3X800 MW PATRATU STPP EXT.PH-I
PATRATU VIDYUT UTPADAN NIGAM LIMITED

VOLUME – II B & III

TECHNICAL SPECIFICATION
FOR
SEWAGE TREATMENT PLANT

SPECIFICATION NO.: PE-TS-434-673A-A001 REV 00

BHARAT HEAVY ELECTRICALS LIMITED
POWER SECTOR
PROJECT ENGINEERING MANAGEMENT
NOIDA

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SECTION - A
INTENT OF SPECIFICATION

SCOPE of INQUIRY/ INTENT OF SPECIFICATION:

1.1 This specification is intended to cover design, engineering, manufacture, fabrication, assembly, inspection & testing at vendor's & sub-vendor's works, painting, forwarding, supply and delivery at site including start up and commissioning spares, mandatory spares, properly packed for transportation, unloading / handling and storage at site, in site transportation, assembly , erection and commissioning, trail run, preparation and submission of "As Built" drawings, site testing, carrying out performance guarantee tests at site and handover of **SEWAGE TREATMENT PLANT** as per the details in different sections / volumes of this specification for **3X800 MW PATRATU STPP.**

The bidder's scope shall also include any other services, etc. if called for in the succeeding sections of the specification.

1.2 The contractor shall be responsible for providing all material, equipment & services, which are required to fulfil the intent of ensuring operability, maintainability, reliability and complete safety of the complete work covered under this specification, irrespective of whether it has been specifically listed herein or not. Omission of specific reference to any component / accessory necessary for proper performance of the equipment shall not relieve them of the responsibility of providing such facilities to complete the supply, erection and commissioning of Sewage Treatment Plant.

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1.3 It is not the intent to specify herein all the details of design and manufacture. However, the equipment shall conform in all respects to high standards of design, engineering and workmanship and shall be capable of performing the required duties in a manner acceptable to purchaser who will interpret the meaning of drawings and specifications and shall be entitled to reject any work or material which in his judgment is not in full accordance herewith.

1.4 The extent of supply under the contract includes all items shown in the drawings, notwithstanding the fact that such items may have been omitted from the specification or schedules. Similarly, the extent of supply also includes all items mentioned in the specification and /or schedules, notwithstanding the fact that such items may have been omitted in the drawing.

1.5 Items though not specifically mentioned but needed to make the system complete as stipulated under these specifications are also to be furnished unless otherwise specifically excluded.

1.6 The general terms and conditions, instructions to tenderer and other attachment referred to elsewhere are made part of the tender specification. The equipment materials and works covered by this specification are subject to compliance to all attachments referred to in the specification. The bidder shall be responsible for and governed by all requirements stipulated herein.

1.7 While all efforts have been made to make the specification requirement complete & unambiguous, it shall be bidders' responsibility to ask for missing information, ensure completeness of specification, to bring out any contradictory / conflicting requirement in different sections of the specification and within a section itself to the notice of BHEL and to seek any clarification on specification requirement in the format enclosed under Vol-III of the specification as **"**PRE BID CLARIFICATION SCHEDULE". In absence of any such clarifications, in case of any contradictory requirement, the more stringent requirement as per interpretation of BHEL/Customer shall prevail and shall be complied by the bidder without any commercial and delivery implication on account of the same. Further in case of any missing information in the specification not brought out by the prospective bidders as part of pre-bid clarification, the same shall be furnished by BHEL/ Customer as and when brought to their notice either by the bidder or by BHEL/ customer themselves. However, such requirements shall be binding on the successful bidder without any commercial & delivery implication.

1.8 Deviations, if any, should be very clearly brought out clause by clause in the enclosed schedule; otherwise, it will be presumed that the vendor's offer is strictly in line with NIT specification.

1.9 In case all above requirements are not complied with , the offer may be considered as incomplete and would become liable for rejection.

1.10 Unless specified otherwise, all through the specification, the word contractor shall have same meaning as successful bidder/vendor and Customer/Purchaser/Employer will mean BHEL and/or Customer (NTPC: National Thermal Power Corporation Limited) as interpreted by BHEL in the relevant context. Please refer GCC/SCC for better clarity.

1.11 The equipment covered under this specification shall not be dispatched unless the same have been finally inspected, accepted and dispatch release issued by BHEL/Customer.

1.12 BHEL's/Customer's representative shall be given full access to the shop in which the equipment is being manufactured or tested and all test records shall be made available to him.

SECTION – B

PROJECT INFORMATION

SUB-SECTION–I-B

PROJECT INFORMATION

PATRATU STPS EXPANSION PHASE-I (3X800 MW)

1.00.00 BACKGROUND

A Memorandum of Agreement (MOA) has been entered on 29.07.2015 amongst Govt. of Jharkhand (GoJ), Jharkhand Urja Vikash Nigam Limited (JUVNL), Jharkhand UrjaUtpadan Nigam Limited (JUUNL), Jharkhand BijliVitaran Nigam Limited (JBVNL) and NTPC Limited to form a Joint Venture Company of NTPC Limted& JBVNL for transfer of Patratu Thermal Power Station (PTPS) located in Ramgarh District of Jharkhand State to the proposed JV Company for Performance Improvement of existing capacity & 4000 MW Capacity expansion of PTPS.

Further to signing of JV agreement on 29.07.2015, a Joint Venture Company namely Patratu Vidyut Utpadan Nigam Limited (PVUNL) has been incorporated amongst GoJ, JUVNL, JBVNL and NTPC Ltd. on 15.10.2015. The Performance Improvement of existing capacity and 4000 MW Capacity expansion of Patratu STPS will be implemented by the JV Company (JVC). The configuration of expansion of 4000 MW shall consist of 5 units of 800 MW to be implemented in two phases; Phase-I: 3x800 MW and Phase-II: 2x800 MW.

The present proposal is for Patratu STPS Phase-I (3x800 MW). The project is envisaged to be commissioned during XIII Plan period.

2.00.00 CAPACITY

Patratu STPS Phase-I: 3x800 MW - Present proposal

3.00.00 MODE OF OPERATION

Base Load

4.00.00 LOCATION AND APPROACH

4.01.00 Patratu Thermal Power station (PTPS) is located just outside the coal belt of South Karanpura in Ramgarh District of Jharkhand State. The nearest Railway Station is Patratu which is at a distance of about 4 km on Barkakhana-Barwadih Railway line.

4.02.00 **The latitudes and longitudes of the site are as follows:**

Corner name	Latitude	Longitude
Top Corner	23° 38 ‘ 60 ‘‘ N	85° 17’ 51.5” E
Bottom Corner	23° 38 ‘12.5 ‘‘ N	85° 17’ 27” E
Left Corner	23° 38 ‘ 22.5 ‘‘ N	85° 17’ 10.6 ‘‘ E
Right Corner	23° 38 ‘ 40 ‘‘ N	85° 17’ 57 ‘‘ E

4.03.00 **Airport**

The nearest commercial airport is Ranchi at about 45 km by road.

A copy of Vicinity plan of the project site is placed at **Annexure - I**.

5.00.00 LAND

The total land to be transferred to JV Company is 1859 acres. Out of 1859 acre, about 1234 acres of land has been envisaged for Plant, Ash pond and Land on railway track of the for Phase-I (3x800 MW). The balance 625 acre of land shall be transferred during commencement of Phase-II (2x800 MW).

6.00.00 WATER

The make-up water for PSTPS is to be met from Patratu Dam on Nalkari River (capacity 99 MCM i.e. 110 Cusecs). About 52.34 Cusecs of water will be available at 90% dependable monsoon flow after considering evaporation loss.

GoJ/JUVNL owns and controls water of Patratu Dam. GoJ/JUUNL supplies water to PTPS and to the other entities in the vicinity from this water reservoir. JUVNL had entered into agreements with these other entities for supply of water from water reservoir. JUVNL shall revisit these agreements to meet the requirement of water for expansion projects, if required.

Make up water requirement of PSTPS, Phase-I (3x800 MW) would be about 27 Cusecs with “Air Cooled Condenser” based power plant. GoJ shall provide the required water from the existing reservoir to the JV Company.

The JVC shall be responsible for the water supply arrangement starting at the downstream of intake chamber from where water supply commences for the Station. Ownership of the entire water supply system and related plant and equipment, including the water treatment plant, shall be that of the JVC and after the asset transfer, the JVC shall maintain, take care and use the same. The additional facility including addition of plant, equipment etc. for enhanced requirement (if any) and drawl of water shall be the responsibility of JVC and to be arranged by the JVC at their own cost.

7.00.00 COAL

7.01.00 **Coal Requirement, Availability and Linkage**

About 12 MTPA of coal will be required to meet coal requirement of the Phase-I (3x800 MW) of the project.

The Banhardih captive coal block at a distance of about 155 km from plant is allocated to JUVNL for end use of Patratu expansion. The coal from Banhardih captive coal block shall be transferred to the JVC for the usage of PSTPS with the approval of Ministry of Coal, GOI. MOC (11.09.15) has accorded in-principle approval of the Central Govt. to assign Banhardih Coal Block allocated to JUVNL to the JV Company.

7.02.00 **Coal Transportation**

The envisaged mode of coal transportation from the coal mines to the power plant is by Indian Railways through BOBR / BOX- N wagons.

7.03.00 **Coal Quality**

The primary fuel for the main steam generator shall be coal. The domestic coal quality parameters are indicated in **Annexure-IV-2** and imported coal parameters are indicated in **Annexure-IV-4** are to be considered for steam generator design.

7.04.00 **Fuel Oil**

The fuel oils to be used for start-up, coal flame stabilization and low load operation of the steam generator shall be Heavy Fuel Oils having the characteristics given at **Annexure-IV-3**and Light Diesel Oil having the characteristics given at **Annexure-IV-1.**

8.00.00 NOT USED

9.00.00 STEAM GENERATOR TECHNOLOGY

The steam generators shall be super critical once through type, water tube, direct pulverized coal fired, top supported, balanced draft furnace, single reheat, radiant, dry bottom type, suitable for outdoor installation. The gas path arrangement shall be single pass (Tower type) or two pass type.

10.00.00 FLUE GAS DESULPHURIZATION SYSTEM (FGD) &SCR:

The project is envisaged with Flue Gas Desulfurization (FGD) system and SCR meeting Ministry of Environment, Forest & Climate Change notification dated 07.12.2015. Limestone to be used for design of FGD system shall be as per the characteristic given at Annexure-IV-5.

11.00.00 POWER EVACUATION SYSTEM

85% of power from the project is envisaged to be allocated to Jharkhand State subject to approval of Ministry of Power, while balance 15% would be as unallocated portion and Project is envisaged as regional project. Since major power (85%) is proposed to be absorbed by Jharkhand, the issue of Associated Transmission

System for the project would be taken up with them for planning and execution of transmission system modalities as Inter-State System or ISTS System.

Considering overall capacity of the project as 4000 MW, 765 kV step-up system has been envisaged. Two D/C 765 KV line, one each to New Ranchi (Bero) and Gaya has been envisaged. This would also form part of 765 kV transmission corridor connecting Ranchi to Gaya. These lines can be used to evacuate power to the Eastern Region ISTS as well as to Jharkhand State. In view of above, provision of four nos. of 765 kV outgoing Line bays has been kept in the new 765 kV generation switchyard.

The issue of power evacuation of the proposed project shall be taken up with appropriate Transmission Utility (STU or CTU) as per regulatory provision, based on allocation of power.

12.00.00 METEOROLOGICAL DATA

The meteorological data from nearest observatory is placed at **Annexure-II.**

13.00.00 PLANT WATER SCHEME

The Plant water scheme is described below.

13.01.00 **Equipment Cooling Water (ECW) System (Unit Auxiliaries)**

The plant auxiliaries of Steam Generator and Turbine Generator shall be cooled by Demineralized (DM) water in a closed circuit. The primary circuit DM water shall be cooled through plate type heat exchangers by Circulating Water tapped from ACW system in a secondary circuit. The station auxiliaries such as Air compressors, Compressors of ash handling plant, compressor of mill reject system etc. shall also be cooled by Demineralized (DM) water in a closed circuit .The hot secondary circuit cooling water shall be cooled in the cooling towers and shall be returned back to the system. It is proposed to provide independent primary cooling water circuit for Steam Generator & auxiliaries and TG & its auxiliaries.

13.02.00 **Not used**

13.03.00 **Other Miscellaneous Water Systems**

(a)The drinking water requirement of the plant shall be provided from water treatment plant.

(b) Steam Cycle make-up water, makeup to the primary circuit of ECW (unit auxiliaries) system, boiler fill water shall be provided from demineralizing plant.

(c) The quality of Raw Water & DM Water is enclosed with this sub-section as **Annexure-III**.

(d) Effluent from various areas in TG & SG system shall be collected in respective pits in their areas and pumped to a common terminal point as shown in plant water scheme.

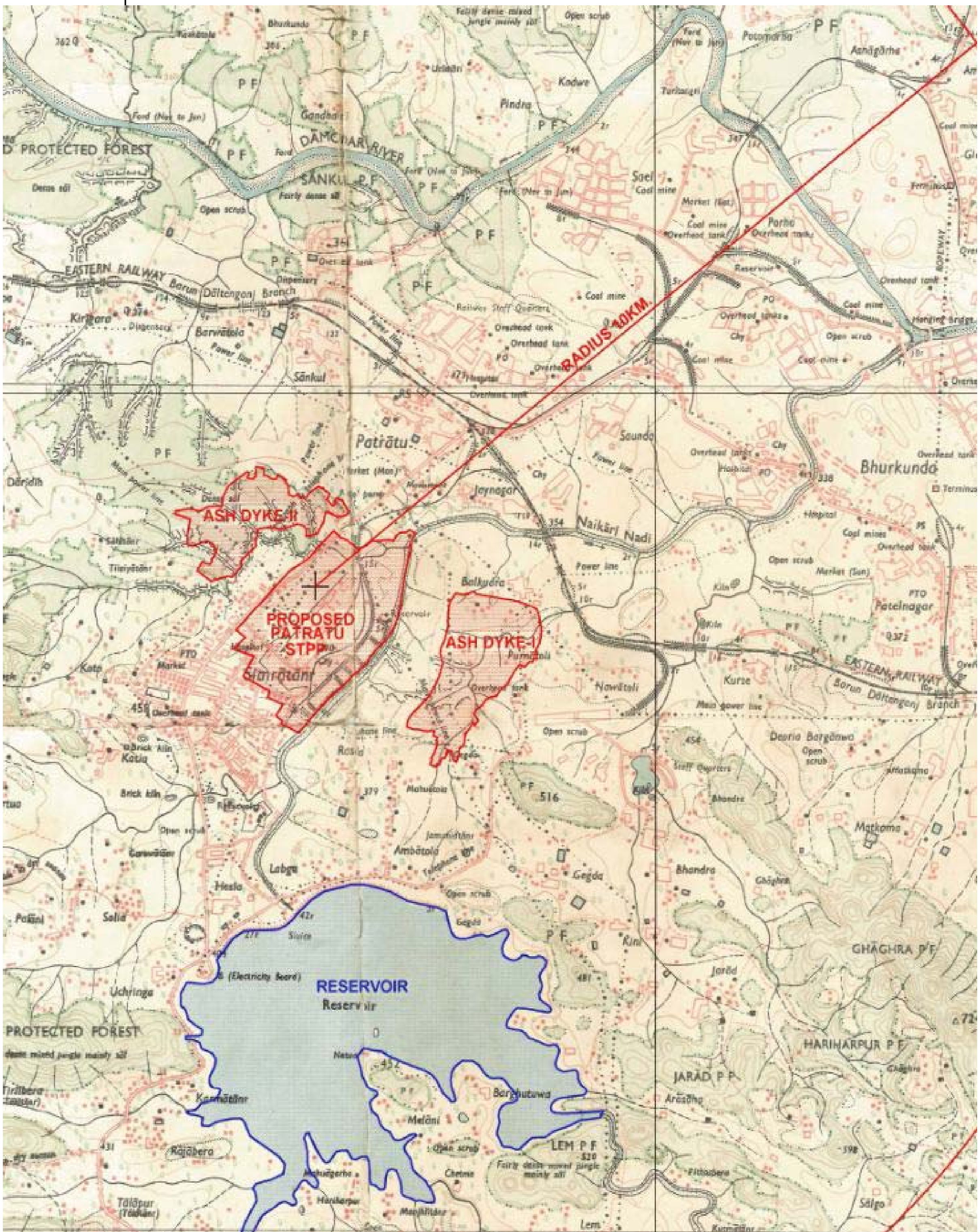
14.00.00 CRITERIA FOR EARTHQUAKE RESISTANT DESIGN OF STRUCTURES AND EQUIPMENT

All power plant structures and equipment, including plant auxiliary structures and equipment shall be designed for seismic forces as given in Part-B of this section.

15.00.00 CRITERIA FOR WIND RESISTANT DESIGN OF STRUCTURES AND EQUIPMENT

All structures and equipment of the power plant, including plant auxiliary structures and equipment, shall be designed for wind forces as given as given in Part-B of this section.

ANNEXURE-I



ASH DYKE-II
PROPOSED PATRATU STPP
ASH DYKE-I
RESERVOIR
RADIUS 10KM.
DAMODAR RIVER
PROTECTED FOREST
EASTERN RAILWAY
Patrātu
Bhurkunda
GHAGHRA P F
HARIHARPUR P F
JARAD P F
LEM P F

ANNEXURE-II

C

जलवायवी सारणी
CLIMATOLOGICAL TABLE

स्टेशन : रामगढ़ STATION :Ramgarh — अक्षांश LAT 23°38' N — देशांतर LONG 85°30' E — समुद्री तल माध्य से ऊँचाई HEIGHT ABOVE M. S. L. 335 मीटर METRES

1953 से 1980 तक के प्रेक्षणों पर आधारित BASED ON OBSERVATIONS FROM 1953 TO 1980

MONTH		STATION LEVEL PRESSURE (hPa)	AIR TEMPERATURE – MEAN: DRY BULB (°C)	WET BULB (°C)	DAILY MAX (°C)	DAILY MIN (°C)	HIGHEST IN THE MONTH (°C)	LOWEST IN THE MONTH (°C)	EXTREMES: HIGHEST (°C)	DATE AND YEAR	LOWEST (°C)	DATE AND YEAR	HUMIDITY: RELATIVE HUMIDITY (%)	VAPOUR PRESSURE (hPa)	CLOUD AMOUNT: ALL CLOUDS (Oktas of sky)	LOW CLOUDS (Oktas of sky)	RAINFALL: MONTHLY TOTAL (mm)	NO. OF RAINY DAYS	TOTAL IN WETTEST MONTH WITH YEAR (mm)	TOTAL IN DRIEST MONTH WITH YEAR (mm)	HEAVIEST FALL IN 24 HOURS (mm)	DATE AND YEAR	MEAN WIND SPEED (Kmph)
जनवरी JAN	I		14.6	11.9	24.5	8.2	28.5	3.7	33.4	31 1967	1.2	05 1978	68	11.8	1.2	0.6	16.7	1.7	62.3 1953	0.0	42.0	04 1966	2.0
	II		20.2	15.2									55	13.3	1.3	0.7							
फरवरी FEB	I		17.1	13.3	27.6	10.5	32.7	5.5	37.8	24 1967	3.0	10 1978	62	12.4	1.0	0.5	19.3	1.3	94.0 1961	0.0	54.0	08 1961	2.8
	II		23.5	16.6									48	13.4	1.1	0.6							
मार्च MAR	I		23.5	17.2	33.0	15.1	37.3	10.4	41.4	29 1966	7.0	11 @ 1979	50	14.6	1.1	0.4	11.4	1.2	36.4 1956	0.0	23.2	06 1962	3.3
	II		29.3	18.7									35	14.3	1.5	0.6							
अप्रैल APR	I		30.2	21.3	38.4	21.0	42.3	15.6	45.2	16 1973	13.5	07 1967	42	18.5	1.2	0.4	16.0	1.4	52.7 1952	0.0	41.0	01 1959	4.3
	II		34.5	22.1									34	16.7	1.8	0.8							
मई MAY	I		32.6	24.1	40.8	24.5	44.8	20.0	48.0	11 1973	17.0	06 @ 1979	47	23.2	1.6	0.0	28.7	2.3	136.6 1959	0.0	76.4	28 1959	4.5
	II		36.3	24.3									38	20.7	2.4	1.2							
जून JUN	I		30.9	25.5	37.5	25.5	43.2	21.7	47.6	12 1965	19.5	01 1979	62	28.3	3.5	1.9	129.4	7.4	332.4 1961	13.4 1973	140.0	07 1961	4.9
	II		32.0	25.6									62	27.3	4.4	2.7							
जुलाई JUL	I		28.1	25.4	32.3	24.3	37.3	22.1	46.5	1961	20.0	09 @ 1974	77	30.3	5.5	4.0	289.9	16.5	565.3 1950	131.9 1966	205.2	18 1950	4.2
	II		28.9	25.7									77	30.6	5.8	4.1							
अगस्त AUG	I		27.6	25.3	31.7	24.1	35.3	22.1	38.0	06 1973	18.2	20 1960	79	30.5	5.3	3.5	288.7	15.8	616.0 1953	50.0 1974	169.9	24 1953	3.5
	II		28.3	25.8									81	31.1	5.6	3.7							
सितम्बर SEP	I		27.2	24.8	31.6	23.0	35.0	21.1	38.0	05 1974	18.9	30 1957	79	29.5	4.5	3.0	253.8	11.4	770.8 1957	92.7 1955	198.1	01 1957	3.1
	II		27.8	25.3									81	30.2	5.0	3.4							
अक्तूबर OCT	I		24.9	22.1	31.4	19.1	34.4	14.4	38.0	02 1970	10.6	27 1966	74	24.4	2.4	1.4	91.7	4.2	265.7 1963	2.6 1979	134.4	12 1973	2.0
	II		26.7	23.2									74	25.7	2.8	1.6							
नवम्बर NOV	I		19.6	16.3	28.3	12.4	31.5	8.2	35.1	01 1973	5.4	23 1960	66	15.9	0.9	0.2	3.9	0.5	77.5 1948	0.0	34.3	07 1948	1.6
	II		22.8	18.4									63	17.9	1.1	0.5							
दिसम्बर DEC	I		14.7	12.1	24.5	8.3	28.6	4.0	32.0	01 1971	0.6	24 1961	68	12.0	0.9	0.4	2.7	0.3	56.4 1950	0.0	56.4	28 1950	1.7
	II		19.6	15.3									60	13.9	1.2	0.6							
वार्षिक योग या माध्य ANNUAL TOTAL OR MEAN	I		24.3	19.9	31.8	18.0	44.9	3.0	48.0		0.6		65	21.0	2.4	1.4	1208.2	64.0	1840.1	798.7	205.2		3.2
	II		27.5	21.4									59	21.3	2.8	1.7			1961	1955			
वर्षों की सं NUMBER OF YEARS	I		23	23	21	21	21	21	22		22		24	23	22	17	26	26	27	27	27		16
	II		24	24									24	24	23	17							

