- HARYANA	
51	LIMIT SWITCH	BCH	NEW DELHI	
		SIEMENS	NEW DELHI	
		JAIBALAJI	NEWDELHI	
52	ANNUNCIATOR	IIC	MUMBAI	
		MINILEC	AHEMDABAD	
		PROCON	CHENNAI	



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53	INTERPOSING RELAY	ECONIX	MUMBAI	
		PHEONIX	DELHI	
54	SELECTOR SWITCH	SCHENIDER	INDIA	
		SIEMENS	INDIA	
		L&T	INDIA	
		KAYCEE	INDIA	
55	INDICATION LAMPS, PUSHBUTTON, AUX. CONTACTOR, AUX. RELAYS	SCHENIDER	INDIA	
		SIEMENS	INDIA	
		ABB	INDIA	
		L&T	INDIA	
56	TIMER	BCH	INDIA	
		EAPL	INDIA	
57	PNEUMATIC ACTUATOR/CYLINDER(METALLIC)	SCHRADDER	MUMBAI	
		NUCON	HYDERABAD	
		ROTEX	MUMBAI	
		VAAS	CHENNAI	

The make of Sub-vendor items shall be generally as indicated above which is subject to customer / BHEL approval during detail engineering.

Make of any unlisted items shall be subject to customer / BHEL approval during detail engineering. For such items, bidder to furnish list of sub-vendors during detail engineering stage for Customer / BHEL's review and approval. Bidder shall furnish following supporting documentation within 1 month of placement of LOI. Thereafter no request for additional sub-vendor shall be entertained.

- Documentation to show that the equipment /system has been supplied for a plant of similar or higher capacity.
- Documentation in the form of certificate that the equipment/system has been operating satisfactorily for two years as on the scheduled date of bid opening.

The successful bidder will get the makes of all items approved from Customer/ Consultant during detail engineering within two months of placement of LOI. The complete list will be necessarily be submitted within one month of placement of LOI to ensure timely placement of order for BOIs

Bidder to assess the capability of their proposed sub-vendors in terms of preparation of drawings, calculations, documents, quality assurance, supply of material etc. as per project schedule before placing the order on them.

Dealers are not acceptable for any item of the package. Bidder shall procure all items including plates, structural, flanges; counter flanges etc. from approved sub vendor only.



**TECHNICAL SPECIFICATION FOR
FUEL OIL HANDLING SYSTEM
3X800 MW PVUNL PATRATU TPP PHASE-1**

SPECIFICATION NO. PE-TS-434-166-A001

SECTION 'I-A'

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ANNEXURE-II

DRAWINGS / DOCUMENTS SUBMISSION PROCEDURE

DRAWING AND DOCUMENTS FOR SUBMISSION

S.N.	Drawings and documents	Soft and Hard Prints
1.0	<i>DRAWING FOR APPROVAL</i>	
1.1	For approval	Soft+2 Hard Print
1.2	For customer approval	Soft+2 Hard Print
1.3	For final distribution	Soft+2 CD +5 Hard Print
2.0	DRAWING FOR REFERENCE	
2.1	For reference	Soft+2 Hard Print
2.2	For final distribution	Soft+2 CD+5 Hard Print
3.0	CERTIFICATE, REPORTS ETC.	Soft+2 Hard Print
4.0	AS BUILT DRAWINGS (IF REQUIRED)	Soft+2 CD+8 Hard Print
5.0	O&M MANUAL	
5.1	Draft for approval	Soft +3 CD+ 5 Hard Print
5.2	For final distribution	Soft +3 CD + 8 Hard Print
6.0	QUALITY PLAN / Field quality plan / PG test	Soft + 2 Hard Print



**TECHNICAL SPECIFICATION FOR
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3X800 MW PVUNL PATRATU TPP PHASE-1**

SPECIFICATION NO. PE-TS-434-166-A001

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ANNEXURE-III

MASTER DRAWING LIST WITH SCHEDULE OF SUBMISSION

3X800 MW PATRATU STPP : FUEL OIL HANDLING SYSTEM							
S.No	Vendor Drawing No	NTPC Drawing No	Drawing Title	CAT	Sch submission week from LOI	Resubmission after incorporating comments	Status
1	PE-V0-434-166-A020	9585-001-130-PVE-B-011	GA, Data sheet & Characteristic curves of Motors for Screw Pumps	A	8	Within 1 week	
2	PE-V0-434-166-A029	9585-001-130-PVI-B-036	Instrument Hookup Diagram for FOHS	I	8	Within 1 week	
3	PE-V0-434-166-A075	9585-001-130-PVI-G-001	Drive & IO list	A	8	Within 1 week	
4	PE-V0-434-166-A030	9585-001-130-PVI-H-037	Instrument Schedule of FOHS	I	8	Within 1 week	
5	PE-V0-434-166-A048	9585-001-130-PVI-Y-012	Data Sheet- Electrical Actuator for FOHS	I	8	Within 1 week	
6	PE-V0-434-166-A023	9585-001-130-PVI-Y-013	Data Sheet- Level Transmitter for FOHS	A	8	Within 1 week	
7	PE-V0-434-166-A021	9585-001-130-PVI-Y-014	Data Sheet- Pressure / Differential Pressure Gauge	I	8	Within 1 week	
8	PE-V0-434-166-A022	9585-001-130-PVI-Y-015	Data Sheet- Pressure Transmitter / Differential Pressure transmitter	A	8	Within 1 week	
9	PE-V0-434-166-A024	9585-001-130-PVI-Y-016	Data Sheet- Level Indicator for FOHS	I	8	Within 1 week	
10	PE-V0-434-166-A025	9585-001-130-PVI-Y-017	Data Sheet - Flow Meter & Strainer for FOHS	A	8	Within 1 week	
11	PE-V0-434-166-A026	9585-001-130-PVI-Y-018	Data Sheet - Temp/ Indicator for FOHS	I	8	Within 1 week	
12	PE-V0-434-166-A027	9585-001-130-PVI-Y-019	GA & Data Sheet- Junction Box for FOHS	I	8	Within 1 week	
13	PE-V0-434-166-A017	9585-001-130-PVM-B-020	GA of Strainer for HFO & LDO unloading Pumps	I	8	Within 1 week	
14	PE-V0-434-166-A011	9585-001-130-PVM-B-023	Staircase drawing for HFO & LDO Storage Tank & LDO DAY TANK	I	4	Within 1 week	
15	PE-V0-434-166-A016	9585-001-130-PVM-B-024	GA of Oil Water Separator	A	4	Within 1 week	
16	PE-V0-434-166-A009	9585-001-130-PVM-B-025	GAD OF FOHS FOR CCOE APPROVAL	I	8	Within 1 week	
17	PE-V0-434-166-A058	9585-001-130-PVM-B-032	GA OF FLOOR COIL HEATER IN FO STORAGE TANK	I	4	Within 1 week	
18	PE-V0-434-166-A055	9585-001-130-PVM-B-040	Fabrication Details of HFO & LDO Storage Tank	I	4	Within 1 week	
19	PE-V0-434-166-A059	9585-001-130-PVM-H-038	Valve Schedule of FOHS	I	4	Within 1 week	
20	PE-V0-434-166-A060	9585-001-130-PVM-H-039	Pipe Schedule of FOHS	I	4	Within 1 week	
21	PE-V0-434-166-A018	9585-001-130-PVM-P-021	GA of Oil Hose for FOHS (HFO, LDO, Steam & Condensate)	I	8	Within 1 week	
22	PE-V0-434-166-A005	9585-001-130-PVM-P-022	GA of roof Structure for HFO& LDO Storage Tank & LDO DAY TANK	I	4	Within 1 week	
23	PE-V0-434-166-A007	9585-001-130-PVM-P-033	Piping Layout in & around Pump House	A	4	Within 1 week	
24	PE-V0-434-166-A008	9585-001-130-PVM-P-034	Piping Layout in & around Storage Tank Farm Area	A	4	Within 1 week	
25	PE-V0-434-166-A006	9585-001-130-PVM-P-035	Composite Layout of Fuel Oil Area	A	4	Within 1 week	
26	PE-DG-434-166-A061	9585-001-130-PVM-U-005	SIZING CALCULATION OF UTILITIES OF FOHS (STEAM CONSUMPTION, PIPE SIZING, SIZING CALC FOR PRS , STEAM TRAP, FLOOR COIL HEATER AND INSULATION & CLADDING)	A	4	Within 1 week	Approved
27	PE-V0-434-166-A010	9585-001-130-PVM-U-006	Design Calculation of Oil Water Separator	A	4	Within 1 week	
28	PE-V0-434-166-A050	9585-001-130-PVM-U-007	FOHS Line Pressure Drop Calculation along with NPSH AND PUMP HEAD CALCULATION OF PUMPS FOR HFO	A	4	Within 1 week	Approved
28	PE-V0-434-166-A050A	9585-001-130-PVM-U-007A	FOHS Line Pressure Drop Calculation along with NPSH AND PUMP HEAD CALCULATION OF PUMPS FOR LDO	A	4	Within 1 week	
29	PE-V0-434-166-A051	9585-001-130-PVM-U-008	DESIGN CALCULATION AND GAD OF SUCTION HEATER FOR FOHS	A	8	Within 1 week	
30	PE-V0-434-166-A056	9585-001-130-PVM-U-009	STRESS ANALYSIS OF LINES FOR FOHS (STEAM & CONDENSATE LINES)	A	8	Within 1 week	
31	PE-V0-434-166-A057	9585-001-130-PVM-U-010	DESIGN CALCULATION & GAD OF MISCELLANEOUS TANKS FOR FOHS (DRAIN OIL)	A	4	Within 1 week	
33	PE-V0-434-166-A041	9585-001-130-PVM-W-057	PG Test Procedure for FOHS	A	12	Within 1 week	
34	PE-V0-434-166-A042	9585-001-130-PVM-X-058	O&M Manual for Fuel Oil System	I	12	Within 1 week	
35	PE-V0-434-166-A012	9585-001-130-PVM-Y-026	GAD and TDS of Screw Pumps of FOHS	A	4	Within 1 week	