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जलवायवी सारणी
CLIMATOLOGICAL TABLE

स्टेशन : रामगढ़
STATION : Ramgarh

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ANNEXURE-III

RAW WATER ANALYSIS

S.No	Constituent	As	mg/l
1	Calcium	$CaCO_3$	105
2	Magnesium	$CaCO_3$	81
3	Sodium	$CaCO_3$	70
4	Potassium	$CaCO_3$	7
	Total cations	$CaCO_3$	263
5	M- Alkalinity	$CaCO_3$	180
6	P- Alkalinity	$CaCO_3$	0
7	Chloride	$CaCO_3$	60
8	Sulphate	$CaCO_3$	23
	Total Anions	$CaCO_3$	263
9	Total Silica, Reactive Silica, Reactive Silica, Colloidal	SiO_2	17 15 2
10	Iron (Total)	Fe	0.5
11	pH	-	7.0-7.8
12	Turbidity	NTU	100
13	Total dissolved solids		350-400
14	Temperature	Deg C	20-35
15.	TOC		1.93
16.	BOD		8
17.	COD		14

CLARIFIED WATER ANALYSIS (For DM Plant Design)

Organic Matter - Less than 0.05 mg/litre (see note #1 below)
Iron Content - Less than 0.3 mg/litre
Turbidity - Less than 10 NTU
Note # 1- Organic matter shall be tested as per KMnO4 method.
Note # 2- Clarified water is being used as cooling water. The cycle of Concentration of Cooling water is 5. Other parameters of Cooling Water shall be derived based on Raw water analysis after modifying the continuous dosing of Alum as $Al_2(SO4)_3$ -70ppm on 100% Basis, Lime as Ca(OH)2 -30ppm on 100% Basis , Coagulant aid - 2ppm on 100% Basis, PAC- 25-40 ppm on 100% Basis & Chlorine Di Oxide - 2 ppm.
Note- The above dosing rate may subject to minor variation during detail engineering stage. However the design of UF shall be based on colloidal silica value given in raw water analysis.

ANNEXURE-III

THE MINIMUM QUALITY OF DM WATER TO BE CONSIDERED FOR MAKE-UP WATER

Sl.No.	Characteristics	Value
1.	Silica (Max.)	0.02 ppm as Sio2
2.	Iron as Fe	Nil
3.	Total hardness	Nil
4.	pH value	6.8 -7.2
5.	Conductivity	Not more than 0.1micro mho/cm excluding the effects of free CO2

ANNEXURE-IV-1

LIGHT DIESEL OIL CHARACTERISTICS

AS PER IS 15770-2008

	Characteristics	LDO
1.	Pour Point (max)	21 °C & 12°C for Summer and Winter respectively
2.	Kinematic viscosity in centistokes at 40 deg.C	2.5 to 15.0
3.	Sediment percent by mass (max)	0.10
4.	Total sulphur percent by mass (max)	1.5
5.	Ash percentage by mass (max)	0.02
6.	Carbon residue (Rams bottom) percent by pass (max.)	1.50
7.	Acidity inorganic	Nil
8.	Flash point (Min.) - Pensky Martens	66 deg.C
9.	Copper strip corrosion for 3 hours at 100°C	Not worse than No. 2
10.	Water content, % by volume (max)	0.25
11.	GCV(kcal/kg)	10,000

ANNEXURE-IV-2

DOMESTIC COAL CHARACTERISTICS

S No.	Characteristics (As received basis)	Range of 95% coal supplies			Range of 5% coal supplies	
		Column-1	Column-2	Column-3	Range of Adequacy coal	
1.0	**PROXIMATE ANALYSIS**	**Design**	**Worst**	**Best**	**Worst**	**Best**
1.1	Total Moisture (%)	14	17	11	18	10
1.2	Ash (%)	36	42	34	44	30
1.3	Volatile matter (%)	23	19	24	19	28
1.4	Fixed carbon (%)	27	22	31	19	32
2.0	**ULTIMATE ANALYSIS**					
2.1	Carbon (%)	33.31	27.23	39.07	25.72	44.43
2.2	Hydrogen (%)	3.49	3.05	3.53	2.93	3.72
2.3	Sulphur (%)	0.6	0.9	0.5	0.95	0.35
2.4	Nitrogen (%)	0.9	1.3	0.8	1.4	0.6
2.5	Oxygen (%) (By difference)	11.7	8.52	11.1	7	10.9
2.6	Total Moisture (%)	14	17	11	18	10
2.7	Ash (%)	36	42	34	44	30
2.8	GCV (kcal/kg)	3400	2900	3900	2800	4400
2.9	Hard Grove index	55	50	60	45	65
2.10	YGP Index (mg/kg)	75	80	70	85	65
2.11	Carbonates	0.3	0.38	0.27	0.2	0.43
2.12	Phosphorous	0.05	0.04	0.06	0.03	0.07
2.13	Chloride	0.08	0.15	0.05	0.18	0.04
2.14	Trace Elements (ppm)					
2.14.1	Arsenic	1	1.5	0.5	2.5	0.4
2.14.2	Lead	35	75	25	150	10
2.14.3	Mercury	0.1	0.5	0.08	0.6	0.06
2.14.4	Selenium	0.8	1	0.6	1.5	0.5
3.0	**ASH ANALYSIS**					
3.1	Silica (%)	59.25	63.4	56.92	63.56	54.2
3.2	Alumina (%)	27.62	27.29	28.47	27.2	29.89
3.3	Iron Oxide (%)	6.75	5.48	7	5.46	7.5
3.4	Titania (%)	1.95	0.88	2.5	0.98	2.82
3.5	P_2O_5(%)	0.24	0.3	0.11	0.35	0.1
3.6	Lime (%)	0.9	0.7	1.5	0.6	1.6
3.7	Magnesia (%)	0.2	0.3	0.15	0.35	0.1
3.8	Sulphuric Anhydride (%)	1.2	0.5	1.4	0.4	1.7
3.9	Sodium Oxide (%)	0.17	0.25	0.15	0.3	0.15
3.10	Balance Alkalies (By Difference) (%)	1.72	0.9	1.8	0.8	1.94
4.0	**ASH FUSION RANGE** (Under reducing atmosphere)					
4.1	Initial Deformation Temperature (°C)	1100	1100	1100	1100	1100
4.2	Hemispherical temperature (°C)	1300	1250	1350	1250	1350
4.3	Flow temperature (°C)	1400	1400	1400	1400	1400

ANNEXURE-IV-3

FUEL OIL CHARACTERISTICS

Sl. No.	Characteristics	Heavy Furnace Oil grade HV (HFO) IS-1593-1982	Low Sulphur Heavy Stock (LSHS) IS-11489-1985	Heavy Petroleum stock (HPS) IS-11489-1985
1.	Total sulphur content	4.5% Max.	1.0% Max.	4.5% Max.
2.	Gross calorific value (KCal/kg)	of the order of 10,000	of the order of 10,000	of the order of 10,000
3.	Flash Point (Min)	66 deg C	76 deg C	66 deg C
4.	Water content by volume (Max)	1.0%	1.0%	1.0%
5.	Sediment by weight (Max)		0.25%	0.25% 0.25%
6.	Asphaltene content by weight (Max.)	2.5%	2.5%	2.5%
7.	Kinematic viscosity in Centistokes	370 at 50deg C	100 at 100deg C	100 at 100deg C
8.	Ash Content by weight (Max.)	0.1%	0.1%	0.1%
9.	Acidity (inorganic)	Nil	Nil	Nil
10.	Pour Point (Max.)	57 deg C	66 deg C	72 deg C
11.	Sodium content	—	—	100 ppm
12.	Vanadium content	25 ppm	25ppm	25 ppm
13.	Specific heat below pour point (KCal/Kg °C)		0.65	

ANNEXURE-IV-4

TYPICAL IMPORTED COAL AND ASH CHARACTERISTICS

Sl.No.	Characteristics (as received basis)	Imported Coal	
		Worst	Best
1.0	**Proximate Analysis**		
1.1	Total Moisture (%)	20	16
1.2	Ash (%)	10	10
1.3	Volatile Matter (%)	30	45
1.4	Fixed Carbon (%)	40	29
1.5	Total (%)	100	100
2.0	**Ultimate Analysis**		
2.1	Carbon (%)	56.4	62.4
2.2	Hydrogen (%)	4.5	4.9
2.3	Sulphur (%)	0.9	0.8
2.4	Nitrogen (%)	0.9	0.5
2.5	Oxygen (%) (By difference)	7.3	5.4
2.6	Carbonates (%)	0	0
2.7	Phosphorous (%)	0	0
2.8	Total Moisture (%)	20	16
2.9	Ash (%)	10	10
	Total	100	100
2.10	GCV (Kcal/Kg)	5800	6500
2.11	Hard Grove Index	45	60
2.12	YGP (mg/kg)	100	70
3.0	**Ash Analysis**		
3.1	Silica (SiO_2) (%)	32.74	34.94
3.2	Alumina(Al_2O_3) (%)	30.5	28.43
3.3	Iron Oxides(Fe_2O_3) (%)	18.2	15.2
3.4	Titania (TiO_2)	1.56	1.76
3.5	Phosphoric Anhydride(P_2O_5) (%)	0.44	0.54
3.6	Lime (CaO) (%)	6.12	7.62
3.7	Magnesia (MgO) (%)	1.83	1.93
3.8	Sulphuric Anhydride (%)	6.95	7.65
3.9	Sodium Oxide (Na_2O) (%)	0.3	0.4
3.10	Balance alkalies (by difference)	1.36	1.56
	Total	100	100
4.0	**Ash Fusion Temperature reducing temperature**		
4.1	Initial deformation Temp (℃)	1100	1250
4.2	Hemispherical Temp. (℃)	1300	1350
4.3	Flow Temp. (℃)	1400	1400

ANNEXURE-IV-5

LIMESTONE CHARACTERISTICS

The details of Limestone data shall be furnished later.

SPECIFIC TECHNICAL REQUIREMENT OF SEWAGE TREATMENT PLANT (MECHANICAL)

SECTION-C1
(SEWAGE TRATMENT PLANT)

- **SPECIFIC TECHNICAL REQUIREMENT (MECHANICAL)**
- **DATASHEET-A**
- **P & ID FOR SEWAGE TRAETMENT PLANT.**

1.0 GENERAL

This specification is intended to cover design (i.e. Preparation and submission of drawing/ documents including " As Built " drawings and O&M Manuals) , engineering, manufacture, fabrication, assembly, inspection / testing at vendor's & sub-vendor's works, painting, maintenance tools & tackles (as applicable), fill of lubricants & consumables (excluding chemicals), mandatory spares along with spares for erection ,start up and commissioning as required, forwarding, proper packing, shipment and delivery at site, unloading, handling, transportation & storage at site, in site transportation, assembly, minor civil works, erection & commissioning, trial run at site, preparation of drawings in 3D and carrying out performance guarantee /Functional / Demonstration tests at site (As applicable), training of customer/ client O&M staff & final handing over to end customer in flawless condition for project and package specified above complete with all accessories for the total scope defined as per BHEL NIT & tender technical specification no. PE-TS-434-673A-A001 for Sewage treatment plant package of **3X800 MW NTPC PATRATU STPP EXT.PH-I.**

2.0 REFERENCE DOCUMENTS

A.	PE-DG-434-673-A001	:	P & ID FOR SEWAGE TREATMENT PLANT
B.	DATASHEET – A	:	FOR ABOVE SYSTEM
C.	PE-DG-434-100-M001	:	PLOT PLAN

3.0 SCOPE OF SUPPLY (MECHANICAL)

Following are in bidder's scope of supply:

Broad scope of work of this package includes all equipment and accessories. Please also refer Mechanical data sheet, P&ID and the respective section of Electrical and C&I sections for respective scopes.

3.1.1 Two (2) nos.(1W+1S) submersible grinding type sewage transfer pumps for sewage sump (S1) complete with all instrumentation, valves, piping, motor, etc.

3.1.2 Two (2) nos.(1W+1S) submersible grinding type sewage transfer pumps for sewage sump (S2) complete with all instrumentation, valves, piping, motor, etc.

3.1.3 Two (2) nos.(1W+1S) submersible grinding type sewage transfer pumps for sewage sump (S3) complete with all instrumentation, valves, piping, motor, etc.

3.1.4 Two (2) nos.(1W+1S) submersible grinding type sewage transfer pumps for sewage sump (S4) complete with all instrumentation, valves, piping, motor, etc.

3.1.5 Two (2) nos.(1W+1S) submersible grinding type sewage transfer pumps for sewage sump (S5) complete with all instrumentation, valves, piping, motor, etc.

3.1.6 Two (2) nos.(1W+1S) submersible grinding type sewage transfer pumps for sewage sump (S6) complete with all instrumentation, valves, piping, motor, etc.

3.1.7 Two (2) nos.(1W+1S) submersible grinding type sewage transfer pumps for sewage sump (S7) complete with all instrumentation, valves, piping, motor, etc.

3.1.8 Two (2) nos.(1W+1S) submersible grinding type sewage transfer pumps for sewage sump (S8) complete with all instrumentation, valves, piping, motor, etc.

3.1.9 Two (2) nos.(1W+1S) submersible grinding type sewage transfer pumps for common sewage collection sump complete with all instrumentation, valves, piping, motor, etc.

3.1.10 All instrumentation and accessories in sewage sump S1, S2, S3, S4, S5, S6, S7 & S8 (RCC work in BHEL scope).

3.1.11 All instrumentation and accessories in common sewage collection sump (RCC work in BHEL scope) located in STP area.

3.1.12 Two (2) nos. (1w + 1s) oil free type air blowers with electric motor drives for supplying air required for common collection sump, sludge holding tank & equalization tank. Each blower shall be complete with motor, v-belt drive with belt guard, inlet filter/silencer, flexible couplings and discharge snubber, all mounted on a single base. Relief valve(s) shall be provided as required. Acoustic hood for air blowers shall also be provided by the bidder.

3.1.13 One (1) no. bar screen chamber of MOC RCC (RCC work in BHEL scope) with bars/coarse screen (MOC: SS-304 fitted with SS 304 frame) inclined at 60° and spacing between bars shall be 10 mm for screening of incoming sewage shall be provided by bidder.

3.1.14 One (1) no. oil & grease chamber of MOC RCC (RCC work in BHEL scope) provided with oil & grease trap for removal of oil & grease from the incoming sewage shall be provided by bidder. Mechanical items Baffle arrangement and perforated pipes etc. shall be provided by bidder.

3.1.15 One (1) no. above ground equalization tank of RCC construction (RCC work in BHEL scope) of minimum retention time of 8 hours located in STP area.

3.1.16 Two (2) nos.(1W+1S) vertical submersible grinding type MBBR feed pumps for equalization tank complete with all instrumentation, valves, piping, motor, etc.

3.1.17 All instrumentation and accessories in equalization tank (RCC work in BHEL scope) located in STP area.

3.1.18 One (1) no. above ground MBBR reactor of RCC construction (Capacity as per process requirement) located in STP area. Media for MBBR reactor shall be of MOC PVC/PP.

3.1.19 Two (2) nos. (1w + 1s) oil free type air blowers with electric motor drives for supplying air required for MBBR reactor. Each blower shall be complete with motor, v-belt drive with belt guard, inlet filter/silencer, flexible couplings and discharge snubber, all mounted on a single base. Relief valve(s) shall be provided as required. Acoustic hood for air blowers shall also be provided by the bidder.

3.1.20 One no. above ground tube settler (secondary settler) shall be in bidder' scope. Material of construction of settler shall be RCC and MOC of media shall be PVC.

3.1.21 One (1) no. above ground hypo contact cum filter feed tank of RCC construction (RCC work in BHEL scope) located in STP area.

3.1.22 All instrumentation and accessories in hypo contact cum filter feed tank (RCC work in BHEL scope) located in STP area.

3.1.23 Two (2) nos.(1W+1S) horizontal centrifugal type filter feed pumps for hypo contact cum filter feed tank complete with all instrumentation, valves, piping etc. for feeding water to Dual media filter & activated carbon filter for tertiary treatment. This pump has to be also cater the backwash requirement of Dual media filter & activated carbon filter

3.1.24 One (1) no. Sodium hypochlorite dosing tank (MOC: HDPE) of minimum 200 ltrs. capacity for dosing chemical to hypo contact cum filter feed tank/ centrifuge feed line, complete with instrumentation, dissolving basket and slow speed (100-200 rpm) agitator of SS-316 construction. MOC of dissolving basket will be SS-316.

3.1.25 Three (3) no. Sodium hypochlorite dosing pump (MOC: PP) complete with all instrumentation and accessories, valves, piping, motor, etc. as per P&ID of sewage treatment plant.

3.1.26 One (1) no. (1X100%) dual media filter (MOC: FRP/MSRL) along with filter media, piping, valves, fittings, instrumentation and accessories associated with the same.

3.1.27 One (1) no. (1X100%) Activated Carbon Filter (MOC: FRP/MSRL) along with media, carbon trap, piping, valves, fittings, instrumentation and accessories associated with the same.

3.1.28 One (1) no. above ground treated water tank of RCC construction (RCC work in BHEL scope) complete with all instrumentation and accessories & of minimum retention time of 8 hours located in STP area.

3.1.29 Two (2) nos.(1W+1S) horizontal centrifugal type treated water disposal pumps for treated water tank complete with all instrumentation, valves, piping etc.

3.1.30 One (1) no. below ground sludge sump (RCC work in BHEL scope) complete with all instrumentation and accessories.

3.1.31 Two (2) nos.(1W+1S) vertical screw type sludge transfer pumps for sludge sump complete with all instrumentation, valves, piping etc.

3.1.32 Two (2) no. (1W+1S) centrifuge of MOC MSEP/CI and wetted parts of SS-304.

3.1.33 One (1) no. Poly-electrolyte dosing tank (MOC: HDPE) of min 500 ltr. storage capacity for dosing chemical to centrifuge feed line complete with instrumentation, dissolving basket and slow speed (100-200 rpm) agitator of SS-316 construction. MOC of dissolving basket will be SS-316.

3.1.34 Two (2) no. Poly-electrolyte dosing pump (MOC: PP), capacity to suit, along with instrumentation and accessories as per P&ID of sewage treatment plant.

3.1.35 1 no. sludge handling trolley for manual disposal of sludge cake.

3.1.36 Required Piping for transferring Centrate from centrifuge outlet to equalization tank along with necessary valve, fitting & flanges.

3.1.37 Required Piping for transferring waste water generated from dual media filter & activated carbon filter to common sewage collection sump/ equalization tank along with necessary valve, fitting & flanges.

3.1.38 Required Piping for transferring over flow of hypo- contact cum filter feed tank to plant drain along with necessary fitting & flanges.

3.1.39 Required Piping for transferring over flow of treated water tank to plant drain along with necessary fitting & flanges.

3.1.40 Piping required for sludge recirculation line along with valves from the outlet of sludge transfer pumps to MBBR tank along with necessary valve, fitting & flanges.