36	PE-V0-434-166-A013	9585-001-130-PVM-Y-027	DS of Pipes, Fittings, Flanges, Gasket etc for FO System	I	4	Within 1 week	
37	PE-V0-434-166-A014	9585-001-130-PVM-Y-028	TDS & GA for CS Gate / Globe / Check Valves - FO System	I	4	Within 1 week	
38	PE-V0-434-166-A015	9585-001-130-PVM-Y-029	TDS & GA for Ball / Plug Valves - FO System	I	4	Within 1 week	
39	PE-V0-434-166-A052	9585-001-130-PVM-Y-030	DS AND GAD OF PRS, TCV, TRAP, INSULATION AND CLADDING FOR FOHS	I	8	Within 1 week	
40	PE-V0-434-166-A019	9585-001-130-PVM-Y-031	Data Sheet for painting on pipes and valves (Painting procedure at site) for FO System	I	4	Within 1 week	
41	PE-V0-434-166-A037	9585-001-130-QVE-Q-043	QAP-Motor for FOHS	A	8	Within 1 week	
42	PE-V0-434-166-A036	9585-001-130-QVI-Q-042	QAP- Electrical Actuator for FOHS	A	8	Within 1 week	
43	PE-V0-434-166-A038	9585-001-130-QVI-Q-044	QAP- Pressure/ DP Transmitter for FOHS	A	8	Within 1 week	
44	PE-V0-434-166-A047	9585-001-130-QVI-Q-047	QAP- Flow Meter for FOHS	A	8	Within 1 week	
45	PE-DG-434-166-A001	9585-001-130-PVM-L-001	P&IDs OF FOHS (HFO, LDO, STEAM, CONDENSATE & DAY TANK SYSTEM)	A	4	Within 1 week	
46	PE-V0-434-166-A033	9585-001-130-QVM-Q-049	QAP for Plate, Structure, Pipe etc for FOHS	A	4	Within 1 week	
47	PE-V0-434-166-A034	9585-001-130-QVM-Q-050	QAP for Ball / Plug Valve for FO System	A	8	Within 1 week	
48	PE-V0-434-166-A035	9585-001-130-QVM-Q-051	QAP for CS Gate / Globe / Check Valves - FO System	A	8	Within 1 week	
49	PE-V0-434-166-A031	9585-001-130-QVM-Q-052	QAP Screw Pump for FOHS	A	8	Within 1 week	
50	PE-V0-434-166-A032	9585-001-130-QVM-Q-053	QAP for Hose for FOHS	A	8	Within 1 week	
51	PE-V0-434-166-A049	9585-001-130-QVM-Q-054	QAP for Strainers for Pumps and Flow meter of FOHS	A	8	Within 1 week	
52	PE-V0-434-166-A054	9585-001-130-QVM-Q-055	QAP- Miscellaneous BOI's for FOHS	A	8	Within 1 week	
53	PE-V0-434-166-A053	9585-001-130-QVM-Q-056	QAP OF PRS, TCV, TRAP, INSULATION AND CLADDING FOR FOHS	A	8	Within 1 week	
54	PE-V0-434-166-A070	-	CIVIL INPUT DRAWING IN UNLOADING AREA OF FOHS	I-G-P	8	Within 1 week	
55	PE-V0-434-166-A071	-	CIVIL INPUT DRAWING IN UNLOADING PUMP HOUSE OF FOHS	I-G-P	8	Within 1 week	
56	PE-V0-434-166-A072	-	CIVIL INPUT DRAWING IN TANK FARM AREA FOR FOHS	I-G-P	8	Within 1 week	
57	PE-ID-434-166-A002	-	ELECTRICAL LOAD LIST OF FOHS	I-G-P	8	Within 1 week	
58	PE-DC-434-166-A002	9585-001-130-PVM-W-002	Operation and Control Philosophy of fuel oil Unloading System	A	4	Within 1 week	
59	PE-DG-434-166-A004	9585-001-130-PVM-B-004	GA/Nozzle Orientation of HFO, LDO & DOT Storage Tank	A	4	Within 1 week	

NOTES

1. Finally approved documents / drawings to be provided in editable format(MS office/Autocad format) for onward submission to end
2. Bidder to note that during detailed engineering, drwg/doc will be submitted through web based document management system in addition to
3. *I-G-P stands for ' internal generation purpose
4. Any other drawings and documents as required by BHEL / Customer / Consultant shall be furnished by the successful bidder during detail engineering stage

SIGNATURE:

NAME:

DESIGNATION:

COMPANY:

DATE:

COMPANY SEAL



**TECHNICAL SPECIFICATION FOR
FUEL OIL HANDLING SYSTEM
3X800 MW PVUNL PATRATU TPP PHASE-1**

SPECIFICATION NO. PE-TS-434-166-A001

SECTION 'I-A'

REVISION 00

DATE: 15.06.2018

Other points to be considered while preparing drawings:

- a) GA drawing covering all details shown in data sheets like design data, dimensions, material of construction, list of appurtenances, lists of specifications, details of paints, standards & codes, general notes including details of test to be conducted on tank in accordance with specification and brand-name of welding electrodes to be used etc.
- b) Field quality plan / quality assurance plan / check list shall be prepared by the bidder for storage tanks / each instrument / item and shall be submitted to BHEL / customer / consultant for approval after placement of order and any changes required by BHEL / customer / consultant for the same shall be incorporated and adhered by the bidder without any commercial implications.
- c) All possible efforts shall be made by the bidder to get the approval of drawings and documents from BHEL / customer / consultant at the earliest and the documents prepared / generated by them or their sub-vendors shall be checked by their competent authority before submission to BHEL.
- d) Revision made by the bidder in any drawings and documents shall be highlighted by indicating the no. of revisions in a triangle without fail so that the minimum time is required by BHEL to review the drawings and documents.
- e) Any other drawings and documents in addition to the list of drawings and documents indicated in the NIT specification as required by BHEL for the execution of the project shall be furnished by them during detailed engineering stage and no commercial implication shall be entertained by BHEL for the same.
- f) Bidder to do 3D modelling of the package and review model in compatible format to be provided to BHEL on different stages as asked by BHEL. Bidder is required to prepare PIDs, Electrical drawings and all layout drawings using intelligent software with capability for transfer of data to and from corresponding Software being used by PEM. Details of the software compatible with BHEL software is given elsewhere in the specification.
- g) Bidder to extract 2-D drawings (AutoCAD) from the 3-D software and soft copy of the same to be provided for interfacing with other agency drawings.
- h) Data sheets of various items shall be prepared by the bidder for fuel oil system and shall be submitted to BHEL / customer / consultant for approval after placement of order and any changes required by BHEL / customer / consultant for the same shall be incorporated and adhered by the bidder without any commercial implications.
- i) Civil works will be done by BHEL based on civil inputs furnished by the bidder during detail engineering. In case of any changes in the civil input drawing after civil work is completed. Necessary prices on account of modification of the civil work shall be deducted from bidder's account.
- j) Bidder to furnish the civil pedestal details drawing indicating.
 - Scope of work by BHEL and bidder shall be indicated with different legend or in the form of note.
- k) Recommended locations of insert plates / embedment plates.
- l) All drawings and documents including general arrangement drawing, data sheet, calculation etc. shall be furnished to BHEL during detailed engineering stage and shall include / indicate the following details for clarity w.r.t. inspection, construction, erection and maintenance etc.:
 - All drawings and documents shall bear BHEL's title block and drawing / document number. However, BHEL's drawing / document numbering scheme shall be furnished to the successful bidder after the placement of L.O.I.
 - All drawings and documents shall indicate the list of all reference drawings including general arrangement.
 - All drawings shall include / show plan, elevation, side view, cross - section, skin section, blow - up view, all major self-manufactured and bought out items shall be labelled and included in BOQ / BOM in tabular form.
 - Specification / schedule of painting shall be made as a part of general arrangement drawing of each item indicating at least 3 make.
 - All text/ numeric in the document / drawings to be generated by the successful bidder will be in English language only.