3.1.41 Piping required for transferring treated water through treated water disposal pumps to horticulture network (500 m) along with necessary valve, fitting & flanges.

3.1.42 Piping required for transferring sewage from sewage sump S1 to common sewage collection sump located in STP area along with necessary valve, fitting & flanges.

3.1.43 Piping required for transferring sewage from sewage sump S2 to upstream sump/common sewage collection sump located in STP area along with necessary valve, fitting & flanges.

3.1.44 Piping required for transferring sewage from sewage sump S3 to upstream sump/common sewage collection sump located in STP area along with necessary valve, fitting & flanges.

3.1.45 Piping required for transferring sewage from sewage sump S4 to upstream sump/ common sewage collection sump located in STP area along with necessary valve, fitting & flanges.

3.1.46 Piping required for transferring sewage from sewage sump S5 upstream sump/ to upstream sump/common sewage collection sump located in STP area along with necessary valve, fitting & flanges.

3.1.47 Piping required for transferring sewage from sewage sump S6 to upstream sump/ common sewage collection sump located in STP area along with necessary valve, fitting & flanges.

3.1.48 Piping required for transferring sewage from sewage sump S7 to upstream sump/common sewage collection sump located in STP area along with necessary valve, fitting & flanges.

3.1.49 Piping required for transferring sewage from sewage sump S8 to upstream sump/common sewage

collection sump located in STP area along with necessary valve, fitting & flanges.

3.1.50 Necessary piping, valves, fitting, instruments etc. As per P&ID for sewage treatment plant enclosed with this technical specification.

3.1.51 The scope of supply and erection shall include all interconnecting piping, fittings, supports, valves, instruments etc.

3.1.52 The MBBR based sewage treatment plant operation & control shall be carried out from the stand alone DDCMIS (BHEL scope) based control system located inside STP area.

3.1.53 Sewage transfer pumps installed in various sewage lifting sumps (S1, S2, S3, S4, S5, S6, S7 & S8) located outside boundary of STP area shall be controlled through self-standing local control panel. Self-standing local control panel shall be in bidder's scope. Redundancy of instruments shall be provided by bidder as per requirement spelled in **Section-C3** (SPECIFIC TECHNICAL REQUIRMENT- C&I).

3.1.54 Bidder to take care the length of piping as indicated in plot plan/elsewhere in specification of sewage treatment plant. Pipe routing shall be decided during detailed engineering, however bidder will consider 10 m static head + 10% margin (or as per grade level of respective sewage collection sump location as indicated in the attached drg in tender specs) during pump selection for outside STP area and treated water disposal pumps.

3.1.55 The pipes from the individual sewage lifting stations/ sewage sumps (S1, S2, S3, S4, S5, S6, S7 & S8 located outside STP area) to common collection sump located in STP area shall be routed on pedestals/buried. Further treated water piping from treated water disposal pumps (located in STP area) to horticulture network area shall also be routed on pedestals/buried. For buried piping wrapping, coating and protection is in bidder's scope & shall be as per IS-10221.

3.1.56 The pipe inside STP area shall be preferably run on pipe pedestals. All auxiliary steel structures (u-clamps, nuts, bolts, channels etc.) For fixing the pipe on the pedestal or trestles shall be in the scope of bidder. If buried piping is required, wrapping, coating and protection of all the buried pipe is also in bidder's scope & shall be as per is 10221.

3.1.57 All steel inserts plates with lugs, rungs, ladder, puddle pipes, bolts, edge angle in desired shape, nuts, sleeves, and all other embedding components etc. as required to grout in BHEL civil works and to support/hold the equipment being supplied under this specification shall be in bidder's scope.

3.1.58 Any statutory clearance required for the system from MOEF or local pollution control board/ local authorities/ CPCB's (Central Pollution Control Board) latest regulatory requirement prevailing at the time of execution of the contract, is in bidder's scope. **Bidder shall give detailed calculations in support of meeting the specified outlet water quality (as per applicable statutory requirements or as specified, whichever is stringent), with supporting backup which shall be subject to approval of BHEL/Customer.** Bidder to also note that the sizing of STP (System, MBBR tank, etc) shall be subject to approval during detailed engineering Requirements/ supply of any necessary equipment/instruments to meet/comply to statutory obligations is in bidder's scope.

There is requirement of complying with CPCB IT Division document "Protocol for real time (Emission & Effluent) data management from industries version 1.2 (10.6.2015) or the latest regulatory requirement prevailing at the time of execution of the contract. EQMS shall be provided as part of ETP. **However, for Sewage treatment plant, required/necessary EQMS instruments (not limited to, but including anlaysers for pH, BOD, COD, conductivity, oil in water, TSS) shall be provided by bidder** with provision for bidirectional connectivity over ModBus/RS-232/RS-485 with Employer's central cloud server/EQMS for real time data monitoring, remote diagnostics & remote calibration checks, etc. All necessary hardware and software required at instrument end shall be provided by the Bidder.

3.1.59 The Bidder's scope includes all the first fill and one year's topping, requirements of consumables such as oils, lubricants including grease, servo fluids, gases, etc. Consumption of all these consumables during the initial operation or carrying out performance guarantee test of bidder's supplied equipment (whichever is later) and final filling after the initial operation OR carrying out performance guarantee test at site (As applicable) of bidder's supplied equipment (whichever is later) shall also be included in the scope of the

Bidder. Bidder shall also supply a quantity not less than 10% of the full charge of each variety of lubricants, servo fluids, gases, etc. used which is expected to be utilised during the first year of operation. This additional quantity shall be supplied in separate Containers. As far as possible lubricants marketed by the Indian Oil Corporation shall be used. The variety of lubricants shall be kept to a minimum possible.

3.1.60 **For AMC requirements bidder to refer details mentioned in Section-C3 (SPECIFIC TECHNICAL REQUIRMENT- C&I).**

3.1.61 The pipe sizes indicated in the tender specification/ P & I diagram are minimum. Wherever pipe sizes are not indicated, the same shall be selected based on the specification requirement and shall be subject to BHEL / customer approval during detailing engineering. All pipes shall be carbon steel unless exclusively mentioned.

3.1.62 All necessary drains, vents and sampling points with valves as specified and as required are in bidder's scope.

3.1.63 Monitoring gadgets, instruments and equipment required for maintenance (till carrying out performance guarantee test at site (As applicable) & plant handover.

3.1.64 Associated piping, instrumentation and valves required for the system.

3.1.65 All necessary instruments and controls required for easy and safe operation of the system.

3.1.66 Wherever terminal points between BHEL and bidder indicated, bidder shall provide pipes with counter flange.

3.1.67 All pipes, fittings etc. Required for hand railing, platforms, and ladders shall be in the scope of bidder. All ladders shall be non-civil work. All insert plates, nuts and bolts, counter flanges wherever Applicable shall be in the scope of bidder. Supply and erection of hand railing as desired for safety purpose will be in bidder's scope.

3.1.68 All the sumps, tanks, reservoirs and other water retaining structures shall be provided with access ladders/rungs from operating platforms/ground level as the case may be.

3.1.69 Instrumentation, valves etc. Indicated in P & ID of sewage treatment plant are bare minimum requirement, however bidder has to provide complete system for trouble free operation meeting technical specification requirement.

3.1.70 Sewage sumps S1, S2, S3, S4, S5, S6, S7, and S8 shall be located outside STP area however rest facilities indicated in P & ID of STP shall be located inside STP area provided in plot plan included in this specification.

3.1.71 All blank flanges/counter flanges, isolations valves, tees etc. to interconnect the pipes at all terminal points.

3.1.72 8 nos. Chain pulley block / electrical hoist for handling of sewage transfer pumps located outside STP area provided sewage lifting sumps (S1, S2, S3, S4, S5, S6, S7 & S8).1 no. Chain pulley block / electrical hoist for handling of common collection sump sewage transfer pump. 1 no. chain pulley block/ Electrical hoist for handling of MBBR feed pumps. 1 no. chain pulley block/ Electrical hoist for handling of Vertical screw sludge transfer pumps. 1 no. chain pulley block/ Electrical hoist for handling of filter feed pump & treated water disposal pumps. 1 no. electric hoist for handling of centrifuge. Selection criterion of chain pulley block/ electric hoist shall be as per ELECTRIC HOIST AND MANUAL HOIST (CHAIN PULLEY BLOCK) specification defined elsewhere in this tender technical specification.

3.1.73 Media, bar screen chamber, oil & grease trap, media for MBBR tank, media for Tube settler, media for dual media filter, media for activated carbon filter & air grid arrangement for common collection sump, equalization tank, MBBR tank & Sludge pit.

3.1.74 PIPING

a) Complete piping indicated in P & ID of Sewage treatment plant is in bidder's scope of supply and erection. In addition, any additional piping required to make the system complete inside STP area shall be in bidder's scope. Pipe length inside STP area has to be considered by bidder in their scope as per approved equipment layout and piping layout during detailed engineering. The below indicated pipes shall be designed, supplied, erected, laid and tested by the bidder. Elbows, tees, flanges, counter flanges, Hangers and supports, embedment plates with lugs etc. required for the below given piping shall also be provided by the bidder.

b) Pipe distances from sumps outside STP area up to STP area are given below:

SL. NO.	FROM	TO (Also refer P&ID)	Distance (In meters)
1.	Sewage sump (S1)	Common collection sump	440
2.	Sewage sump (S2)	Sewage sump (S1)	540
3.	Sewage sump (S3)	Sewage sump (S2)	530
4.	Sewage sump (S4)	Sewage sump (S5)	720
5.	Sewage sump (S5)	Sewage sump (S1)	1025
6.	Sewage sump (S6)	Sewage sump (S1)	725
7.	Sewage sump (S7)	Sewage sump (S6)	585
8.	Sewage sump (S8)	Sewage sump (S6)	505

Bidder to note that no commercial settlement / adjustment shall be entertained for variation up to +/- 5% of pipe lengths tabulated above during detailed engineering.

Bidder to note that above piping distances are in bidder's scope. Distances given above are from one area to other area only, however inside piping in respective area shall be in bidder's scope which is not included in above distances. Layout and routing shall be finalized during detailed engineering. However, system shall be designed to take care of any increase or decrease in length of piping.

c) Piping from treated water disposal pumps up to horticulture network 500 meters shall be in bidder's scope. Layout and routing shall be finalized during detailed engineering. However, system shall be designed to take care of any increase or decrease in length of piping.

d) In addition, any additional piping and associated accessories required to complete the system shall be in bidder's scope.

3.1.75 Mandatory spares as per attached Annexure-V of Section C1 to this technical specification.

3.1.76 Special tools and tackles as required for the system.

3.1.77 All special tools necessary for proper maintenance or adjustment of the equipment packaged in permanent box. Finish paints for touch-up painting of equipment after erection at site in sealed container.

3.1.78 Start-up and commissioning spares as required.

3.1.79 Instrument air piping (after BHEL terminal point) along with necessary valves, instrumentation, fitting & flanges to meet the system requirement shall be in bidder's scope.

3.1.80 Supply of handrail material & erection of the same shall be in bidder's scope.

4.0 ADDITIONAL REQUIREMENT

4.1 Operating platforms, ladders, supports and other structural works for each sump/tanks as well as dosing equipment etc. for sewage treatment plant to facilitate accessibility for operation and maintenance is also in bidder's scope.

4.2 All special tools necessary for proper maintenance or adjustment of the equipment packaged in permanent box. Finish paints for touch-up painting of equipment after erection at site in sealed container.

4.3 All required elbow, tee, pipe fittings etc. required for erection of the complete system including piping shall

be in bidder's scope. Bidder to provide the detailed BOQ shall be derived during detail engineering. Bidder to consider 10% margin over and above the BOQ requirement of all the fittings.

4.4 All the pipes outside STP area shall preferably be below ground (buried). For pipes running in STP area wherever pipe racks are not available, pipes shall run on pedestals or below ground. All fixing items such as U clamps, nuts, bolts etc. required to lay the pipes on pedestals shall be in bidder's scope of work. Coating, wrapping and protection required for buries pipes shall be in bidder's scope of work.

4.5 Bidder shall consider 10 m static head + 10% margin (or as per grade level of respective sewage collection sump location as indicated in the attached drg in tender specs), in addition to the losses in straight pipes and bend in pipes, tees, reducer, expander and valves etc. while selection of pump head during detailed engineering.

4.6 On completion of erection, a complete list of bearings/ equipment giving their location and identification marks shall be furnished to the Owner along with lubrication requirements.

4.7 MCC, DDCMIS based control room & battery room shall be located in STP area building. All Sewage treatment facilities and chemical dosing facilities shall be located in Sewage treatment plant building. Further for all pumps located outside building shall be provided with localised canopy arrangement on pump & motor and the same shall be in bidder's scope.

4.8 Document approval by customer under Approval category or information category shall not absolve the vendor of their contractual obligations of completing the work as per specification requirement. Any deviation from specified requirement shall be reported by the vendor in writing and require written approval. Unless any change in specified requirement has been brought out by the vendor during detail engineering in writing while submitting the document to customer for approval, approved document (with implicit deviation) will not be cited as a reason for not following the specification requirement.

4.9 In case vendor submits revised drawing after approval of the corresponding drawing, any delay in approval of revised drawing shall be to vendor's account and shall not be used as a reason for extension in contract completion.

4.10 Bidders shall make Site visit in order to familiarize themselves with existing condition of site before submitting the bid in order to make their offer complete. During detail engineering also, the successful bidder shall be responsible for the correctness of details w.r.t. existing facility at site. Customer approval on any drawing having details of existing facility shall not be cited by the successful bidder a valid reason for any shortcoming in the work by them. BHEL shall also not entertain any cost implication for any lack of input data with regard to site during detail engineering.

4.11 Successful bidder shall furnish detailed erection manual for each of the equipment as well as complete system supplied under this contract at least 3 months before the scheduled erection of the concerned equipment / component or along with supply of concerned equipment / component whichever is earlier.

4.12 Final Electrical Load list will be submitted by the successful bidder as per agreed drawing/ doc submission schedule. Thereafter any change in the electrical load list shall be entertained only subject to its feasibility, and BHEL reserves the right to debit the vendor cost of any changes necessitated in the switch gear /MCC on account of changed loads.

4.13 Wherever CIVIL works is excluded from the bidder's scope, successful bidder shall furnish civil assignment / scope drawings. The corresponding CIVIL drawing prepared by BHEL / CIVIL agency, based on civil assignment drawing of bidder will be furnished to the successful bidder for concurrence. In case any modification is required in the civil work already carried out based on final civil inputs given by vendor, BHEL reserves the right to debit cost of such rework to vendor".

4.14 All necessary valves and fittings for the installations with the actuators necessary for their remote operation.

4.15 Embedment plates with lugs shall also be provided by bidder as per system requirement.

4.16 All channels & brackets, mounting plates as required for mounting of motors, pumps, stirrers, tank etc. shall

be in bidder's scope.

4.17 All necessary structural steel for pipe supporting structure, platforms, walkways / pathways and access stairs, mechanical plant and equipment, mechanical services and pipe work associated with STP Plant.

4.18 All handrails shall be of 32 mm nominal bore MS pipes (medium class) as per IS: 1161 galvanized using 750 gm/sq. m of zinc. Hand railing shall be a two-rail system with the top rail 1000 mm above the walkway surface and the intermediate rail 450 mm below the top rail. Handrail post spacing shall be limited to 1500 mm as far as possible but can be proportioned to the length of the opening. In such a case spacing shall not exceed 1850 mm centre to centre of posts. Hand railing shall be shop fabricated for specific locations and field welded or bolted to the erected structural steel. Railings shall be provided with 100 mm wide and 8 mm thick MS strip at bottom as toe guard all along the length of railing in horizontal plane. For RCC stairs, hand railing with 20 mm square MS bar balustrade with suitable MS flat and Aluminium / Teakwood handrail shall be provided, unless specifically mentioned otherwise.

4.19 Instrument hook up material shall be in bidder's scope.

4.20 Permanent ladder (not rungs) for approaching the top of tanks, valves for All steel inserts with lugs, plates, bolts, nuts, sleeves, edge angles and all other embedding components etc. as required to grout in civil works and to support/hold the equipments being supplied under this specification for opening/maintenance purpose.

4.21 Wrapping, coating and protection of the entire buried pipe shall be as per IS 10221 or AWWA C 203-93.

4.22 Any item/work either supply of equipment or erection material which have not been specifically mentioned in but are necessary to complete the woks for trouble free and efficient operation of the plant shall be deemed to be included within the scope of this specification and shall be in bidder's scope without any commercial, technical and delivery implication to BHEL.

4.23 All other items are also included in scope of supply as specified in other part of the specification.

4.24 Bidder shall perform the guarantee parameters as per specification requirement to the satisfaction of owner. The exact modalities of verifying guarantee for the parameters indicated in the specification shall be finally as agreed with the owner during detailed engineering & mutually agreed.

5.0 ELECTRIC HOIST AND MANUAL HOIST (CHAIN PULLEY BLOCK)

Required number of electric hoist / manual hoist of adequate capacity, to meet the erection and maintenance requirements are to be provided for the various areas.

Bidder to note that chain pulley block shall be manufactured as per class-II of IS3832 & Electric hoist shall be manufactured as per class-II of IS-3938.

The stipulations of all statutory codes like Indian Electricity Act, Indian Electricity Rules, Factory Acts, Local Municipality act etc. shall however prevail over the specification requirements, in case any conflict arises between this specification and the statutory codes.

Maintenance tools and tackles shall be as per data sheet attached.

5.1 DESIGN CRITERION FOR ELECTRIC HOIST AND MANUAL HOIST (CHAIN PULLEY BLOCK)

For items weighing 300 kg and above, hoists and trolleys along with monorails shall be provided throughout the plant where crane cannot be utilized. For items weighing less than 1000 kg, manual hoists shall be provided. For items weighing 1000 kg and more, electric hoists (lift & travel) shall be provided. In case the lifting height is more than 10m, electric hoist (lift & travel) shall be provided irrespective of the weight. All hoists shall be provided with trolleys.

Capacity of cranes & hoists shall be selected considering a minimum margin of 25% over the maximum weight of the heaviest equipment / component to be handled by the Crane/Hoist.

For hand operated hoists, the hoists shall be suitable for operation from floor level. Hand chain shall be provided for long travel of trolley and the Hoisting mechanism. The operator shall be able to control the movement of the electrical/ manual hoist with the help of floor operated pendant.

5.2 SCOPE OF SUPPLIES

Equipment and services to be furnished by the bidder for the ELECTRIC HOIST/ MANUAL HOIST with accessories as per the details given in the technical specification and data sheet A. Any equipment /accessories not specified in the specification but required to make the ELECTRIC HOIST/ MANUAL HOIST complete and efficient operation shall also be under the bidder's scope of work.

Compliance with this specification shall not relieve the bidder of the responsibility of furnishing material and workmanship to meet the specified working/duty conditions.

5.2.1 Electric hoist shall include but not be limited to the following: -

a. Hoisting and CT drive arrangement
b. All electrical equipment including cables (as per electrical scope matrix) and panels.
c. PVC insulated shrouded bus bar DSL
d. Earthing arrangement.
e. Initial fill of lubricant.
f. Painting of electric hoist and accessories.
g. Maintenance Tools & Tackles (as per attached list)
h. Erection & Commissioning spares
i. Isolating switch in enclosure at operating floor for disconnecting supply to DSL while maintaining the electric hoist.

5.2.2 Erection and Commissioning spares (ELECTRIC HOIST)

The Bidder shall also supply erection & commissioning spares along with his main equipment as per his experience, for replacement of damaged or unserviceable parts during the execution of the project at site, to avoid delay in the project schedule. This shall form part of the main equipment supply. The Purchaser shall retain the unutilized commissioning spares. The initial fill of lubricants, oil etc. shall also be supplied by the bidder.

5.2.3 Services to be provided by the bidder
Packing, forwarding and transportation to site, storage and handling at site.

5.2.4 Erection and Commissioning

5.2.5 Functional test (Overload testing, load testing at rated speed, travel and hoisting motion checks as per relevant Indian standards).

5.2.6 Obtaining clearance and acceptance certificate from the concerned competent authority after site test as applicable. Necessary fees/expenditure as required shall be borne by the bidder.

5.3 INSPECTION AND TESTING

As per enclosed reference quality plan and as per IS 3938 (latest revision). Prime inspection agency shall be Consultant/ End Customer. Equipment supplied shall be strictly in accordance with nomenclature & technical specification. Any additional testing requirement/CHP (Customer Hold Point) at any stage of inspection deemed necessary by Consultant/ End Customer during detailed engineering shall be carried out without any commercial or technical implication.

5.4 TESTING AT VENDOR'S WORKS

Hoist along with its drives, controls and other accessories shall be demonstrated for the rated capacity against the rated speed of motions and for the service conditions specified as specified in QAP and as per IS 3938 for electric hoist and IS 3832 for manual hoist.
The bidder shall have the full responsibility for the safe and efficient operation of the hoist with associated accessories as a single unit.
If the shop performance tests indicate the failure of any of the components to achieve the guaranteed performance, the deficiency shall be made good at bidder's cost.