PATRATU VIDYUT UTPADAN NIGAM LIMITED

3X800MW PVUNL PATRATU TPP PHASE-1

*TECHNICAL SPECIFICATION
FOR
FUEL OIL HANDLING SYSTEM*

ANNEXURE - IV

(INPUT DRAWINGS & DOCUMENTS OF TENDER)



**BHARAT HEAVY ELECTRICALS LTD
POWER SECTOR PROJECT ENGINEERING MANAGEMENT
PPEI, NOIDA-INDIA**

LEGEND	
SYMBOL	D E S C R I P T I O N
	HOSE
	HFO PIPE WITH INSULATED & STEAM TRACED
	COIL HEATER
	PUMP
	LOCAL DRAIN
	MOTOR
	LIMIT SWITCH
	PRESSURE INDICATOR
	PRESSURE TRANSMITTER
	DIFFERENTIAL PRESSURE INDICATOR TRANSMITER
	FLOW METER (CORIOLIS TYPE)
	FLOW GAUGE
	LEVEL TRANSMITTER(RADAR/ULTRASONIC TYPE)
	LEVEL INDICATOR
	LEVEL SWITCH
	TEMPERATURE INDICATOR
	TEMPERATURE ELEMENT + TEMPERATURE TRANSMITTER
	SIGNAL TO DCS
	STEAM TRAP
	SIMPLEX STRAINER
	STEAM CONTROL VALVE
	GLOBE VALVE (NORMALLY OPEN/ NORMALLY CLOSED)
	PLUG VALVE (NORMALLY OPEN/ NORMALLY CLOSED)
	BALL VALVE (NORMALLY OPEN/ NORMALLY CLOSED)
	GATE VALVE (NORMALLY OPEN/ NORMALLY CLOSED)
	NON RETURN VALVE
	RELIEF VALVE
	REDUCER/EXPENDER

EQUIPMENTS DETAIL:—			
S.No.	TAG No.	NAME OF EQUIPMENT	QTY
1	9ENB10BB001, 9ENB11BB001	HFO STORAGE TANK	2
2	9ENR10BB001	OIL WATER SEPARATOR TANK	1
3	9ENC11AP001, 9ENC12AP001, 9ENC13AP001, 9ENC14AP001, 9ENC15AP001	HFO UNLOADING PUMPS	5
4	9ENC11AT001, 9ENC11AT002, 9ENC12AT001, 9ENC12AT002, 9ENC13AT001, 9ENC13AT002, 9ENC14AT001, 9ENC14AT002, 9ENC15AT001, 9ENC15AT002	HFO SUCTION STRAINER	10
5	9ENB10AC001, 9ENB11AC001	HFO SUCTION HEATER	2
6	9ENB10AH001, 9ENB11AH001	FLOOR COIL HEATER	2
7	9ENR10AP001, 9ENR10AP002	OIL RECOVERY PUMP (OWS)	2
8	9ENB30AP001, 9ENB30AP002	HFO U/L P/H SUMP PUMP	2
9	ENB31AP001, ENB31AP002, ENB32AP001, ENB32AP002	U/L HEADER TRENCH AND DRAIN TRENCH SUMP PUMP	4

VALVE SELECTION CRITERIA FOR FUEL LINE:	
300NB & BELOW: BALL/ PLUG VALVE	50 NB & ABOVE: SWING CHECK VALVE,
ABOVE 300NB: GATE VALVE	BELOW 50NB: LIFT CHECK VALVE

MOC OF OIL PIPE: API-5L GR. B ERW		
PIPE SIZE	OUTSIDE DIA (MM)	THICKNESS (MM)
15NB	21.34	2.77
20NB	26.67	2.87
25NB	33.40	3.38
40NB	48.26	3.68
50NB	60.32	3.91
100/80/65NB	114.3/ 88.30/ 73.20	3.96
150NB	168.27	4.78
250/200NB	273.05/ 219.07	5.56
350/300NB	355.60/ 323.85	6.35
400NB	406.40	7.14
450/500NB	457/508	7.14
450NB AND ABOVE SIZE PIPE CAN BE 8.0MM PLATE FABRICATED.		
STEAM/CONDENSATE LINE: ASTM 106 GR. B, STD / 40 SCH.		

NOTES:

1. PUMP HEAD SHALL BE AS PER CALCULATION.
2. ALL VALVES SHOULD BE LOCATED AT GRADE/MAN APPROACHABLE LEVEL.
3. VENTS AND DRAINS SHALL BE PROVIDED AT THE HIGHEST AND LOWEST POINTS RESPECTIVELY AS PER LAYOUT REQUIREMENT.
4. ALL INSTRUMENTS ISOLATION VALVES SHALL BE GLOBE VALVE.
5. ALL HFO LINES, DRAIN OIL LINES, PUMPS, STRAINER, HFO TANKS, DRAIN OIL AND TANKS ARE STEAM TRACED. HFO PUMP AND STRAINER SHALL BE STEAM JACKETED.
6. ALL HFO LINES SHALL BE STEAM TRACED AS FOLLOWS:—

S.NO.	HFO LINE SIZE	NO. OF TRACERS	TRACER LINE SIZE
1	100 NB AND BELOW	1	20NB
2	150NB TO 300NB	2	20NB
3	350NB AND ABOVE	3	20NB

7. ALL DRAIN & VENT VALVES ARE IN NORMALLY CLOSE CONDITION.
8. SIZE OF INLET AND OUTLET SPARE CONNECTIONS SHALL BE SAME AS INLET AND OUTLET NOZZLES.
9. ALL VALVES USED IN OIL LINES SHALL BE FIRE SAFE.
10. ALL HFO, STEAM AND CONDENSATE LINES/EQUIPMENTS SHALL BE INSULATED.
11. COUNTER FLANGES WITH FASTENER & GASKETS AT TERMINAL POINT WILL BE SUPPLY BY VENDER.
12. DRAIN OIL TANK SHALL BE INSULATED.
13. THE INSTRUMENTS AND VALVES FURNISHED IN THE P&ID IS A MINIMUM REQUIREMENT, HOWEVER ANY INSTRUMENT/VALVE REQUIRED FOR COMPLETENESS OF THE SYSTEM SHALL BE PROVIDED BY BIDDER WITHOUT ANY COST IMPLICATION. FOR REDUNDANCY CRITERIA, VENDOR TO FOLLOW THE CLAUSE PERTAINING TO REDUNDANCY CRITERIA MENTIONED IN THE SPECIFIC TECHNICAL REQUIREMENT OF C&I.

PIPE NOMENALATURE			
350	HFO	3	50

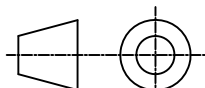
— INSULATION THICKNESS (IN MM)
 — NO. OF STEAM TRACERS
 — SERVICE FLUID
 — PIPE SIZE IN NB