Demonstration tests shall be carried out each time after the rectification /modification is carried out.

5.5 MAKE OF SUB - VENDOR ITEMS

Makes of bought out items will be as per list specified in the specification. Make shall be subject to BHEL / NTPC approval, during detailed engineering. (Refer annexure-II)

5.6 TESTING AT SITE

A) ELECTRIC HOIST:
As required for statutory clearance for operating at site i.e., overload test, load test and other tests as per IS 3938.
Test for Operation -After the supply has been connected, tests shall be carried out to prove the following:
a) The satisfactory operation of each controller, switch, contactor, relay and other control devices and in particular, the correct operation of all limit switches under the most unfavourable conditions;
b) The correctness of all circuits and interlocks and sequence of operation; and
c) The satisfactory operation of all protective devices.

Overload Test -After test but before the hoist is put into service, it shall be tested with overload relays appropriately set, to lift and sustain a test load of 125 percent of the working load. During the overload test, the hoist shall sustain the load under full control. The specified speeds need not be attained but the hoist shall show itself capable of dealing with the overload without difficulty.

B) MANUAL HOIST:
As required for statutory clearance for operating at site with following minimum test i.e., overload and load test.

5.7 MAINTENANCE TOOLS AND TACKLES

One (1) complete unused new set of special purpose tools, tackles and accessories along with detailed instructions and maintenance manual shall be supplied. Tools shall be of suitable sizes for maintenance of electric hoist of each type and capacity. Each tool and wrench shall be stamped so as to be identified easy for its use. The tools shall be supplied in steel toolbox and with a copy of instruction manual. The items supplied shall be of the best quality, specially protected against rusting.

The following shall be provided as minimum requirement:

S-No.	Description	Qty.
1	Complete set of ring spanners (Indicate the sizes offered)	1 Set
2	Complete set of screwdrivers (Indicate the sizes)	1 Set
3.	Adjustable Spanner	1 No.
4.	Insulated plier	1 No.
5.	Grease gun	1 No.
6.	Oil gun	1 No.
7.	Line tester	1 No.

Note: -The tools shall be supplied in one tool box. Bidder shall ensure that the tools & tackles mentioned in above list are sufficient to handle all sizes/capacities of hoists & in case any other /additional tool is required for handling/maintenance any size/capacity of hoist the same shall be included in this list.

5.8 ELECTRICAL REQUIREMENTS

Electrical equipment shall be adequately rated to permit simultaneous operation of any combination of motions of the crane for it duty service.

5.8.1 MOTORS

Motor ratings shall be 25% (at least) over the maximum power requirement. The hoist motors shall be rated to lift 125% of the design load at rated speed.

Motors shall suit the duty class S4, cyclic duration factor 60% and 300 starts per hour and shall be suitable for VVF operation. Motor pull out torque shall not be less than 2.75 times/ rated torque. Motor shall have class F insulation temperature rise limited to class B and enclosures shall conform to the degree of protection IP-55.

All motors shall be capable of the following:

- Operating satisfactorily at full load for 5 minutes without injurious heating with 75% rated voltage at motor terminals.
- Withstand 120% of rated speed for two minutes.
- Current shall not exceed 6 times full load current for creep speed motor.
- Withstanding the stresses imposed if started at 110% rated voltage.
- Start with rated load and accelerate to full speed with 80% rated voltage at motor terminals.
- The locked rotor motor withstand time under hot condition at 110% rated voltage shall be more than motor starting time at minimum permissible voltage by at least 3 seconds for motors upto 20 seconds starting time.
- Maximum torque shall not be below 200% of full load torque.

Each motor more than 30 KW rating shall be provided with space heater. All electrical equipment accessories and wiring shall have tropical protection.

The VVF drive control shall be used for control of each motion. The VVF drive shall be equipped at least with 1024 pulse in card, droop control for synchronization and crane software. The rating of VVF shall be decided considering 250% of full load current of respective drive motor based on in panel rating with derated at 50 Deg C ambient temperature.

The crane(s) shall be furnished complete with all electrical equipment, accessories, like drive motors with VVF drives, conductors, insulators, protective & operating devices, cables, current collectors, all protective devices, anti-collision limit switches, mechanical overload and protection for electrical faults etc.

5.9 DSL

DSL shall meet the following requirements:

- Shrouded bus bar type.
- Minimum 20% allowance for wear and tear shall be considered during sizing.
- Voltage drop for all conductors and cables/ wires shall be limited to 3% of rated voltage between the main disconnect witch and motor terminals.

5.10 LIMIT SWITCHES

The limit switches shall be totally enclosed type IP-55. Each hoist shall be furnished with two (2) limit switches meeting the following requirements:

- A screw type limit switch with self-resetting features which will act in case of over hoisting.
- A gravity operated hand reset type limit switch as a backup protection against over hoisting. Track type limit switches shall be provided on the bridge and trolley to prevent over travelling in either direction.

Trailing cable shall be 1100 V grade, tinned copper, heat resistant, with EPR insulation and as per Class – 5 of IS-8130. Also should have inner PCP sheath and outer CSP sheath with nylon cord reinforcement & heat resistant, oil resistant and flame retardant heavy duty FRLS type.

5.11 CONTROL & INSTRUMENTATION REQUIREMENTS

Necessary start/stop and emergency controls shall be provided. Automatic reset type limit switches shall be provided to prevent over-travel for-

a) Over hoisting and lowering motions of the hook.
b) Long travel motion
c) Cross travel motion

OPERATING SPEEDS FOR MISCELLANEOUS HOISTS

a. Hoist : 3 m/min
b. Trolley travel : 6 m/min
c. Long travel : 10 m/min
d. Creep speed : 10% of full speed (as applicable)
e. Crane runway rails : Rails to suit

Notes:
1. Area, type, capacity mentioned are minimum requirement and shall be finalized during detail engineering without any commercial implication.
2. Travel and Lift are layout dependent and shall be finalized during detail engineering without any commercial implication.
3. Additional electric/manual hoist required during detail engineering shall be provided as per design criteria given above without any commercial implication.

6.0 SCOPE OF SUPPLY FOR ELECTRICAL

The scope of electrical works, equipment and services shall be as Section C2 included in specification. Other electrical design details shall be as per section D of the technical specification.

7.0 SCOPE OF SUPPLY CONTROL AND INSTRUMENTATION

7.0.1 Minimum instrumentation as per PE-DG-434-673-A001, however bidder will provide all necessary instrumentation for safe and trouble free operation.

7.0.2 Other control and instrumentation design details are specified in specification section C3/D.

8.0 SCOPE OF CIVIL

The CIVIL works is excluded from the bidder's scope. Successful bidder shall furnish civil assignment / scope drawings. The corresponding CIVIL drawing prepared by BHEL / CIVIL agency, based on civil assignment drawing of bidder, will be furnished to the successful bidder for concurrence. In case any modification is required in the civil work already carried out based on final civil inputs given by vendor, BHEL reserves the right to debit cost of such rework to vendor".

All insert plates with lugs, puddle pipe, angle, edge angle in shape as desired for edge protection of RCC structures, rung ladders, hand railing, pumps channel, bolts, nuts, gaskets etc as required to grout in BHEL civil works and to hold / support the equipments being supplied under this specification for the STP shall be in the scope of bidder.

9.0 QUALITY ASSURANCE PLANS AND SUB VENDOR LIST

1) The quality assurance plan is enclosed as **QUALITY PLAN FOR WATER TREATMENT PACKAGE (Sewage Treatment Plant) IN SECTION-C1.** However requirement of detailed QP, inspection checklist, certificate of conformance etc. for each equipment and sub-vendor shall be finalized during detailed engineering stage; decision of BHEL/customer shall be binding on vendor in this regard. Any changes/additional tests insisted upon by Owner during approval of QAP's shall be accepted by bidder without any commercial and delivery implication to BHEL/Customer. Bidder shall submit the quality plans in BHEL format during detailed engineering stage. Bidder to note further that during detailed engineering all the QAP's/check lists etc. shall be submitted to Customer/BHEL for approval. All inspection & testing etc. shall be carried out accordingly.

2) The sub vendor list enclosed in Section-C1 is indicative only and is subject to approval / acceptance by customer (NTPC). Bidder to propose his sub vendor list with back up documents (experience list, end user certificate as applicable) etc. The same shall subject to BHEL and Customer approval during detailed engineering stage without any technical, commercial & delivery implication to BHEL.

10.0 TERMINAL POINTS

10.0.1 Service water line (50 NB) will be provided by BHEL at 5 m distance from STP area. Further distribution in STP will be in bidder's scope. Bidder to note that pressure available at terminal point

for service water will be around 2 kg/cm2; hence bidder will take care for their pump lubrication accordingly.

10.0.2 Potable water line (40 NB) will be provided by BHEL at 5 m distance from STP area. Further distribution in STP will be in bidder's scope.

10.0.3 500 meter pipeline will be provided by the bidder at clear water pump discharge with isolation valve for horticulture purpose.

All the piping shall be in bidder's scope. The pipes shall be designed, supplied, erected, laid and tested by the bidder. Elbows, tees, flanges Hangers and supports, embedment plates with lugs etc required for the below given piping shall also be provided by the bidder. In addition, any additional piping and associated accessories required to complete the system shall be in bidder's scope.

11.0 PAINTING

Painting shall be as specified in "Surface Preparation & Painting" Sec-D of this technical specification. Internal painting of the equipments shall be suitable for withstanding effect of sewage and mixed liquid suspended solids. Outer painting shall be as per technical specifications. Supporting documents shall be furnished in support of suitability of the lining offered for the duty conditions by bidder during detailed engineering.

12.0 SCOPE OF SERVICE

The bidder's scope also includes following services for scope under this specification:

10.1 Erection and commissioning unloading, storage and handling at site.

10.2 Arrangement of all instruments, reagents, monitoring gadgets for monitoring, & lab facilities to carry out, pre-commissioning, trial run, commissioning and Performance guarantee test/Demonstration test.

10.3 Complete grouting for equipments, fixing and any concreting inside the tanks and lining.

10.4 All personnel required during maintenance, Commissioning and Performance guarantee test.

10.5 Trial run for requisite period.

10.6 Demonstration/ Performance Guarantee test.

10.7 Painting shall be as specified in "Surface Preparation & Painting" Sec-D of this technical specification. Bidder to note that paint shed shall be finalized during detailed engineering as per customer & BHEL requirement and any variation in the painting schedule as finally approved by customer shall be taken care by bidder without any commercial and delivery implication.

10.8 Final touch up paint at site.

10.9 Bidder shall perform the guarantee parameters as per specification requirement to the satisfaction of owner. The exact modalities of verifying guarantee for the parameters indicated in the specification shall be finally as agreed with the owner during detailed engineering & mutually agreed.

13.0 EXCLUSIONS

11.1 Service air up to the terminal point.

11.2 Instrument air up to the terminal point.

11.3 Service water up to terminal point.

11.4 Firefighting facilities.

11.5 All chemicals.

11.6 All civil works including excavation, backfilling & foundation of equipment. However complete grouting for equipment, fixing and any concreting inside vessels and lining shall be in the scope of the bidder.

The civil works including operating / maintenance platforms and interconnection platforms (if any) with ladders / stairs & handrails, structural supports and hangers for pipes / cables / ducts, crane rails, all embedment's and inserts with lugs including anchor fasteners, bolts etc., dressing of foundations, grouting of pockets and underpinning of base plates for equipment / structures and fixing supports, filling and finishing of openings in walls, floors, cladding, roof and trenches shall be in bidder's scope.

14.0 DESIGN /CONSTRUCTION

In addition to the requirements of Section C & D the following shall also be complied under scope of this specification.

The P&ID for Sewage Treatment Plant (Dwg.No.- PE-DG-434-673-A001) is enclosed herein in this section for bidders compliance.

The material of construction specified in data sheet-A are minimum requirements and material of construction for other components not specified shall be similarly selected by the bidder for intended duty which shall be subject to BHEL / Customer approval during detail engineering without any commercial & delivery implication to BHEL.

1.0 GENERAL DESCRIPTION

The function of the Sewage Treatment Plant is to collect all sanitary sewage originating in the plant, perform treatment and transfer the treated water for horticulture / irrigation. Sewage treatment in general carried out to reduce the solid contents of the sewage, and change the character of the sewage so that it can be reused.

Sanitary wastes are collected from the buildings that contain sanitary facilities by gravity. Sanitary lift stations shall be used to forward the waste to an onsite sewage treatment plant. Solid wastes shall be hauled offsite.

2.0 LIFT STATIONS

Each lifting station will have single compartment. Two pumps will be located on each lift station as shown in the Sewage Treatment Plant – P&ID enclosed with technical specification.

3.0 SIZING CRITERIA

Average design flow shall be 75 Cum/day. ***However, bidder to design the equipment for peak load requirements also as per CPHEEO manual requirements.***

4.0 BASIS

Sewage treatment plant shall be designed for inlet and outlet quality of sewage by the bidder. Further Zero discharge condition must be achieved within the plant boundary.

4.1 SEWAGE QUALITY INLET TO SEWAGE TREATMENT PLANT

Sewage Treatment Plant is designed for the following sewage flow rate and characteristics:

Flow Rate	:	75 M^3/day
BOD	:	100-250 mg/l
COD	:	300-450 mg/l
TSS	:	200-300 mg/l

pH	:	6.5 – 8.0
Coliform count	:	1000 counts/ 100 ml
NH4-N	:	As actual
N Total	:	As actual
Temperature	:	Ambient

4.2 SEWAGE TREATMENT OUTLET QUALITY

Treated sewage will conform to the following quality standards, however the treated sewage water qualities shall have to meet the all applicable statutory requirement also, whichever is stringent.

BOD	:	Less than 10 mg/l
COD	:	Less than 50 mg/l
TSS	:	Less than 20 mg/l
pH	:	7.0 – 8.0
Coliform count	:	100 counts/ 100 ml
NH4-N	:	Less than 5mg/l
N Total	:	Less than 10mg/l
Residual chlorine	:	Not exceeding 0.5 mg/l
Temperature	:	Ambient

NOTES: -

The treated sewage quality standards shall be achieved at average sewage flow rates as well as peak sewage flow rates.

4.3 PIPING

All piping within the sewage treatment plan shall be in bidder's scope. Piping and valves shall be sized and rated based on flows and pressures at full-capacity operation. Piping conveying high levels of suspended solids shall be sized to maintain a minimum velocity of 0.6 m/s at the minimum flow rate to prevent solids from settling in the piping.

Pressure drops in pipes will be based on Hazen Williams's formula.
Pipe handling sewage will be spun C.I. pipes (IS-1536) and air application of MOC GI only. Filtered Water & service water shall be IS-2062 Gr. B/ASTM-A-36/ASTM A-53 type 'E' Gr. B/IS-3589 Gr. 410/IS-1239 Heavy, 150 NB & above pipes shall be spiral welded.

Pumps will be sized based on the following:

Capacity: System requirement + 10% margin
Head: System requirement + 10% margin on friction losses.

5.0 PROCESS DESCRIPTION

The sewage treatment plant shall be designed as per guidelines of CPHEEO Manual. The anticipated no. of users shall be 2000 persons. The sewage treatment plant shall be designed to handle a flow of 75Kld considering average per capita consumption of 45lpcd with 80% of used water generated as sewage.

The Sewage Treatment Plant treatment scheme shall be modular type based on MBBR (Moving Bed Bio Reactor) technology followed by disinfection by Hypo and necessary tertiary treatment prior to reuse in horticulture purpose. Aerobic biological sludge generated shall be thickened in the tube settler and aerobically digested/dried in a sludge sump and then transferred to filter press. The dry sludge shall be disposed manually by Customer. The Process Flow Diagram / P & ID is enclosed for reference.

The sewage treatment plant shall consist of following treatment components:

1) **Pre-Treatment,** which consists of raw sewage collection and pumping & screening of incoming sewage & oil & grease removal from the collected sewage.

Preliminary Treatment:

• Coarse screens for screening incoming sewage

- Oil & Grease Trap
- Equalization cum holding tank

2) Biological Treatment, comprising of aeration followed by clarification and Dosing of sodium hypochlorite in the hypo contact cum filter feed tank.

Aeration System:

- Aerobic Biological treatment in the MBBR Tank with fine bubble diffused aeration.
- Transfer of treated partially treated sewage to the Clarification system.

Clarification System:

- Settling of digested sludge in the Tube Settler.
- Transfer & storage of clarified water to the Hypo Contact Cum Filter Feed Tank.
- Dosing of Sodium Hypochlorite in the Hypo Contact Cum Filter Feed Tank.
- Dosing of Sodium Hypochlorite sludge feed line to centrifuge.

3) Sludge Handling System

- Transfer of sludge to the sludge sump from MBBR tank & tube settler.
- Transfer of sludge to centrifuge through sludge transfer pumps.
- Transfer a part of sludge to MBBR tank to maintain MLSS through discharge line of sludge transfer pumps.
- Transfer of centrate or filtrate to the equalization tank.
- Transfer of waste water generated through DMF & ACF to the equalization tank/CCS.
- Disposal of sludge as cakes by sludge trolley.

4) Tertiary Treatment:

- Polishing of treated sewage by DMF& ACF.
- Transfer of Polished sewage water for horticulture.

Detailed description of each treatment step is given below:

The various raw sewages shall be collected by gravity at local sewage lifting stations at different areas and the same to be pumped by using 2 Nos (1W+1S) Sewage Lifting Pumps to an underground common collection sump located in sewage treatment plant area.

Collected raw sewage shall be pumped from the common collection sump using 2 Numbers (1W+1S) common collection non-clog type sump Pumps to the equalization Tank after passing through the bar screen chamber & oil grease chamber provided with oil & grease trap. In bar screen chamber (MOC: RCC) the coarse screens present in the raw incoming sewage shall be subject to screening & oil & grease chamber (MOC: RCC) shall be provided with Oil & grease trap for removal of oil & grease from the raw incoming sewage.

The Sewage Lifting Pumps shall be of submersible and heavy duty grinding type which shall cut and grind solids present in raw sewage into small fragments. The Sewage Lifting Pumps shall automatically START at high level in the Sewage Collection Pit and STOP at low level.

The common collection sump shall also be provided with a coarse air bubble diffuser and an airline tapping from the Air Blower delivery header so as to allow continuous aeration in order to protect the STP Package against unpleasant odours.

2 numbers (1W+1S) Air Blowers common for common collection sump, Equalization tank & sludge sump shall be provided to supply air through an underwater piping grid and fine air bubble membrane diffusers.

Centrate produced from centrifuge shall be transferred to Equalization tank.

2 numbers (1W+1S) vertical submersible MBBR feed pumps shall be provided in equalization tank to transfer sewage from equalization tank to MBBR reactor. 1no. MBBR reactor of RCC construction along with 2 numbers (1W+1S) Air Blowers for MBBR tank to supply air through an underwater piping grid and fine air bubble membrane diffusers to MBBR reactor.

1 number tube settler of RCC construction for Settling of digested sludge in the Tube Settler.

1 number of Hypo contact cum filter feed tank of MOC RCC shall be provided for storage of clarified water after clarification process. Further 1 no. hypo dosing system consists of 1 number Hypo dosing tank of MOC PVC along with 1 number hypo dosing pump shall be provided for dosing of sodium hypo chloride inside the hypo contact cum filter feed tank. Over flow connection from the Hypo contact cum filter feed tank shall be connected through pipe to plant drain.

Further 2 numbers (1W+1S) horizontal centrifugal type filter feed pumps shall be provided for feeding clarified water after clarification process for tertiary treatment through dual media filter & activated carbon filter.

1 number dual media filter & 1no. Activated carbon filter shall be provided for the tertiary treatment of clarified water after clarification process. Backwash & waste water generated from dual media filter & activated carbon filter shall be transferred to the equalization tank.

1 number treated water tank over ground (MOC RCC) shall be there for storage of final treated water after tertiary treatment. Further 2 numbers (1W+1S) horizontal centrifugal type treated water disposal pumps shall be provided for transferring the treated water for gardening purpose.

1 number sludge sump of (MOC RCC underground) for storage of sludge generated from MBBR tank & tube settler shall be provided. 2 nos. (1W+1S) of vertical screw type sludge transfer pumps for feeding sludge from sludge sump to centrifuge. Further 1 number hypo dosing system consists of 1 number Hypo dosing tank along with 1 number hypo dosing pump shall be provided for dosing of sodium hypo chloride during feeding of sludge to centrifuge.

Sodium hypochlorite solution dosing shall be carried out into the hypo contact cum filtered feed tank & feeding line to centrifuge to control the BOD.

Further 1 number trolley mounted arrangement shall be provided for disposal of sludge cake generated from centrifuge.

The stabilized sludge shall be free of offensive odours.

6.0 OPERATION AND CONTROL PHILOSOPHY

The MBBR based sewage treatment plant operation & control shall be carried out from the DDCMIS based control system (BHEL Scope). Control of sewage sumps located outside boundary of STP common area shall be through self-standing local control panel.

DDCMIS based control system for MBBR based sewage treatment plant shall be located in the STP area. However, the control of sewage lifting pumps (S1, S2, S3, S4, S5, S6, S7, & S8) other than STP area shall be through self-standing local control panel.

All pumps shall be fitted with check valves and pressure gauge on the discharge side. All pump shall be tripped automatically in case of low level in the pits/tanks and shall be started manually. Annunciations for high level in pits/tanks shall be provided.

Similarly, air blowers (located at Sewage treatment plant area) shall be suitably interlocked with DDCMIS based control system.

Number of signals / Annunciation shall be provided in DDCMIS and the same shall be decided During Detailed Engineering stage.

Note: Bidder to note that for complete control & operation of the STP plant, bidder to also refer the respective Control & Instrumentation (Section C2) & Electrical (section C3).

15.0 LAYOUT

Space requirement has been indicated in plot plan, attached with specification. All the equipment will be open to sky except control panel, hence bidder has to take care that all the equipment will be whether and dust proof. Control panel will be located in industrial shed in STP area.

16.0 DEMONSTRATION TEST

The Demonstration test shall be as per clause 4.2 above.

17.0 DRAWING/DOCUMENTS REQUIREMENT (PL REFER ELECTRICAL & C&I PORTION ALSO): -

For the Drawings/Documents submission schedule, please refer **Vol-III.**

For the Drawings/Documents Submission Procedure, please refer **Sec-C/ Sec-D**. The bidder has to submit the revised drawing/document along with the compliance sheet indicating enumerate reply to all BHEL and customer comments or observations. Without compliance sheet the submission of the drawings/documents will not be considered and the delay on this account will be solely on bidder's side only. Bidder to comply with the observations of the BHEL and CUSTOMER without price & delivery implication.

18.0 SPARES

1. All the spares for the equipment under the contract provided by the vendor will strictly conform to the specifications and documents and will be identical to the corresponding main equipment/components supplied under the contract.

2. The quality plan and the inspection requirement finalized for the main equipment will also be applicable to the corresponding spares.

3. The list of mandatory spares considered essential by the BHEL & Customer is indicated in Annexure IV. The bidder shall indicate the prices in the 'Schedule of mandatory Spares' whether or not he considers it necessary for the BHEL & Customer to have such spares. If the bidder fails to comply with the above or fails to quote the price of any spare item, the cost of such spares shall be deemed to be included in the contract price. The bidder shall furnish the population per unit of each item. Whenever the quantity is mentioned in "sets" the bidder has to give the item details and prices of each item.

   The prices of mandatory spares indicated by the Bidder in the Bid Proposal sheets shall be used for bid evaluation purposes.

   All mandatory spares shall be delivered at site at least two months before scheduled date of initial operation of the first unit. However, spares shall not be dispatched before dispatch of corresponding main equipments.

   Wherever quantity is specified both as a percentage and a value, the Bidder has to supply the higher quantity until and unless specified otherwise.

4. Start-up and commissioning spares are in bidder's scope of supply.

   Start-up and Commissioning spares are those which would be required during equipment or system testing, start-up and commissioning. All spares used until the plant is finally handed over by the bidder to the customer come under this category. All start-up and commissioning spares as required shall be provided by the bidder without any additional cost to the BHEL and customer.

   Bidder shall be responsible for the ready and timely availability for all the startup and commissioning spares as required during various stages of testing, cleaning and commissioning up to handing over of each unit of the total plant.

   An adequate stock of start-up spares shall be available at the site such that the start-up and commissioning of the equipment/systems, Performance guarantee test and handing over the equipment/ systems to the customer will be carried out without hindrance and delay. All start-up spares which remain unused after the taking over of the plant shall remain the property of the customer.

5. In addition to the spare parts mentioned above, the Bidder shall also provide a list of recommended spares for 3 years of normal operation of the plant and indicate the list and unit prices in Price Schedules. This list shall take into consideration the mandatory spares specified Annexure IV and should be independent of the list of the mandatory spares. The BHEL reserves the right to buy any or all

of the recommended spares. The recommended spares shall be delivered at project site at least two months before the scheduled date of initial operation of first unit. However, the spares shall not be dispatched before the dispatch of the main equipment.

Price of recommended spares will not be used for evaluation of the bids. The price of these spares will remain valid upto 6 months after placement of Notification of Award. However, the Bidder shall be liable to provide necessary justification for the quoted prices for these spares as desired by BHEL.

The vendor warrants:

(i) That all spares supplied will be new and in accordance with the contract document and will be free from defects in design, material and workmanship and shall further guarantee as under:

(ii) In case of any failure in the original component/equipments due to faulty designs, materials and workmanship, the corresponding spare parts if any, supplied will be replaced without any extra cost to the BHEL and customer unless a joint examination and analysis by BHEL and/or customer of such spare parts prove that the defect found in the original part that failed can safely be assured not to be present in spare parts.

(iii) The long term availability of spares to the BHEL and the customer for the full life of the equipment covered under the contract and that before going out of production of spare parts of the equipment covered under the contract, vendor and his sub-vendors shall give the BHEL and the customer at least 24 (Twenty Four) months advance notice so that the latter may order his bulk requirements of spares, if he so desires. The same provision will also be applicable to the sub-vendors. Further, in case of discontinuance of manufacture of any spares by the vendors or his sub-vendors the vendors and his sub-vendors, will provide the BHEL and the customer, 2 (two) years in advance, with full manufacturing drawings, material specifications and technical information required by the BHEL and the customer for the purpose of manufacture of such items and also the right to manufacture such spares for their own requirements.

(iv) Further in case of discontinuance of supply of spares by the vendors or his sub-vendors, the vendor will provide the BHEL and the customer with full information for replacement of such spares with other equivalent makes, if so required by the BHEL and the customer.

(v) Notwithstanding the above, the vendor shall be responsible for supply of spares for the lifetime of the package at reasonable prices. The prices of all future requirements of spares shall be derived from the corresponding ex-works price at which the orders for such spares have been placed by the BHEL and the customer as a part of the mandatory or long term or any other kind of spares. The base indices for calculating ex-works price shall be commissioning of last equipment under main contract.

6. The vendor will indicate the delivery period of the spares, which the BHEL and the customer may procure in accordance with this clause.

7. In case of emergency requirements of spares, the vendor would make every effort to expedite the manufacture and delivery of such spares on the basis of mutually agreed time schedule.

8. In case the vendor fails to supply the mandatory or long term or any other kind of spares on the terms stipulated above, the BHEL and the customer shall be entitled to purchase the same from the alternate sources at the risk and the cost of the vendor and recover from the vendor, the excess amount paid by the BHEL and the customer over the rates as per the contract. In the event of such risk purchase by the BHEL or the customer, the purchases will be as per the works and procurement policy of the BHEL and the customer prevalent at the time of such purchases and BHEL & the customer at his option may include a representative from the vendor in finalizing the purchases.

9. It is expressly understood that the final settlement between the parties in terms of relevant clauses of the tender document shall not relieve the vendor of any of his obligations under the provision of long term availability of spares and such provisions shall continue to be enforced till the expiry of 30 (thirty) years period reckoned from the scheduled date of completion of trial operation of the last equipment unless otherwise discharged expressly in writing by the BHEL or the customer.

19.0 ADDITIONAL REQUIREMENT

1. Engineering for this project is to be carried out in Integrated Intelligent Engineering environment at BHEL end. For Details Refer Drawing Document Submission Procedure/Schedule.

2. Initial charge of all lubricants & grease.

3. All special tools necessary for proper maintenance or adjustment of the equipment packaged in permanent box. Finish paints for touch-up painting of equipment after erection at site in sealed container.

4. Wherever pipe racks are not available, pipes shall run on pedestals or below ground. All fixing items such as U clamps, nuts, bolts etc. required to lay the pipes on pedestals shall be in bidder's scope of work. Coating, wrapping and protection required for buries pipes shall be in bidder's scope of work.

5. For calculation of pump head, bidder to follow the technical specification requirement. Wherever pipes are running on pipe rack, Bidder will consider 10 m static head (or as per grade level of respective sewage collection sump location as indicated in the attached drg in tender specs), in addition to the losses in straight length and bend in pipes and valves etc. 10% overall margin shall be considered, while selection of pump head during detailed engineering. **BIDDER TO NOTE THAT SEWAGE PIPE FROM S-PIT-7 TO S-PIT-6 MAY BE NEEDED TO BE ROUTED ON CONVEYOR STRUCTURE AT HIGHT OF 8-10M SO AS TO CROSS RAILWAY TRACKS. PUMPS SIZING TO BE CONSIDERED ACCORDINGLY.**

6. The pumps shall be designed to operate under discharge valve open and close condition.

7. Pump suction valves, re-circulation valves and discharge valves shall be provided with required limit switches for interlock & control.

8. The starting of pumps (wherever applicable) which are provided with forced water lubrication shall be interlocked with the availability of lube water by means of starting of lubrication water pumps, availability of adequate flow, pressure etc. The standby lubrication pump shall be started automatically during inadequate pressure or while tripping of working pump(s).

9. All the first fill and one Year's topping requirements or 10 % of first fill quantity, whichever is more of consumable such as greases, oil, lubricants, servo fluids/control fluids, gases and etc. which will be required to put the equipment covered under the scope of specifications, into successful commissioning / initial operation and to establish completion of facilities shall be furnished by the bidder. Suitable standard lubricants as available in India are desired. Efforts should be made to limit the variety of lubricants to minimum.

10. Document approval by customer under Approval category or information category shall not absolve the vendor of their contractual obligations of completing the work as per specification requirement. Any deviation from specified requirement shall be reported by the vendor in writing and require written approval. Unless any change in specified requirement has been brought out by the vendor during detail engineering in writing while submitting the document to customer for approval, approved document (with implicit deviation) will not be cited as a reason for not following the specification requirement.

11. In case vendor submits revised drawing after approval of the corresponding drawing, any delay in approval of revised drawing shall be to vendor's account and shall not be used as a reason for extension in contract completion.

12. Bidders shall make Site visit in order to familiarize themselves with existing condition of site before submitting the bid in order to make their offer complete. During detail engineering also, the successful bidder shall be responsible for the correctness of details w.r.t. existing facility at site. Customer approval on any drawing having details of existing facility shall not be cited by the successful bidder a valid reason for any shortcoming in the work by them. BHEL shall also not entertain any cost implication for any lack of input data with regard to site during detail engineering.

13. Final Electrical Load list will be submitted by the successful bidder as per agreed drawing/ doc submission schedule. Thereafter any change in the electrical load list shall be entertained only subject to its feasibility, and BHEL reserves the right to debit the vendor cost of any changes necessitated in the switch gear /MCC on account of changed loads.

14. The complete system shall be proven and necessary design documentation in support of proveness shall be submitted by the successful bidder in support of the systems, if asked by the customer without any price and delivery implication to BHEL and customer.

15. Wherever CIVIL works is excluded from the bidder's scope, successful bidder shall furnish civil assignment / scope drawings. The corresponding CIVIL drawing prepared by BHEL / CIVIL agency, based on civil assignment drawing of bidder will be furnished to the successful bidder for concurrence. In case any modification is required in the civil work already carried out based on final civil inputs given by vendor, BHEL reserves the right to debit cost of such rework to vendor".

16. System to be designed to meet all the statutory requirements. Preparation of all necessary drawings/data/ documents for obtaining necessary Approval of statutory authorities like CCOE , IBR , Weight & Measures Department and any other agency/ competent authority ,on behalf of the customer, related to installation of DM plant (if required) is included in bidder's scope. All expenses required to obtain the approval shall also be borne by the successful bidder. Successful bidder shall inform customer well in advance requirement of authority letter along with format for the same. After issuance of authority letter by customer, it will be vendor's responsibility to regularly follow up with the concerned authorities to obtain timely approval from these authorities. Any delay on account of the same, unless any specific information related to above approval to be furnished by customer is delayed by customer, shall be to vendor's account and shall not be used as a reason for extension in contract completion. Any change arising out of any new government norms, statutory requirements during the course of execution of the project shall be complied by the bidder without any commercial implication.

17. Vendor to attend regular engineering meeting with BHEL and customer fortnightly in BHEL or customer office as decided during detail engineering. Vendor will depute all his concerned engineering representative along with the project manager for discussion and approval. Meeting can be held at site also.

18. Space available for sewage treatment plant is indicated/attached, elsewhere in this specification. Bidder to accommodate their equipment within the space provided.

19. Bidder to submit BBU during detailed engineering after approval of Basic documents. BBU shall be equal to BOQ for the package and there shall be no price and delivery implication is applicable to BHEL / customer for the same. None of the items supplied for the project as non-billable. Incomplete BBU shall not be review by BHEL.

20. Preparation of drawings / document / P&ID's in 3D modelling software and providing soft copy of same to BHEL.

21. Preparation of e-learning package/module and providing the same to BHEL & NTPC for the complete sewage treatment plant. The necessary requirement shall be as per detail specified elsewhere in this specification.

22. Training of plant Owner's personnel, O&M operators' personnel on plant operation and maintenance.

23. Relevant requirements as per GTR, GCC, ECC & SCC.

24. Any statutory requirement / clearance required for the packages from government / local body shall be in bidder's scope. Any change arising out of any new government norms, statutory requirements during the course of execution of the project shall also be complied by the bidder without any commercial implication.

25. Instrument, valves, & piping shown in the flow diagram/ P&IDs are bare minimum requirement. Any additional instrument, valves, and piping required as per system requirement, shall be in the bidders scope.

26. Wherever gravity flow is not possible the bidder shall provide suitable storage & pumping system (2x100%) along with Piping, valves & instrumentation etc to meet the system & process requirement.

27. Service water shall be available near DM plant/ system building/ area at approximately 1.5 to 2.0 Kg/ Cm2. Hence, bidder to take care for cooling/ lubrication of the pumps being supplied by the bidder under this technical specification. If service water pressure requirement is more than available pressure, bidder to consider two (2) nos. cooling pump for package.

28. Capacity of monorail hoists, chain pulley blocks wherever indicated in Datasheet– A are minimum and capacity of such hoists, chain pulley block etc. shall be suitable for handling 125% of maximum weight to be handled during erection and maintenance of the equipments in the pump house, buildings etc. as the case may be.

29. All the sumps, tanks, reservoirs and other water retaining structures shall be provided with access ladders/ rungs from operating platforms/ ground level as the case may be and de-watering pits one for each section. Hand railing will be provided by bidder for safety purpose in all civil structures. Supply and erection of Hand railing as desired for safety purpose will be in bidder's scope.

30. Slings & Lifting lugs shall be provided in all equipment.

31. Charging platform for all the chemical tanks along with required handrails, accessories etc. Permanent ladder (not rungs) for approaching the top of tanks, valves for All steel inserts plates with lugs, plates, bolts, nuts, sleeves, edge angles and all other embedding components etc as required to grout in civil works and to support/hold the equipment's for opening/maintenance purpose, shall be in bidder's scope.

32. In case of any conflict and repetition of clauses in the specification, the more stringent requirements among them are to be complied with.

33. Necessary pipe, piping, fitting, valves, drains, vents, sampling etc. required for the complete PT Plant. Pipe racks shall be provided by BHEL wherever available, wherever pipe racks are not available, pipe shall be laid on pedestal (BHEL or vendor's scope as per civil scope sheet). However all auxiliary steel structure (U-clamps, nuts, bolts, channels etc.) for fixing pipes on pedestal or racks shall be in bidder's scope. Static head to be informed to bidder as per height of the pipe rack.

34. Latest version of all codes and standards to be followed.

20.0 SITE VISIT BEFORE SUBMISSION OF OFFER.

Bidders shall make Site visit in order to familiarize themselves with existing condition of site before submitting the bid in order to make their offer complete. During detail engineering also, the successful bidder shall be responsible for the correctness of details w.r.t existing facility at site. Customer approval on any drawing having details of existing facility shall not be cited by the successful bidder a valid reason for any shortcoming in the work by them. BHEL shall also not entertain any cost implication for any lack of input data with regard to site during detail engineering.

ANNEXURE – I

Items / Components \ Test/Check	Material Test	WPS/PQR/Welder	DPT/MPI	Assembly Fit up	Dimension	RT	Hydraulic test / Pneumatic test / Vacuum test	Perfomance Test	Test as per relevant Std / Appd. Data Sheets	Other Tests	Remarks
COMMON ITEMS:											
1. Horizontal Centrifugal Pumps				Y	Y			Y^1	Y		**LEGENDS:** Applicable tests are identified by 'Y'. Y^a : One per Heat / Heat Treatment batch / Lot. Y^b : On machined surfaces only. Also 100% on Butt Welds & 10% on Fillet Welds. Y^c : UT shall be done for shafts with Dia 50 mm or above & Plates of Thickness 25 mm or above. Y^d :Dynamic Balancing per ISO: 1940, Grade 6.3 minimum shall be conducted for rotating assy. Y^1 : As per Pump governing standard. Tolerences as per HIS, USA. Y^2 : Random 10% RT to be conducted on butt welds for Thk $\geq$10 mm. Y^3 : Seat Leakage Test for actuator operated valves shall be done by operating the valve with job actuator. Y^4 : Tests on Rubber Diaphragms shall be conducted per batch of Rubber mix for Tensile, Elongation, Hardness, Thickness, Bleed Resistance. In addition, Type Test for 50,000 cycles for each type of diaphragm shall also be conducted.
1.1. Casing	Y^a		Y^b		Y		Y				
1.2. Impeller	Y^a		Y^b		Y					Y^d	
1.3. Shaft	Y^a		Y		Y					Y^c	
2. Vertical Pumps				Y	Y			Y^1	Y		
2.1. Casing	Y^a		Y^b		Y		Y				
2.2. Impeller	Y^a		Y^b		Y					Y^d	
2.3. Shaft	Y^a		Y		Y					Y^c	
2.4. Fabricated Parts	Y^a	Y	Y^b		Y	Y^2	Y				
3. Dosing/ Metering Pumps	Y^a				Y		Y	Y^1	Y		
4. Gate/ Globe/ Check Valves	Y^a		Y^b		Y		Y	Y	Y	Y^3, Y^6	
5. Dual Plate Check Valves	Y^a		Y^b		Y		Y	Y	Y	Y^6, Y^{12}	
6. Diaphragm Valves	Y^a				Y		Y		Y	Y^4, Y^3	
7. Butterfly Valves (Low Pr.)				Y	Y		Y	Y	Y	Y^3	

7.1 Body & Disc (Cast	Y^a		Y^b		Y						Y^6 : Blue Matching, Wear Travel for Gate Valves and reduced pressure test for check valves shall be conducted as per relevant standards. Y^7 : Heat Treatment of the Tank/Vessel shall be done per fabrication code requirement. Welded dished ends shall be stress relieved. Dished ends manufactured by cold working shall also be stress relieved as per the requirement of code. Y^8 : RT as per fabrication code requirements. However, dished ends welds, if manufactured by using welded plates shall be subjected to 100% RT. Y^9 :Rubber Lining Mix shall be subjected to Bleed Resistance Test on mould sample. Adhesion Test, Spark Test and Hardness Test for the Rubber lined jobs shall also be conducted. Y^{10} :Gear Boxes shall be checked for smooth No Load Operation at shop to verify noise and vibration levels. Gear Ratio and Kerosene Leak Test shall also be conducted. Y^{11} :One Fan of each type & size shall be routine performance tested as per corresponding code for air flow, static pressure, total pressure, speed, efficiency, power consumption, noise & temperature rise. Also all Fans shall be subjected to run test of 4 hours during which noise, vibration, temperature rise and current drawn shall be measured. Y^{12} :Dry cycle test on valve spring for 1, 00,000 cycles shall be carried out as type test, if not carried out earlier, for the similar MOC, size and type of spring. Y^{13}: :Test as per approved supplier practice. Y^{14} : Electronic leak test for condenser & evaporator unit. Note: The complete Piping system along with valves & fittings shall be hydraulically tested at 1.5 times design pressure or 2 times working pressure whichever is higher after erection at site.