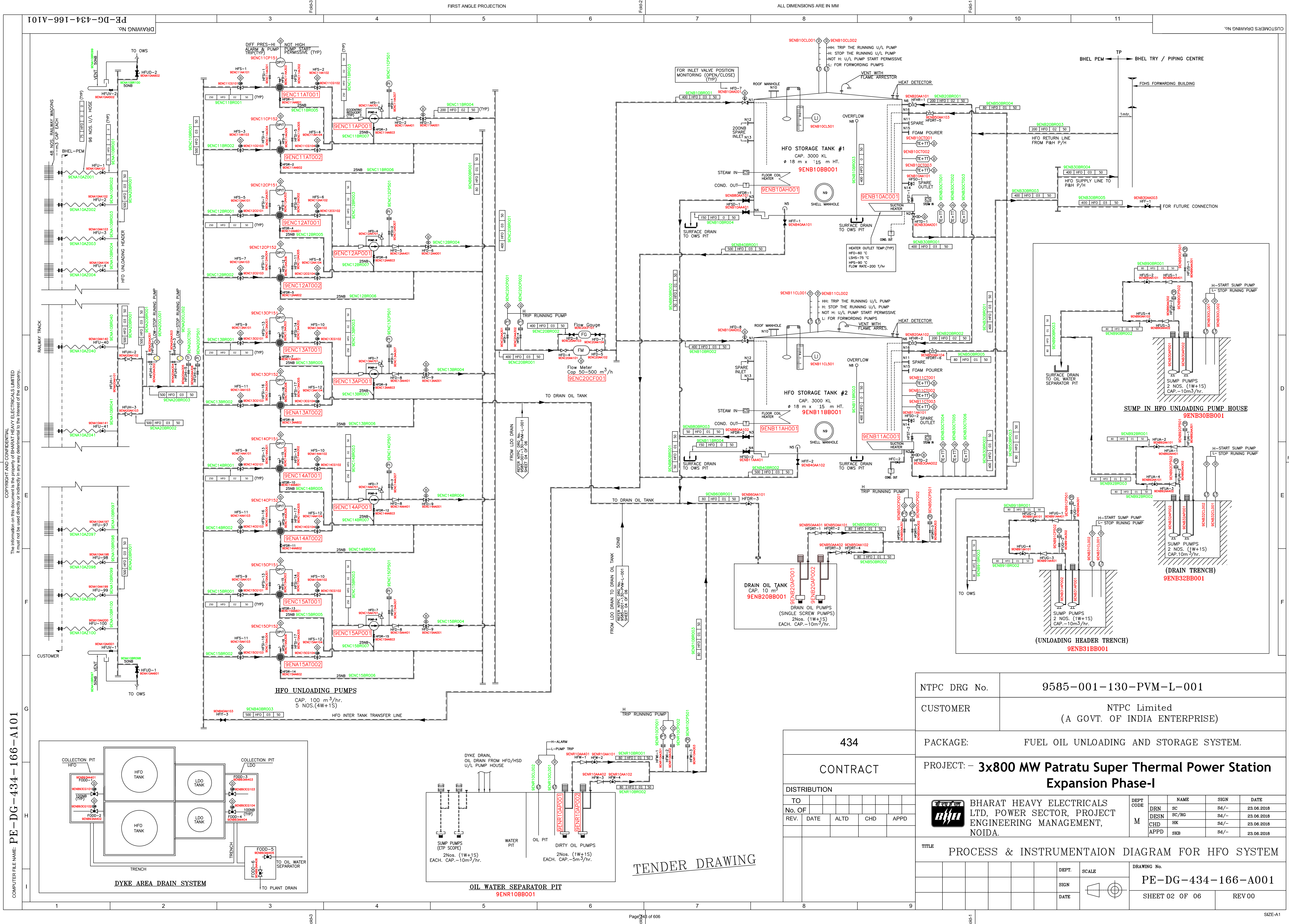
KKS NOMENALATURE				
9	ENC	10	AA	001

Instrument number key
 Equipment/Instrument Key
 Area key
 Function key
 Unit number identifier

TENDER DRAWING

434												
CONTRACT												
DISTRIBUTION												
TO												
No. OF												
REV.	DATE	ALTD			CHD			APPD				

NTPC DRG No.						9585-001-130-PVM-L-001							
CUSTOMER						NTPC Limited (A GOVT. OF INDIA ENTERPRISE)							
PACKAGE: FUEL OIL UNLOADING AND STORAGE SYSTEM.													
PROJECT: - 3x800 MW Patratu Super Thermal Power Station Expansion Phase-I													
 BHARAT HEAVY ELECTRICALS LTD. POWER SECTOR, PROJECT ENGINEERING MANAGEMENT, NOIDA.						DEPT CODE	M	NAME		SIGN		DATE	
								DRN SC		Sd/-		23.06.2018	
								DESIN SC/RG		Sd/-		23.06.2018	
								CHD HK		Sd/-		23.06.2018	
								APPD SKB		Sd/-		23.06.2018	
TITLE						PROCESS & INSTRUMENTAION DIAGRAM FOR HFO SYSTEM							
						DEPT.	SCALE			DRAWING No. PE-DG-434-166-A001			
						SIGN							
						DATE							
						SHEET 01 OF 06				REV 00			



PE-DG-434-166-A101

COMPUTER FILE NAME: PE-DG-434-166-A101

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Page 349 of 606

NTPC DRG No.		9585-001-130-PVM-L-001	
CUSTOMER		NTPC Limited (A GOVT. OF INDIA ENTERPRISE)	
PACKAGE:		FUEL OIL UNLOADING AND STORAGE SYSTEM.	
PROJECT: -		3x800 MW Patratu Super Thermal Power Station Expansion Phase-I	
CONTRACT		BHARAT HEAVY ELECTRICALS LTD, POWER SECTOR, PROJECT ENGINEERING MANAGEMENT, NOIDA.	
DISTRIBUTION		DEPT CODE	
TO		NAME	
No. OF		SIGN	
REV.		DATE	
DATE		SCALE	
ALTD		DRAWING No.	
CHD		PE-DG-434-166-A001	
APPD		SHEET 02 OF 06	
		REV00	

COMPUTER FILE NAME: PE-DG-434-166-A102

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PE-DG-434-166-A102

DRAWING No.

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CUSTOMERS DRAWING No.