Items / Components \ Test/Check	Material Test	WPS/PQR/Welder	DPT/MPI	Assembly Fit up	Dimension	RT	Hydraulic test / Pneumatic test / Vacuum test	Performance Test	Test as per relevant Std / Appd. Data Sheets	Other Tests	Remarks
7.2 Body and Disc (Fabricated)	Y[a]	Y	Y[b]		Y				Y	Y[2]	
7.3 Shaft	Y[a]		Y[b]		Y					Y[c]	
8. Plug/ Ball Valves (Low Pr.)	Y[a]		Y[b]	Y	Y		Y	Y	Y	Y[3]	
9. Blowers/ Compressors	Y[a]		Y[b]	Y	Y			Y	Y	Y[c], Y[d]	
10. Tanks/ Pressure Vessels	Y[a]	Y	Y[b]	Y	Y	Y[8]	Y		Y	Y[7]	
11. Rubber Lining	Y[a]				Y				Y	Y[9]	
12. Strainers	Y[a]	Y	Y[b]	Y	Y		Y		Y		
13. Pipe & Pipe Fittings	Y[a]	Y	Y		Y	Y[8]	Y		Y		
14. Agitators /Flash Mixer/ Flocculator	Y[a]	Y	Y[b]	Y	Y			Y		Y[10]	
15. Ventilation/Exhaust Fan	Y[a]		Y[b]	Y	Y			Y[11]	Y	Y[c], Y[d]	
16. Hoists & Cranes	Y[a]	Y	Y[b]	Y	Y	Y[8]		Y	Y		
17. Wrapping & Coatig Material	Y				Y				Y		
18. Package/ Split AC	Y							Y	Y	Y[14]	

Test/Check / Items / Components	Material Test	WPS/PQR/Welder	DPT/MPI	Assembly Fit up	Dimension	RT	Hydraulic test / Pneumatic test / Vacuum test	Performance Test	Test as per relevant Std / Appd. Data Sheets	Other Tests	Remarks
PT & LET PLANT:											
1. Clariflocculator / Reactor Clarifier / Plate or Tube Settler	Y[a]	Y	Y[b]	Y	Y				Y	Y[10]	
2. Chlorine Tonner / Chlorine Evaporator	Y[a]	Y	Y[b]	Y	Y	Y[8]	Y		Y		
3. Chlorinator / Ejector	Y[a]			Y	Y		Y	Y	Y		
4. Chlorine Gas Filter	Y[a]			Y	Y		Y		Y		
5. Pressure / Vacuum Relief valve / Pressure Regulating Valve	Y[a]			Y	Y		Y	Y	Y		
DM PLANT & CWT SYSTEM:											
1. Resins / Activated Carbon									Y		
2. Filter Membrane					Y				Y		
3. RO Pressure tube	Y[a]				Y		Y		Y		
CPU SYSTEM:											
1. Butterfly valves / Ball valves (HP)	Y[a]			Y	Y		Y	Y	Y	Y[3]	
2. Resins / Activated Carbon									Y		

1) The above mentioned requirement are bare minimum. However any additional comments provided by BHEL / Customer shall be adhered by successful bidder without any commercial and delivery implication to BHEL/Customer.

ANNEXURE - I

QAP FOR LOW PRESSURE PIPING (LP PIPING)

PIPES, FITTINGS, BENDS, VALVES, COATING-WRAPPING, STRAINERS EXPANSION, JOINTS, TANKS, FASTENERS, LINING ETC.

	Tests/Check / Items / Components	Material Test	DPT/MPI / RT	Ultrasonic Test	WPS/ WQS/PQR	Hydraulic / Water Fill Test	Pneumatic Test	Assembly Fit up	Dimensions	Functional/operational Test	Other Tests	All Tests as per relevant Std	REMARKS
1	Pipes & Pipe Fittings	Y[a]	Y[b]			Y1			Y			Y	
2	Diaphragm Valves	Y[a]				Y[5]			Y		Y[6]		
3A	Cast Butterfly Valves (Low Pressure)					Y		Y	Y	Y	Y[7]		
	Body	Y[a]	Y[b]										
	Disc	Y[a]	Y[b]										
	Shaft	Y[a]	Y	Y[c]									
3B	Fabricated Butterfly Valves	REFER NOTE 14											
4	Gate/ Globe/Swing Check / Ball Valves	Y[a]	Y[b]	Y[c]		Y[5]	Y	Y	Y	Y	Y[8]		
5	Dual Plate Check Valves	Y[a]	Y[b]	Y[c]		Y	Y	Y	Y	Y	Y[4]		
6	Rolled & Welded Pipes and Mitre Bends	Y[a]	Y[3]		Y	Y[3]			Y		Y[3] &15	Y	
7	Coating & Wrapping of Pipes	Y[2]									Y[2]		
8	Tanks & Vessels	Y[a]	Y[b]		Y	Y			Y		Y[16]		
9	Strainers	Y[a]	Y[b]		Y#	Y					Y[11]		#For Fabricated Strainer
10	Rubber Expansion Joints	Y[a]				Y[12]		Y	Y		Y[13]		
11	Internal Lining of Pipes	Y[a]							Y		Y[9]		
12	Site Welding		Y[10]		Y	Y							

	NOTES (MEANING OF SUPERSCRIPTS)
a	One per heat/heat treatment batch/lot.
b	On machined surfaces only for castings and on butt welds.
c	For shaft/spindles > or = 50 mm
1	100% Hydraulic test shall be carried out. Weld joints not subjected to hydraulic test shall be subjected to 100% RT
2	Spark Test, Adhesion Test and Material Test for primer and enameled & Coal Tar Tapes as per AWWA-C-203-91/ IS-10221/IS 15337 as applicable.
3	Followings are the testing requirements for fabrication of pipes at site

	TESTS	QUANTUM OF CHECKS
	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 / UT by TIME OF FLIGHT DEFRACTION (TOFD) Technique	5% (100% of T Joints)
	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.
4	Dry Cycle Test on Dual Plate Check valve spring for one lakh Cycles shall be carried out as a type test. If Dry Cycle test carried out earlier for same material & diameter, Test report shall be reviewed.	
5	Seat Leakage Test for Actuator Operated Valves, shall be done with by closing the valves with actuator.	
6	Tests on rubber parts shall be conducted per batch of rubber mix for tensile, Elongation, hardness, adhesion, spark test, bleed resistance test. In addition, type test for 50,000 cycles of each type of diaphragm shall also be conducted.	
7	Hydraulic Test of Body, Seat and disc-strength shall be carried out in accordance with governing design standard in presence of owner's representatives. Actuator operated valves shall be checked for Seat Leakage by closing the valves with actuator. For Proof of Design Test refer respective chapters of engineering portion in the technical specification	
8	Blue matching, wear travel for gates, valves, pneumatic seat leakage, and reduced pressure test for check valves shall be done as per relevant standard. Maximum allowable vacuum loss is 0.5 mm of Hg abs. for valves to be tested for vacuum operation for internal pressure 25 mm of Hg abs. for a period of 15 minutes. Fire safe test for ball valve shall be done wherever specified. In case of already carried out, the test report shall be submitted for review and acceptance by NTPC Engineering. Valves shall be offered for hydro test in unpainted condition.	
9	Tensile, Elongation, Hardness, Specific Gravity, Lining Thickness, Humidity Check, Pipe temperature check, Adhesion Test and Holiday Detection Test etc as per applicable standard shall be done for all lining material and application.	
10	10% of welds (Root and finished welds) shall be subjected to DPT.(100% DPT for compressed air line and boiler & deaerator fill line.).	
11	Pressure drop across the strainer for each type and size as a special test shall be carried out. In case of already carried out, the test report shall be submitted for review and acceptance by NTPC Engineering.	
12	During hydraulic and vacuum tests at 25mm Hg abs in 3 positions, the change in the circumference of arch should not be more than 1.5%. 24 hrs after the test permanent set in dimension should not exceed 0.5%.	
13	Tests on rubber for tensile, elongation, hardness, hydraulic stability check as per ASTM D 471, ozone resistance test as per ASTM D 1149 aging test and adhesion strength of rubber to fabric, rubber to metal adhesion shall be carried out.	
14	In addition of all tests as indicated for Cast Butter Fly valve being applicable for fabricated butterfly valves, following test shall be done for Fabricated Butter Fly Valve: a. UT as per ASTM A-435 on plate material for body and disc shall be carried out for plate thickness 25mm and above. b. 100% RT and DPT as per ASTM, Section-VIII, Division-I, on butt joins of body and disc. 10% DPT on other welds shall be done. c. Post weld heat treatment as per ASME, Section-VIII, Division-I on butt joints of body and disc. d. Welders and WPS shall be qualified as per ASME- section IX	
15	Maximum number of segments in segmental flanges shall be four (04) only. All butt weld joints in the segmental flanges shall be examined by RT/UT. Segmental flanges exceeding 37.5 mm thickness shall be stress-relieved as per norms of ASME Section VIII after welding	
16	For pressure vessel welds RT shall be done as per design code requirements.	

ANNEXURE-II

SUB-VENDOR LIST

	Project:	PATRATU	3x800	MW	LIST OF ITEMS REQUIRING QUALITY PLAN			DOC. NO. :	CS-9585-001-2	
					AND SUB-SUPPLIER APPROVAL			REV. NO. :		
	Package:	EPC						DATE:	06.04.2017	
	Supplier:	BHEL								
	Contract No.:	CS-9585-001-2			SUB-SYS	STEAM GENERATOR/RAW MATERIALS				
S.No.	ITEM	QP/Insp. Cat.	QP No.	QP Sub-Schedule	QP approval schedule	Proposed sub-supplier	Place	Suppliers approval status/ category	supplier Details submission schedule	Remarks
1	SEAMLESS TUBES	$				TUBOS REUNIDOS	SPAIN	A		CS,T-11,T-12,22,T-23,T-91
		$				VALLOREC & MANNESMANN	GERMANY	A		T-92,T-91,T-23,T-22,T-11,T-12,CS
		$				VALLOREC TUBES	FRANCE	A		T-92,T-91,T-23,T-22,T-11,T-12,CS
		$				TENNARIS GLOBAL(NKK TUBES)	JAPAN	A		T-91,T-22,T-11,T-12,CS
		$				HENGYANG VALIN STEEL TUBE CO.	CHINA	A		CS & AS UPTO T-22(with TPI INSPECTION) SUB TO CONDITIONS
		$				TENNARIS GLOBAL(DALMIN ITALY)	ITALY	A		T-22,T-11,T-12,CS
		$				JINAGSU CHENGDE STEEL TUBE	CHINA	A		T-92,T-91,T-22,T-11,T-12,CS SUB TO TPIA INSPECTION CONDITIONS
		$				JEE(KAWASAKI)	JAPAN	A		T-92,T-91,T-22,T-11,T-12,CS
		$				TENNARIS GLOBAL(SILCO, ROMANIA)	ROMANIA	A		CS,T-11,T-22,T-23,T-91,T-12,
		$				CHANGZHOU CHANGBAO PRECISION	CHINA	A		CS
		$				PRODUCTUS TUBLARES	SPAIN	A		T-91,T-22,T-11,T-12,CS
		$				SUMITOMO METALS	JAPAN	A		T-92,T-91,T-23,T-22,T-11,T-12,CS
		$				BENTLER	GERMANY	A		T-92,T-91,T-22,T-11,T-12,CS,SS
		$				IBF	ITALY	A		T-91,T-22,T-11,T-12,CS
		$				WAYMAN GORDAN	USA	A		T-91,T-22,T-11,T-12,CS,
		$				BHEL SSTP	TRICHY	A		T-22,T-11,T-12,CS
		$				JINDAL SAW LTD.	NASHIK	A		CS,T-11,T-22 ,T-12,SUB TO CONDITIONS
		$				REMI	INDIA	A		CS,T-11,T-22 ,T-12,SUB TO CONDITIONS
		$				ISMT	AHMEDANAGAR/BARAMATI	A		CS,T-11,T-22 ,T-12,SUB TO CONDITIONS
		$				MSL	RAJGAD	A		CS SUB TO CONDITIONS
		$				BAOSHAN IRON & STEEL CO. LTD.	CHINA	A		CS,T-11,T-22,T-12,(WITH TP1) SUBJECT TO CONDITIONS

Bharat Heavy Electricals Limited * PS-MKTG Delhi *

Patratu Vidyut Utpadan Nigam Limited (Govt. of Jharkhand Undertaking) C & M Deptt.

06-04-2017
A. SAKTHI GANESH
Engineer - QA/BHEL-Trichy

Annexure-Q1

	Project:	PATRATU	3x800	MW	LIST OF ITEMS REQUIRING QUALITY PLAN			DOC. NO. :	CS-9585-001-2	
					AND SUB-SUPPLIER APPROVAL			REV. NO. :		
	Package:	EPC						DATE:	06.04.2017	
	Supplier:	BHEL								
	Contract No.:	CS-9585-001-2			SUB-SYS	STEAM GENERATOR/RAW MATERIALS				
S.No.	ITEM	QP/Insp. Cat.	QP No.	QP Sub-Schedule	QP approval schedule	Proposed sub-supplier	Place	Suppliers approval status/ category	supplier Details submission schedule	Remarks
		$				HMT	GUJARAT	A		HOT FINISHED CS GRADE (UPTO 76.2 MM OD & 12 MM THK)
		$				CHANGZHOU CHANGBAO PRECISION	CHINA	A		T-11,12
2	SEAMLESS TUBES(RIFLED)	$				SALZGITTER MANESS/AMANN PRECISION	FRANCE	A		CS
		$				CHANGHOU CHANGBAO PRECISION	CHINA	A		T-11,12
		$				BAOSHAN STEEL	CHINA	DR		
		$				TENNARIS GLOBAL(DALMINE)	ITALY	DR		
		$				SUMITOMO	JAPAN	DR		
		$				TUBOS REUNIDOS	SPAIN	DR		
3	SEAMLESS TUBES(SS)	$				KOBE	JAPAN	A		SS 304,SS347H
		$				POSCO SPL STEEL CO	KOREA	A		SS 304,347H,SUPER 304
		$				TUBACEX	SPAIN	A		
		$				SMST	ITALY	A		SS 304,347H, SUPER 304
	SEAMLESS TUBES(SS)UPTO DIA<76.1MM	$				SUMITOMO METAL IND LTD.	JAPAN	A		SS 304,347H, SUPER 304
	SEAMLESS TUBES(SS) UPTO OD 159.0MM & WT-12.5MM	$				HUADI STEEL GROUP	CHINA	A		SS 304, 304H,347H(WITH TPI) SUB TO CONDITIONS
	SEAMLESS TUBES(SS) UPTO OD 159.0MM & WT-12.5MM	$				ZHEJIANG JIULI HI TECH	CHINA	A		SS 304, 304H,347H(WITH TPI) SUB TO CONDITIONS
						PRODUCTUS TUBLARES	SPAIN	DR		
4	SEAMLESS PIPES	$				TUBACEX	SPAIN	A		SS PIPES
		$				SUMITOMO METALS	JAPAN	A		P-92,P-91,P-22,P-11,P-12,CS
		$				VALLOREC TUBES	FRANCE	A		P-92,P-91,P-22,P-11,P-12,CS

Bharat Heavy Electricals Limited * PS-MKTG Delhi *

Patratu Vidyut Utpadan Nigam Limited (Jharkhand) * C&M Deptt. *

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	Project:	PATRATU	3x800	MW	LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB-SUPPLIER APPROVAL			DOC. NO. :	CS-9585-001-2	
								REV. NO. :		
	Package:	EPC						DATE:	06.04.2017	
	Supplier:	BHEL								
	Contract No.:	CS-9585-001-2			SUB-SYS	STEAM GENERATOR/RAW MATERIALS				

S.No.	ITEM	QP/Insp. Cat.	QP No.	QP Sub-Schedule	QP approval schedule	Proposed sub-supplier	Place	Suppliers approval status/ category	supplier Details submission schedule	Remarks
		$				HENGYANG VALIN STEEL TUBE COL	CHINA	A		CS
		$				BHEL SSTP	TRICHY	A		CS
		$				TUBOS REUNIDOS	SPAIN	A		P-91,P-22,P-11,P-12,CS
		$				VALCONVY TRUB	CZECH REP	A		CS,P-11,P-12,P-22
		$				ACELOR MITTAL	ROMANIA	A		CS
		$				WAYMAN GORDAN	USA	A		P-91,P-22,P-11,P-12,CS
		$				TENNARIS GLOBAL(NKK TUBES)	JAPAN	A		P-91,P-22,P-11,P-12,CS
		$				IBF SPA	ITALY	A		P-92,P-91,P-22,P-11P-12,CS
		$				JFE(KAWASAKI)	JAPAN	A		P-92,P-91,P-22,P-11,P-12,CS
		$				PRODUCTUS TUBLARES	SPAIN	A		P-91,P-22,P-11P-12,CS
		$				VALLOREC & MANNESMANN	GERMANY	A		P-92,P-91,P-22,P-11,P-12,CS
		$				TENNARIS GLOBAL(DALMINE)	ITALY	A		P-91,P-22,P-11,P-12,CS
		$				JINDAL SAW LTD.	NASHIK	A		CS,P-11,P-22 ,P-12,SUB TO CONDITIONS
		$				ISMT	AHMEDANAGAR/BARAMATI	A		CS,P-11,P-22,P-12, SUB TO CONDITIONS
		$				YANGZHOU CHENGDE STEEL PIPE CO. LTD.	CHINA	A		P-92,P-91,P-22,P-11,P-12,CS SUB TO TPIA INSPECTION CONDITIONS
		$				MSL	RAJGAD	A		CS SUB TO CONDITIONS
		$				REMI	BHARUCH	A		CS,P-11,P-22 ,P-12,SUB TO CONDITIONS
		$				RATNAMANI	MUMBAI	DR		CS
		$				ZIZIANG GROSS	CHINA	DR		CS
		$				PRODUCTUS TUBLARES	SPAIN	DR		FOR P92 GRADE
	SEAMLESS PIPES(DIA UPTO 159MM)	$				TENNARIS GLOBAL SILCO TUBES)	ROMANIA	A		P-91,P-22,P-11,P-12,CS
	SEAMLESS PIPES(UPTO 160MM)	$				BENTLER	GERMANY	A		P-92,P-91,P-22,P-11,P-12,CS
	SEAMLESS PIPES(UPTO 219.0MM)	$				JIANGSU CHENGDE STEEL TUBE	CHINA	A		P-92,P-91,P-22,P-11,P-12,CS SUB TO TPIA INSPECTION CONDITIONS

Bharat Heavy Electricals Limited * PS-MKTG Delhi

Patratu Vidyut Utpadan Nigam Limited * (Jharkhand) * C & M Deptt.

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	Project:	PATRATU	3x800	MW	LIST OF ITEMS REQUIRING QUALITY PLAN			DOC. NO. :	CS-9585-001-2	
					AND SUB-SUPPLIER APPROVAL			REV. NO. :		
	Package:	EPC						DATE:	06.04.2017	
	Supplier:	BHEL								
	Contract No.:	CS-9585-001-2			SUB-SYS	STEAM GENERATOR/RAW MATERIALS				
S.No.	ITEM	QP/Insp. Cat.	QP No.	QP Sub-Schedule	QP approval schedule	Proposed sub-supplier	Place	Suppliers approval status/ category	supplier Details submissio n schedule	Remarks
	SEAMLESS PIPES(UPTO 88.9MM)	$				BAOSHAN IRON & STEEL CO. LTD.	CHINA	A		CS SUBJECT TO CONDITION
	SEAMLESS PIPES(UPTO OD 914 X WT 102 MM)	$				RINGMIL	ITALY	A		FORGED CS PIPE
5	PLATES & ROLLED SECTION(UPTO GRADE 91)	$				INDUS STEEL	BELGIUM	A		CS-SA515 AS UP T0 GR-91
		$				ILSENBURGER GROBBLECH(SALZGITTER MANESSMANN)	GERMANY	A		CS-SA 299, SA515, BS EN 10025, IS 2062 OTHER STRUCTURAL STEEL GRADES; AS UPTO GR.-91
		$				DILLINGER-GTSVENTES	GERMANY	A		CS-SA 299, SA515, BS EN 10025, A36, IS 2062 OTHER STRUCTURAL STEEL GRADES; AS UPTO GR.-91
		$				ARCONI D.O.O.	SLOVENIA	A		CS- SA515, BS EN 10025, A36, IS 2062 OTHER STRUCTURAL STEEL GRADES; AS UPTO GR.-91
6	PLATES & ROLLED SECTION(UPTO GRADE 22)	$				THYSEEN KRUPP	GERMANY	A		CS- SA515 BS EN 10025 A36 IS 2062 OTHER STRUCTURAL STEEL GRADES. AS UPTO GR.-22
		$				INDUSTEEL LOIRE	FRANCE	A		CS-SA 299, SA515; AS UPTO GR.-22
		$				ESSAR STEEL LTD.	HAZIRA	A		CS- SA515, BS EN 10025, A36, IS 2062, OTHER STRUCTURAL STEEL GRADES; AS GR.-12 &22
		$				VOESTALPINE GROBBLECH GMBH	AUSTRIA	A		CS- SA515 BS EN 10025 A36 IS 2062 OTHER STRUCTURAL STEEL GRADES; AS UPTO GR.-22.
		$				SAIL	BHILAI/SALEM	A		CS- SA515 BS EN 10025 A36 IS 2062 OTHER STRUCTURAL STEEL GRADES; AS UPTO GR.-22.
		$				NIPPON STEEL	JAPAN	A		CS- SA515 BS EN 10025 A36 IS 2062 OTHER STRUCTURAL STEEL GRADES; AS UPTO GR.-22.
		$				POSCO	KOREA	A		CS- SA515 BS EN 10025 A36 IS 2062 OTHER STRUCTURAL STEEL GRADES; AS UPTO GR.-22.