LEGEND

SYMBOL	DESCRIPTION
	HOSE
	LDO PIPE LINE
	PUMP
	LOCAL DRAIN
	MOTOR
	LIMIT SWITCH
	PRESSURE INDICATOR
	PRESSURE TRANSMITTER
	DIFFERENTIAL PRESSURE INDICATOR TRANSMITER
	FLOW METER (CORIOLIS TYPE)
	FLOW GAUGE
	LEVEL TRANSMITTER(RADAR/ULTRASONIC TYPE)
	LEVEL INDICATOR
	LEVEL SWITCH
	SIGNAL TO DCS
	SIMPLEX STRAINER
	GLOBE VALVE (NORMALLY OPEN/ NORMALLY CLOSED)
	PLUG VALVE (NORMALLY OPEN/ NORMALLY CLOSED)
	BALL VALVE (NORMALLY OPEN/ NORMALLY CLOSED)
	GATE VALVE (NORMALLY OPEN/ NORMALLY CLOSED)
	NON RETURN VALVE
	RELIEF VALVE
	REDUCER/EXPENDER

EQUIPMENTS DETAIL:-

S.No.	TAG No.	NAME OF EQUIPMENT	QTY
1	9EGB10BB001, 9EGB11BB001	LDO STORAGE TANK	2
2	9EGC11AP001, 9EGC12AP001	LDO UNLOADING PUMPS	2
3	9EGC11AT001, 9EGC11AT002, 9EGC12AT001, 9EGC12AT002, 9EGC31AT001, 9EGC31AT002	SUCTION STRAINER	6
4	9EGB12BB001	LDO DAY OIL TANK	1
5	9EGC31AP001, 9EGC31AP002	LDO TRANSFER PUMPS	2

VALVE SELECTION CRITERIA FOR FUEL LINE:

300NB & BELOW: BALL/ PLUG VALVE	50 NB & ABOVE: SWING CHECK VALVE,
ABOVE 300NB: GATE VALVE	BELOW 50NB: LIFT CHECK VALVE

NOTES:

1. ALL VALVES SHOULD BE LOCATED AT GRADE/MAN APPROACHABLE LEVEL.

2. VENTS AND DRAINS SHALL BE PROVIDED AT THE HIGHEST AND LOWEST POINTS RESPECTIVELY.

3. HIGHER SIZE HAS BEEN PROVIDED BASED ON PIPE SIZING CRITERIA AND AS PER TENDER DRG.

4. ALL INSTRUMENTS ISOLATION VALVES SHALL BE GLOBE VALVE.

5. ALL DRAIN & VENT VALVES ARE IN NORMALLY CLOSE CONDITION.

6. THE INSTRUMENTS AND VALVES FURNISHED IN THE P&ID IS A MINIMUM REQUIREMENT, HOWEVER ANY INSTRUMENT/VALVE REQUIRED FOR COMPLETENESS OF THE SYSTEM SHALL BE PROVIDED BY BIDDER WITHOUT ANY COST IMPLICATION. FOR REDUNDANCY CRITERIA, VENDOR TO FOLLOW THE CLAUSE PERTAINING TO REDUNDANCY CRITERIA MENTIONED IN THE SPECIFIC TECHNICAL REQUIREMENT OF C&I.

KKS NOMENALATURE

9	ENC	10	AA	001
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INSTRUMENT NUMBER KEY

EQUIPMENT/INSTRUMENT KEY

AREA KEY

FUNCTION KEY

UNIT NUMBER IDENTIFIER

PIPE NOMENALATURE

XXX	XXX	XXX	XXX
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INSULATION THICKNESS (IN MM)

NO. OF STEAM TRACERS

SERVICE FLUID

PIPE SIZE IN NB

TENDER DRAWING

434

CONTRACT

DISTRIBUTION

TO	No. OF	REV.	DATE	ALTD	CHD	APPD

9585-001-130-PVM-L-001

NTPC Limited
(A GOVT. OF INDIA ENTERPRISE)

PACKAGE: FUEL OIL UNLOADING AND STORAGE SYSTEM.

PROJECT: - 3x800 MW Patratu Super Thermal Power Station
Expansion Phase-I

BHARAT HEAVY ELECTRICALS LTD, POWER SECTOR, PROJECT ENGINEERING MANAGEMENT, NOIDA.

DEPT CODE
M

	NAME	SIGN	DATE
DRN	SC	Sd/-	23.06.2018
DESN	SC/RG	Sd/-	23.06.2018
CHD	HK	Sd/-	23.06.2018
APPD	SKB	Sd/-	23.06.2018

TITLE

PROCESS & INSTRUMENTAION DIAGRAM FOR LDO SYSTEM

							DEPT.	SCALE	DRAWING No.
							SIGN		PE-DG-434-166-A001
							DATE		SHEET 03 OF 06
									REV00

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