Bharat Heavy Electricals Limited ★ PS-MKTG Delhi ★

Patratu Vidyut Utpadan Nigam Limited ★ Distt-Ramgarh(Jharkhand) ★ C & M Deptt. A/C

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	Project:	PATRATU	3x800	MW	LIST OF ITEMS REQUIRING QUALITY PLAN			DOC. NO. :	CS-9585-001-2	
					AND SUB-SUPPLIER APPROVAL			REV. NO. :		
	Package:	EPC						DATE:	06.04.2017	
	Supplier:	BHEL								
	Contract No.:	CS-9585-001-2			SUB-SYS	STEAM GENERATOR/RAW MATERIALS				

S.No.	ITEM	QP/Insp. Cat.	QP No.	QP Sub-Schedule	QP approval schedule	Proposed sub-supplier	Place	Suppliers approval status/ category	supplier Details submissio n schedule	Remarks
		$				REINER BRACH GMBH & CO.	GERMANY	A		CS- SA 299 SA515 BS EN 10025 A35 IS 2062 OTHER STRUCTURAL STEEL GRADES; AS UPTO GR.-22.
		$				JFE	JAPAN	DR		
		$				CLABECQ	BELGIUM	DR		
		$				JSPL	INDIA	DR		
		$				DUFERCO	GERMANY	DR		
		$				GULDE	GERMANY	A		MEMBRANE FINS UPTO GR-22
		$				ARCELLOR MITTAL	ROMANIA	DR		
		$				METAL ONE	JAPAN	DR		MEMBRANE FINS UPTO GR-12
		$				LLYODS STEEL INDUS LTD(UTTAM VALUE STEEL)	INDIA	A		UPTO GR.-22; SUBJECT TO CONDITION
7	PLATES & ROLLED SECTION(CS)	$				ARCELLOR MITTAL GALATI	ROMANIA	A		CS PLATES UPTO 80 MM
		$				JSW STEEL LTD.	INDIA	A		STRUCTURAL STEEL
		$				RINL	INDIA	A		STRUCTURAL STEEL
		$				ESSAR STEEL LTD.	INDIA	A		STRUCTURAL STEEL
		$				TISCO	INDIA	A		STRUCTURAL STEEL
		$				LLYODS STEEL INDUS LTD(UTTAM VALUE STEEL)	INDIA	A		STRUCTURAL STEEL
		$				ISPAT INDUSTRIES LTD.	INDIA	A		STRUCTURAL STEEL
		$				JSPL	INDIA	A		STRUCTURAL STEEL
		$				SAIL	INDIA	A		STRUCTURAL STEEL
8	PLATES(SS)	$				OUTOKUMPU	SWEDEN	A		SS PLATES UPTO 20 MM THK
		$				INDUS STEEL	BELGIUM	A		GR-304,309,310,316

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Patratu Vidyut Utpadan Nigam Limited C & M Deptt. Distt-Ramgarh(J)

06-04-2017

	Project:	PATRATU	3x800	MW	LIST OF ITEMS REQUIRING QUALITY PLAN			DOC. NO. :	CS-9585-001-2	
					AND SUB-SUPPLIER APPROVAL			REV. NO. :		
	Package:	EPC						DATE:	06.04.2017	
	Supplier:	BHEL								
	Contract No.:	CS-9585-001-2			SUB-SYS	STEAM GENERATOR/RAW MATERIALS				

S.No.	ITEM	QP/Insp. Cat.	QP No.	QP Sub-Schedule	QP approval schedule	Proposed sub-supplier	Place	Suppliers approval status/ category	supplier Details submission schedule	Remarks
		$				JSL STAINLESS	JAIPUR	A		LINER SS 304
		$				INDUSTEEL LOIRE	FRANCE	A		GR-304,309,310,316
		$				SAIL	BHILAI/SALEM	A		GR-304,309,310,317
		$				COLUMBUS STAINLESS STEEL(ACRINOX)	SOUTH AFRICA	A		GR-304,309,310,318
		$				NIPPON STEEL CORP.	JAPAN	DR		
		$				THYSEEN KRUPP	GERMANY	DR		
		$				SUMITOMO	JAPAN	DR		
		$				ACRONI SLOVENIS	JAPAN	DR		
		$				DKC	KOREA	DR		
9	ALUMINIUM CLADDING	III				MAIN CONTRACTOR'S APPROVED SOURCES				

NOTE 1:	VENDORS UNDER A(ACCEPTED CATEGORY) ARE APPROVED AND ACCEPTED BY NTPC IN PAST WITH OR WITHOUT CONDITIONS. SIMILAR CONDITIONS AS THE CASE MAY BE SHALL BE APPLICABLE FOR THIS PROJECT ALSO.
NOTE 2:	VENDORS UNDER DR (DETAILS REQUIRED) CATEGORY SHALL BE REQUIRED TO SUBMIT THE DETAILS IN NTPC QUESTIONNAIRE.
NOTE 3:	PRE DESPATCH INSPECTION FOR ALLOY/SS GRADES NEEDS TO BE TIED UP BY MAIN CONTRACTOR OR THIRD PARTY INSPECTION AGENCY AS REQUIRED.
NOTE 4:	($) REVIEW OF MILL TC FOR RAW MATERIAL TO BE DONE BY NTPC AND SHALL BE INCLUDED IN THE QP OF CORRESPONDING EQUIPMENT.

06-4-2017

Bharat Heavy Electricals Limited PS-MKTG Delhi

Patratu Vidyut Utpadan Nigam Limited C & M Deptt. Dist-Ramgarh(Jharkhand)

	Project:	PATRATU 3x800 MW			LIST OF ITEMS REQUIRING QUALITY PLAN			DOC. NO.:	CS-9585-001-2	
					AND SUB-SUPPLIER APPROVAL			REV. NO.:	0	
	Package:	Steam Generator Island Package						DATE:	04.04.2017	
	Supplier:	BHEL			BHEL TRICHY					
	Contract No.:	CS-9585-001-2			SUB-SYST STEAM GENERATOR					
S.No.	ITEM	QP/Insp. Cat.	QP No.	QP Sub-Schedule	QP approval schedule	Proposed sub-supplier	Place	Suppliers approval status/ category	supplier Details submissio n	Remarks
1	SEPARATOR & STORAGE TANK	I				ALSTOM	USA	A		
		I				BHEL	TRICHY	A		
		I				ALSTOM	DURGAPUR	A		
		I				SHANGHAI BOILER WORKS	CHINA	DR		
		I				ALSTOM SURABHAYA	INDONESIA	DR		
		I				ALSTOM	WUHAN	DR		
2	HEADERS AND SUCTION MANIFOLDS	I				ALSTOM	USA	A		
		I				BHEL	TRICHY	A		
		I				ALSTOM	DURGAPUR	A		
		I				SHANGHAI BOILER WORKS	CHINA	DR		
		I				ALSTOM SURABHAYA	INDONESIA	DR		
3	TUBULAR PRODUCTS-ONLY SPIRAL WALLS	I				BHEL	TRICHY	A		
		I				ALSTOM	DURGAPUR	A		
		I				ALSTOM	USA	A		
		I				SHANGHAI BOILER WORKS	CHINA	DR		
		I				ALSTOM WUHAN	CHINA	DR		
		I				ALSTOM SURABHAYA	INDONESIA	DR		
4	TUBULAR PRODUCTS (COILS & PANELS) EXCLUDING SPIRAL WALL	I				ALSTOM	DURGAPUR	A		
		I				BHEL	TRICHY	A		
		I				ALSTOM	USA	A		

Bharat Heavy Electricals Limited PS-MKTG Delhi

Patratu Vidyut Utpadan Nigam Limited C & M Deptt. Distt-Ramgarh (Jharkhand)

(NITIN KUMAR) PS-M BHEL

	Project:	PATRATU	3x800	MW	LIST OF ITEMS REQUIRING QUALITY PLAN			DOC. NO. :	CS-9585-001-2	
					AND SUB-SUPPLIER APPROVAL			REV. NO. :	0	
	Package:	Steam Generator Island Package						DATE:	04.04.2017	
	Supplier:	BHEL				BHEL TRICHY				
	Contract No.:	CS-9585-001-2			SUB-SYST	STEAM GENERATOR				
S.No.	ITEM	QP/Insp. Cat.	QP No.	QP Sub-Schedule	QP approval schedule	Proposed sub-supplier	Place	Suppliers approval status/ category	supplier Details submissio n	Remarks
5	CRITICAL PIPING / PCP (MS, CRH,HRH & FW) AND BOILER PIPING	I				BHEL	TRICHY	A		
		I				ALSTOM	DURGAPUR	A		
6	MISC HP PIPING EXCLUDING CRITICAL PIPING (CS, AS UPTO 91 GRADE)	I				BHEL	TRICHY	A		
		I				ALSTOM	DURGAPUR	A		
7	NON IBR PIPING / LP PIPING (Pr upto 10 Ksc)	III				MAIN CONTRACTOR'S APPROVED SOURCES				
8	FORMED FITTINGS(Gr91)	I				BHEL	TRICHY	A		
9	SPHERES	I				ALSTOM	DURGAPUR	A		
		I				BHEL	TRICHY	A		
		I				ALSTOM	USA	A		
10	GRAVIMETRIC COAL FEEDERS	I				REFER SUB OR LIST				
11	RAW COAL GATE ASSEMBLY FOR GRAVEMETRIC FEEDER	I				BHEL	TRICHY	A		
12	COAL BURNER ASSY & SOFA	I				ALSTOM	USA	A		
		I				BHEL	TRICHY	A		
13	AIR COOLED OIL GUN ASSEMBLY	I				BHEL	TRICHY	A		
14	OIL PREHEATER & PRESSURISING SKID ASSY.	III				MAIN CONTRACTOR'S APPROVED SOURCES				
15	HFO/LFO PUMPS	I				ALWEILER	GERMANY	A		
		I				BOURMANN	GERMANY	A		

Bharat Heavy Electricals Limited PS-MKTG Delhi

Patratu Vidyut Utpadan Nigam Limited C & M Deptt. Distt. Ramgarh (Jharkhand)

	Project:	PATRATU	3x800	MW	LIST OF ITEMS REQUIRING QUALITY PLAN			DOC. NO.:	CS-9585-001-2	
					AND SUB-SUPPLIER APPROVAL			REV. NO. :	0	
	Package:	Steam Generator Island Package						DATE:	04.04.2017	
	Supplier:	BHEL			BHEL TRICHY					
	Contract No.:	CS-9585-001-2			SUB-SYST STEAM GENERATOR					

S.No.	ITEM	QP/Insp. Cat.	QP No.	QP Sub-Schedule	QP approval schedule	Proposed sub-supplier	Place	Suppliers approval status/ category	supplier Details submission	Remarks
		I				TUSHACO PUMPS	DAMAN	A		SCREW TO BE IMPORTED FROM ALLWEILLER GERMANY
		I				LEISTRITZ	GERMANY	A		
		I				BOURMANN	GERMANY	A		
		I				KRAL	AUSTRIA	A		
		I				ALEKTON	CHENNAI	A		
		I				UT PUMPS	FARIDABAD	A		SUBJECT TO CONDITIONS .
16	SOOT BLOWERS(LRSB,WALL DESLAGGER, ROTARY BLOWER,TEMP. PROBE)	I				BHEL	TRICHY	A		
17	ELECTRIC HOIST WITH TROLLEY, UNDERSLUNG CRANE	I								Main BOIs eg. Hook, motors and C&I item from NTPC approved sources
		I				CONSOLIDATED HOISTS	SATARA	A		EOT CRANES UPTO 40 TONS & HOISTS UPTO 40 TONS.
		I				POWER BUILD P LTD	VV NAGAR	A		HOIST UPTO 10 TONS
		I				CONSOLIDATED HOISTS	PUNE	A		HOIST UPTO 20 TONS
		I				TRACTOR TRIFOR	FARIDABAD	A		HOIST UPTO 15 TONS
		I				HERCULES HOIST LTD.	MUMBAI	A		HOIST UPTO 30 TONS
		I				GRIP ENGINEERS	HYDERABAD	A		HOIST UPTO 40 TONS
		I				ANUPAM INDUSTRIES	VITHAL UDYOGNAGAR	A		EOT CRANES UPTO 50 TONS
		I				DYNAMECH CRANES	THANE,MUMBAI	A		UPTO 20 TONS
		I				ARMSEL MHE PVT. LTD.	BANGALORE	A		UPTO 20 TONS
		I				HERCULES HOIST LTD.	MUMBAI	A		HOIST UPTO 20 TONS
		I				UNIVERSAL HOIST	THANE,	A		HOIST UPTO 20 TONS
		I				LIFTING EQUIPMENTS	DELHI	DR		
		I				TECHNO INDUSTRIES	AHMEDABAD	DR		

Bharat Heavy Electricals Limited PS-MKTG Delhi

Patratu Vidyut Utpadan Nigam Limited * Patratu * Distt-Ramgarh(Jharkhand) * C & M Deptt.

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	Project:	PATRATU	3x800	MW	LIST OF ITEMS REQUIRING QUALITY PLAN			DOC. NO.:	CS-9585-001-2	
					AND SUB-SUPPLIER APPROVAL			REV. NO.:	0	
	Package:	Steam Generator Island Package						DATE:	04.04.2017	
	Supplier:	BHEL			BHEL TRICHY					
	Contract No.:	CS-9585-001-2			SUB-SYST	STEAM GENERATOR				
S.No.	ITEM	QP/Insp. Cat.	QP No.	QP Sub-Schedule	QP approval schedule	Proposed sub-supplier	Place	Suppliers approval status/ category	supplier Details submission	Remarks
18	ELECTRIC HOIST WITH TROLLEY, UNDERSLUNG CRANE - CAPACITY UPTO 5 TONS	III				MAIN CONTRACTOR'S APPROVED SOURCES				
19	RECIRCULATION PUMP	I				REFER SUB QR ITEMS LIST				
20	LP CONDENSATE TRANSFER PUMP	I				ITT GOULD	USA	A		
		I				FLOW SERVE	USA	A		
		I				SULZER	NAVI MUMBAI	A		
21	AUXILIARY BOILER	I				REFER SUB QR ITEMS LIST				
22	SCANNER AIR FAN	I				ANDREW YLE	KOLKATA	A		
		I				ACCEL	AHMEDABAD	A		
		I				PATEL AIRTEMP(I) LTD.	AHMEDABAD	A		
		I				TLT INDIA	GUJARAT	A		
		I				BHEL,BAP	RANIPET	A		
		I				CB DOCTOR(IMM)	AHMEDABAD	A		
		I				AIROCHEN ENGG. CO.	KOLHAPUR	DR		
		I				AR CONTROL & CHEM ENGG. CO. LTD.	MUMBAI	DR		

Bharat Heavy Electricals Limited * PS-MKTG Delhi

Patratu Vidyut Utpadan Nigam Limited * (Distt.-Ramgarh(Jharkhand)) C & M Deptt.

	Project:	PATRATU	3x800	MW	LIST OF ITEMS REQUIRING QUALITY PLAN			DOC. NO.:	CS-9585-001-2	
					AND SUB-SUPPLIER APPROVAL			REV. NO. :	0	
	Package:	Steam Generator Island Package						DATE:	04.04.2017	
	Supplier:	BHEL			BHEL TRICHY					
	Contract No.:	CS-9585-001-2			SUB-SYST STEAM GENERATOR					

S.No.	ITEM	QP/Insp. Cat.	QP No.	QP Sub-Schedule	QP approval schedule	Proposed sub-supplier	Place	Suppliers approval status/ category	supplier Details submission	Remarks
23	SEAL AIR FAN	I				CB DOCTOR & CO.	AHMEDABAD	A		
		I				ACCEL	AHMEDABAD	A		
		I				TLT INDIA	AHMEDABAD	A		
		I				PATEL AIRTEMP(I) LTD.	AHMEDABAD	A		
		I				BHEL,BAP	RANIPET	A		
		I				ANDREW YLE	KOLKATA	A		
24	FURNACE MAINT. PLATFORM(SKY CLIMBER)	I				NV SKYMAN INT. SA	BELGIUM	A		
		I				NV SKCLIMBER EUROPE SA	BELGIUM	A		
		I				POWER CLIMBER	BELGIUM	DR		
		I				DAEO PRECISION	KOREA	A		
		I				HINGWING GONDOLA	HONGKONG	DR		
25	QUICK ERECT FURNACE SCAPPHOLDING	II								VENDORS TO BE PROPOSED LATER DURING PROJECT EXECUTION
26	METALLIC EXPANSION JOINT	I				BHEL	TRICHY	A		

Bharat Heavy Electricals Limited PS-MKTG Delhi

Patratu Vidyut Utpadan Nigam Limited * Distt.: Hazaribagh (Jharkhand) * C & M Deptt.

	Project:	PATRATU	3x800	MW	LIST OF ITEMS REQUIRING QUALITY PLAN			DOC. NO.:	CS-9585-001-2	
					AND SUB-SUPPLIER APPROVAL			REV. NO. :	0	
	Package:	Steam Generator Island Package						DATE:	04.04.2017	
	Supplier:	BHEL			BHEL TRICHY					
	Contract No.:	CS-9585-001-2			SUB-SYST STEAM GENERATOR					
S.No.	ITEM	QP/Insp. Cat.	QP No.	QP Sub-Schedule	QP approval schedule	Proposed sub-supplier	Place	Suppliers approval status/ category	supplier Details submissio n	Remarks
27	DUCT ASSY,FLOWMETER WEIGHTING UPTO 10 TONS	III				MAIN CONTRACTOR'S APPROVED SOURCES				
28	DUCT ASSY TRANSISTION PIECE, DUCT ASSY,FLOWMETERS WEIGHTING> 10 TONS	III				MAIN CONTRACTOR'S APPROVED SOURCES				Trial Assembly Audit Check by NTPC.
29	LIGHT BONDED MINERAL WOOL	I				MINWOOL ROCK FIBRES LTD.	RAJNANDAON, BHILAI	A		
		I				LAPINUS ROCKWOOL LTD.	GWALIOR	A		
		I				LLOYDS INSULATION, CHENNAI	BHILAI	A		
		I				PUNJSTAR INSULATION	BHILAI	A		
		I				GOENKA ROCK WOOL	RAIPUR	A		
		I				THERMOCARE ROCKWOOL PVT. LTD. ES. LTD.	RAJNANDAON	A		
		I				SHREERAM EQUITECH	DURG	A		
		I				MINWOOL ROCK FIBRES LTD.	RAJNANDAON, BHILAI	A		
		I				ROCKWOOL INDIA LTD.	MEDAK-AP	A		
		I				DHANBAD ROCKWOOL INSULATION PVT. LTD.	DHANBAD	A		
		I				MINSULATE MFG. CO.	JAMSHEDPUR	A		
		I				POLYBOND PROJECTS PVT. LTD.	DURG	A		
						HI-TECH ROCK FIBRE LTD.	RAJNANDGOAN	A		
						JAMSHEDPUR MINERAL WOOL	JAMSHEDPUR	A		
						ROCKWOOL INDUSTRIES	BHILAI	A		
30	CASTABLE REFRACTORY	III				MAIN CONTRACTOR'S APPROVED SOURCES				
31	POURABLE INSULATION	III				MAIN CONTRACTOR'S APPROVED SOURCES				
32	CLH & VLH	I				BHEL	TRICHY			other vendorS as per BHEL PIPING CENTER LIST

Bharat Heavy Electricals Limited PS-MKTG Delhi

Patratu Vidyut Utpadan Nigam Limited Distt. Ramgarh (Jharkhand) C & M Deptt.

	Project:	PATRATU	3x800	MW	LIST OF ITEMS REQUIRING QUALITY PLAN			DOC. NO.:	CS-9585-001-2	
					AND SUB-SUPPLIER APPROVAL			REV. NO. :	0	
	Package:	Steam Generator Island Package						DATE:	04.04.2017	
	Supplier:	BHEL			BHEL TRICHY					
	Contract No.:	CS-9585-001-2			SUB-SYST	STEAM GENERATOR				
S.No.	ITEM	QP/Insp. Cat.	QP No.	QP Sub-Schedule	QP approval schedule	Proposed sub-supplier	Place	Suppliers approval status/ category	supplier Details submission	Remarks
		I				BHEL HERP	VARANASI			
33	HANGER & SUPPORTS-(OTHER THAN CLH & VLH)	III				MAIN CONTRACTOR'S APPROVED SOURCES				
34	CONVENTIONAL VALVES(GATE,GLOBE & CHECK)									91/92 GRADE CASTINGS FOR CONVENTIONAL VALVES SHALL BE FROM MAIN CONTRACTOR'S APPROVED SOURCES WHICH ARE HAVING ELECTRIC ARC FURNACE, VOD AND LRF FACILITIES
		I				BHEL	TRICHY	A		CONVENTIONAL VALVES(GATE,GLOBE & CHECK) BHEL RANGE, 2/3 WAY VALVES
		I				VELAN	H4T1X8 MONTREAL CANADA	A		GATE/CHECK V/V UPTO 22"CI 2500
		I				LEADER VALVES	JALANDHAR	A		CCS GLOBE V/X 24" CI 600, GLOBE V/V 24"CI 300,CHECK V/V 24"CI 600
		I				CRESCENT VALVES	MUMBAI	A		UPTO NB 300 CL 600
		I				VELAN VALVE CORP	USA	A		GATE V/V 2-24"CI 900-4500,CAST STEEL GATE V/V 18-48"CI150-600
		I				VELAN	UK	A		1) GLOBE V/V 1/4"-2"CI4500 ,2) BONNETLESS GLOBE V/V 1/2-2.5"CI 150-600)
		I				VELAN	QUBEC CANADA	A		GATE/GLOBE/CHECK V/V UPTO 3"CI 2680
		I				L&T VALVES	COIMBATORE	A		1) CAST 2500 CI GATE(CS &AS) UPTO 20" & CHECK(CS&AS) UPTO 16"; 2) FORGED 4500 CI(CS&AS) GATE UPTO 1" & GLOBE/CHECK UPTO 2".

Bharat Heavy Electricals Limited PS-MKTG Delhi

Patratu Vidyut Utpadan Nigam Limited C & M Deptt. Distt-Ramgarh(Jharkhand)

	Project:	PATRATU	3x800	MW	LIST OF ITEMS REQUIRING QUALITY PLAN			DOC. NO.:	CS-9585-001-2	
					AND SUB-SUPPLIER APPROVAL			REV. NO. :	0	
	Package:	Steam Generator Island Package						DATE:	04.04.2017	
	Supplier:	BHEL				BHEL TRICHY				
	Contract No.:	CS-9585-001-2			SUB-SYST	STEAM GENERATOR				
S.No.	ITEM	QP/Insp. Cat.	QP No.	QP Sub-Schedule	QP approval schedule	Proposed sub-supplier	Place	Suppliers approval status/ category	supplier Details submission	Remarks
		I				BDK	HUBLI	A		UPTO NB 300 & CL 600,FORGED UPTO NB 50 CL. 800
		I				FOURESS ENG. INDIA LTD.	MUMBAI	A		UPTO NB 200 CL 600,NB 250-600 CL 300
		I				NITTON VALVES	AURANGABAD	A		WCB/WCC(GATE VALVE UPTO 36" Cl 600)
		I				SAMSHIN	SOUTH KOREA	A		2500 CL GATE/GLOBE/CHECK UPTO 24"; CL 3500 GATE UPTO 18" & GLOBE UPTO 6"; 4500 CL GATE UPTO 6" & GLOBE/CHECK/ANGLE UPTO 2"
		I				VELAN	H4T1G2 MONTREAL CANADA	A		GATE/GLOBE/CHECK UPTO 24"Cl 4500
		I				VELAN	PORTUGAL	A		CAST STEEL GATE/GLOBE/CHECK 2-12"Cl 150-600
		I				ROCKWELL	USA	A		APPROVAL RANGE AS PER NTPC APPROVAL LETTER
		I				CRIS	FRANCE	A		APPROVAL RANGE AS PER NTPC APPROVAL LETTER
		I				OKANO VALVES	JAPAN	A		APPROVAL RANGE AS PER NTPC APPROVAL LETTER
		I				RAIMONDI	ITALY	A		APPROVAL RANGE AS PER NTPC APPROVAL LETTER
		I				HP VALVES	NEITHERLANDS	A		TRIM VALVES;APPROVAL RANGE AS PER NTPC APPROVAL LETTER
		I				FLOW SERVE	USA	A		APPROVAL RANGE AS PER NTPC APPROVAL LETTER
		I				DRESSER MASONEILAN	USA	A		APPROVAL RANGE AS PER NTPC APPROVAL LETTER

Bharat Heavy Electricals Limited ★ PS-MKTG Delhi

Patratu Vidyut Utpadan Nigam Limited ★ Distt-Ramgarh (Jharkhand) ★ C & M Deptt.

	Project:	PATRATU	3x800	MW	LIST OF ITEMS REQUIRING QUALITY PLAN			DOC. NO.:	CS-9585-001-2	
					AND SUB-SUPPLIER APPROVAL			REV. NO. :	0	
	Package:	Steam Generator Island Package						DATE:	04.04.2017	
	Supplier:	BHEL				BHEL TRICHY				
	Contract No.:	CS-9585-001-2			SUB-SYST	STEAM GENERATOR				

S.No.	ITEM	QP/Insp. Cat.	QP No.	QP Sub-Schedule	QP approval schedule	Proposed sub-supplier	Place	Suppliers approval status/ category	supplier Details submission	Remarks
		I				OKANO VALVES	JAPAN	A		APPROVAL RANGE AS PER NTPC APPROVAL LETTER
		I				TOA	JAPAN	A		APPROVAL RANGE AS PER NTPC APPROVAL LETTER
		I				CRIS	FRANCE	A		APPROVAL RANGE AS PER NTPC APPROVAL LETTER
		I				TYCO SEMPELL	GERMANY	A		APPROVAL RANGE AS PER NTPC APPROVAL LETTER
		I				MIL CONTROLS	KERALA	A		APPROVAL RANGE AS PER NTPC APPROVAL LETTER
		I				FOURESS ENG. INDIA LTD.	INDIA	A		APPROVAL RANGE AS PER NTPC APPROVAL LETTER
		I				DEUTSCHE BABCOCK	GERMANY	A		APPROVAL RANGE AS PER NTPC APPROVAL LETTER
		I				KSB	COIMBATORE	A		APPROVAL RANGE AS PER NTPC APPROVAL LETTER
		I				SPX PROCESS EQUIPMENTS/COPES VULCAN	USA	A		APPROVAL RANGE AS PER NTPC APPROVAL LETTER
		I				TOA/MEIWA	JAPAN	A		APPROVAL RANGE AS PER NTPC APPROVAL LETTER
		I				RAIMONDI	ITALY	A		APPROVAL RANGE AS PER NTPC APPROVAL LETTER
		I				BABCOCK BORSING	ESPANA	A		APPROVAL RANGE AS PER NTPC APPROVAL LETTER
		I				DEWARNCE	UK	A		APPROVAL RANGE AS PER NTPC APPROVAL LETTER
35	SAFETY VALVE(SPRING TYPE)	I				DRESSER	USA	A		
		I				SEMPELL AG	GERMANY	A		
		I				TYCO(PENTAIR VALVES & CONTROLS)	USA	A		
		I				FUKUI	JAPAN	A		
		I				RIENEKE GMBH	GERMANY	A		HYD TYPE

Bharat Heavy Electricals Limited PS-MKTG Delhi

Patratu Vidyut Utpadan Nigam Limited Distt-Ramgarh (Jharkhand) C & M Deptt.

	Project:	PATRATU	3x800	MW	LIST OF ITEMS REQUIRING QUALITY PLAN			DOC. NO. :	CS-9585-001-2	
					AND SUB-SUPPLIER APPROVAL			REV. NO. :	0	
	Package:	Steam Generator Island Package						DATE:	04.04.2017	
	Supplier:	BHEL				BHEL TRICHY				
	Contract No.:	CS-9585-001-2			SUB-SYST	STEAM GENERATOR				
S.No.	ITEM	QP/Insp. Cat.	QP No.	QP Sub-Schedule	QP approval schedule	Proposed sub-supplier	Place	Suppliers approval status/ category	supplier Details submissio n	Remarks
		I				BOPP & REUTHER	GERMANY	A		HYD TYPE
		I				VALVE TECHNOLOGIES	USA	A		APPROVAL RANGE AS PER NTPC APPROVAL LETTER
		I				MEIWA	JAPAN	A		APPROVAL RANGE AS PER NTPC APPROVAL LETTER
		I				BHEL	TRICHY	A		
36	ERV	I				VALVE TECHNOLOGIES	USA	A		
		I				FUKUI	JAPAN	A		
		I				SEMPELL AG	GERMANY	A		
		I				DRESSER	USA	A		
		I				MEI WA CORP.	JAPAN	A		APPROVAL RANGE AS PER NTPC APPROVAL LETTER
		I				RIENEKE GMBH	GERMANY	A		APPROVAL RANGE AS PER NTPC APPROVAL LETTER
37	PLUG VALVE	I				FLOW SERVE INDIA CONTROLS	KANCHIPURAM	A		UPTO 150 NB CI 300,UPTO 400 NB CI 150
						HAWA VALVES	MUBAI	A		UPTO 8" SIZE AND CLASS 300
		I				3Z CORP.	KOREA	A		UPTO 10" SIZE AND CLASS 300
		I				BDK	HUBLI	A		APPROVAL RANGE AS PER NTPC APPROVAL LETTER
		I				ZED VALVES CO. PVT. LTD.	AHMEDABAD	DR		
38	SAFETY VALVE SILENCERS	III				MAIN CONTRACTOR'S APPROVED SOURCES				

Bharat Heavy Electricals Limited PS-MKTG Delhi

Patratu Vidyut Utpadan Nigam Limited C & M Deptt. Distt-Ramgarh(Jharkhand)

	Project:	PATRATU 3x800 MW			LIST OF ITEMS REQUIRING QUALITY PLAN			DOC. NO. :	CS-9585-001-2	
					AND SUB-SUPPLIER APPROVAL			REV. NO. :	0	
	Package:	Steam Generator Island Package						DATE:	04.04.2017	
	Supplier:	BHEL				BHEL TRICHY				
	Contract No.:	CS-9585-001-2			SUB-SYST	STEAM GENERATOR				
S.No.	ITEM	QP/Insp. Cat.	QP No.	QP Sub-Schedule	QP approval schedule	Proposed sub-supplier	Place	Suppliers approval status/ category	supplier Details submissio n	Remarks
39	PRIMARY STRUCTURE - CEILING GIRDERS, MAIN COLUMNS, AUX COLUMNS, BUILT UP BEAMS, BOXES, BUCKSTAY, BRACINGS, MILL BAY STR, APH SUPPORT STR, TRANSFER TOWER	I				NTPC APPROVED VENDORS				PROJECT SPECIFIC APPROVAL OF EACH VENDOR TO BE TAKEN BY BHEL FROM NTPC; VENDOR TO MEET TECH. SPEC. REQUIREMENTS FOR STR. FABRICATION
40	BUCK STAY, BRACINGS MFD FROM ROLLED SECTIONS	III				MAIN CONTRACTOR'S APPROVED SOURCES				VENDOR TO MEET TECH. SPEC. REQUIREMENTS FOR STR. FABRICATION
41	SECONDARY STRUCTURE-PLATFORMS , GALLERIES , WALKWAY, STAIRCASE, LADDER, DUCT SUPPORT STRUCTURE, ANCHOR BOLTS ETC	III				MAIN CONTRACTOR'S APPROVED SOURCES				VENDOR TO MEET TECH. SPEC. REQUIREMENTS FOR STR. FABRICATION
42	ELECTROFORGED GRATINGS	II				INDIANA GRATINGS P. LTD.	PUNE	A		
		II				KARDE ANAND UDYOG	PUNE	A		
		II				PREMIER POWER PROJ.	HOWRAH	A		
		II				BHOLA RAM STEEL	PATNA	A		
		II				PINAX STEEL	PATNA	A		
		II				GREATWELD	PUNE	A		
		II				VIN FAB ENGG. PVT. LTD.	MUMBAI	A		
43	STRAINERS	III				MAIN CONTRACTOR'S APPROVED SOURCES				

Bharat Heavy Electricals Limited * PS-MKTG Delhi

Patratu Vidyut Utpadan Nigam Limited * C & M Deptt. 11/14 * Distt-Ramgarh(Jharkhand)

	Project:	PATRATU	3x800	MW	LIST OF ITEMS REQUIRING QUALITY PLAN			DOC. NO. :	CS-9585-001-2	
					AND SUB-SUPPLIER APPROVAL			REV. NO. :	0	
	Package:	Steam Generator Island Package						DATE:	04.04.2017	
	Supplier:	BHEL				BHEL TRICHY				
	Contract No.:	CS-9585-001-2			SUB-SYST	STEAM GENERATOR				

S.No.	ITEM	QP/Insp. Cat.	QP No.	QP Sub-Schedule	QP approval schedule	Proposed sub-supplier	Place	Suppliers approval status/ category	supplier Details submissio n	Remarks
44	CERAMIC LINED COAL PIPES & BENDS	I				BHEL EDN	BANGALORE	A		
						BHEL	JAGDISHPUR	A		
45	COAL PIPES & BENDS(W/O CERAMIC LINES)	III				MAIN CONTRACTOR'S APPROVED SOURCES				
46	COAL BUNKER	I				NTPC APPROVED VENDORS				VENDORS TO BE PROPOSED LATER DURING PROJECT EXECUTION
47	SOOT BLOWER PRESSURE REDUCING VALVES & BLOCK					REFER C&I VENDOR LIST				
48	91/92 GRADE FITTINGS (NOTE 6)	I								
		I				PETROL RACCORD SPA	ITALY	A		P-91, P-92 FORMED/FORGED
		I				BOKOYOUNG METAL CO.	LOREA	A		P-91,FORGED
		I				TF TECH CO. LTD.	KOREA	A		P-91 FORGED
		I				FLASH FORGE	VIZAG	A		91 WITH SIZE/TYPE CONDITIONS AS PER NTPC APPROVAL LETTER
		I				BGH EDELSTAHL SIEGEN GMBH	GERMANY	A		P-91 FORGED
		I				ERNE FITTINGS GMBH	AUSTRIA	A		P-91 FORMED
		I				GAM RACCORD SPA	ITALY	A		P-91 FORMED

Bharat Heavy Electricals Limited PS-MKTG Delhi

Patratu Vidyut Utpadan Nigam Limited C & M Deptt. Distt-Ramgarh (Jharkhand)

12/14

	Project:	PATRATU 3x800 MW			LIST OF ITEMS REQUIRING QUALITY PLAN			DOC. NO. :	CS-9585-001-2	
					AND SUB-SUPPLIER APPROVAL			REV. NO. :	0	
	Package:	Steam Generator Island Package						DATE:	04.04.2017	
	Supplier:	BHEL			BHEL TRICHY					
	Contract No.:	CS-9585-001-2			SUB-SYST STEAM GENERATOR					

S.No.	ITEM	QP/Insp. Cat.	QP No.	QP Sub-Schedule	QP approval schedule	Proposed sub-supplier	Place	Suppliers approval status/ category	supplier Details submissio n	Remarks
		I				TECHNO FORGE SPA	ITALY	A		P-91, P-92 FORMED
		I				MEGA SPA	ITALY	A		P-91 FORGED/WELDED
		I				BASSI LLUIGI SPA	ITALY	A		P-91 FORGED/WELDED
		I				IBF SPA	ITALY	A		P-91, P-92 FORMED/FORGED
		I				ALLIED INT. (TACTUBI RACCORDI SPA, VIA ROMA 150, 29027 PODENZANO)	ITALY	A		P-91, P-92 FORMED
		I				BRUCK STRASSE 16 ENSHEIM	GERMANY	A		P-91 FORGED/WELDED
		I				SUNGKWANG BEND CO. LTD.	KOREA	A		P-91/F-91 FORMED/FORGED/WELDED
		I				TK CORP, FORGITAL	KOREA	A		P-91 FORMED
						TIANJIN JINDING PIPING CO. LTD.	CHINA	A		91 FORMED (ELBOW, TEE, REDUCER)
						RINGMILL SPA	ITALY	A		FOR SEAMLESS AS (UPTO 91 GRADE) FORGED PIPE
		I				FORGITAL	ITALY	DR		
		I				DEE DEVELOPMENT	PALWAL	A		91 WITH SIZE/TYPE CONDITIONS AS PER NTPC APPROVAL LETTER
						CHW FORGE LTD.	GHAZAIBAD	A		91 WITH SIZE/TYPE CONDITIONS AS PER NTPC APPROVAL LETTER
						FORGE MONCHIERI SPA	ITALY	A		91 FORGING- WITH SIZE/TYPE CONDITIONS AS PER NTPC APPROVAL LETTER
						VIAR SPA	ITALY	DR		91 FORGINGS
						TIANJINDING PIPING CO. LTD.	CHINA	DR		
		I				AFFLERBACH	GERMANY	DR		
49	FITTINGS(CS,SS & AS UPTO GR 22)	II				MAIN CONTRACTOR'S APPROVED SOURCES				
50	KNIFE EDGE GATE VALVES(Mill Outlet and Burner Inlet)	I				GALAXY CONTROLS PVT. LTD.	CHENNAI	A		Upto size 26'

Bharat Heavy Electricals Limited PS-MKTG Delhi

Patratu Vidyut Utpadan Nigam Limited C & M Deptt. Distt-Ramgarh(Jharkhand)

13/14

	Project:	PATRATU 3x800 MW			LIST OF ITEMS REQUIRING QUALITY PLAN			DOC. NO. :	CS-9585-001-2	
					AND SUB-SUPPLIER APPROVAL			REV. NO. :	0	
	Package:	Steam Generator Island Package						DATE:	04.04.2017	
	Supplier:	BHEL				BHEL TRICHY				
	Contract No.:	CS-9585-001-2			SUB-SYST	STEAM GENERATOR				
S.No.	ITEM	QP/Insp. Cat.	QP No.	QP Sub-Schedule	QP approval schedule	Proposed sub-supplier	Place	Suppliers approval status/ category	supplier Details submissio n	Remarks
		I				ORBINOX INDIA PVT.LTD.	COIMBATORE	A		Upto size 30"
		I				BRAY CONTOLS (VAAS INDUSTRIES PVT.LTD.)	CHENNAI	A		Upto size 28"
		I				JASH ENGG. LTD.	INDORE	A		UP TO SIZE 30
		I				GENERAL ENGG.CONSORTIUM	BANGALORE	DR		
51	SCR SYSTEM	I								REFER SUB QR LIST; VENDORS FOR SCR SUB ITEMS TO BE TIED UP AFTER SUB QR CLEARANCE ; L2 VENDORS SHALL BE DISCUSSED AND TIED UP AFTER FINALISATION OF L1 VENDOR

NOTE 1:	VENDORS UNDER A(ACCEPTED CATEGORY) ARE APPROVED WITH OR WITHOUT CONDITIONS IN PAST. SIMILAR CONDITIONS AS THE CASE MAY BE FOR THE VENDORS SHALL BE APPLICABLE FOR THIS PROJECT AND TIED UP IN THE QUALITY PLAN.
NOTE 2:	VENDORS UNDER DR (DETAILS REQUIRED) CATEGORY SHALL BE REQUIRED TO SUBMIT THE DETAILS IN NTPC QUESTIONNAIRE.
NOTE 3:	FOR EQUIPMENTS LIKE AUXILIARY BOILERS/HOISTS/GATES DAMPERS/LUB OIL SYSTEM,DOSING SSKID, G.FEEDERS THE MAJOR BOI SHALL BE AS PER NTPC APPD. LIST.
NOTE 4:	ALL MOTORS REQUIRED FOR PUMP-MOTOR/FAN-MOTOR ASSY,APH,GRAVIMETERIC FEEDER,PULVERISER SHALL BE FROM NTPC APPD. VENDOR LIST.
NOTE 5:	FOR MOTORISED/PNEUMATIC ACTUATED VALVES THE SUBSUPPLIERS FOR ACTUATORS SHALL BE AS PER NTPC APPD. LIST. REFER NTPC C&I LIST.
NOTE 6:	RAW MATERIAL FOR 91 AND ABOVE GRADE MATERIAL FITTINGS TO BE FROM NTPC APPROVED SOURCES AS PER RAW MATERIAL VENDOR LIST.

Bharat Heavy Electricals Limited ★ PS-MKTG Delhi

Patratu Vidyut Utpadan Nigam Limited ★ C & M Deptt. ★ Distt-Ramgarh(Jharkhand)

	Project:	PATRATU	3x800	MW	LIST OF ITEMS REQUIRING QUALITY PLAN			DOC. NO.:	CS-9585-001-2	
					AND SUB-SUPPLIER APPROVAL			REV. NO.:	0	
	Package:	EPC (SG SCOPE)						DATE:	05.04.2017	
	Supplier:	BHEL				BHEL, HYDERABAD				
	Contract No.:	CS-9585-001-2			SUB-SYST	MILLS				
S.No.	ITEM	QP/Insp. Cat.	QP No.	QP Sub-Schedule	QP approval schedule	Proposed sub-supplier	Place	Suppliers approval status/ category	Sub-supplier Details submission schedule	Remarks
1	MILL	I				REFER SUB QR LIST				FORMAL ACCEPTANCE AFTER SUB QR CLERANCE
2	PLANETARY GEAR BOX	I				BHEL	HYDERABAD	A		SUBJECT TO CONDITIONS
		I				SIEMENS	GERMANY	A		
3	GRINDING ROLL	I				AIA ENGG.	NAGPUR	A		SUBJECT TO SIZE CONDITIONS
		I				AIA ENGG.	AHMEDABAD	A		
		I				MEGOTTEAUX	RAJKOT	A		
		I				SHREE BALAJI INDUSTRIAL PRODUCTS	JAIPUR	DR		
4	BULL RING SEGMENTS	I				AIA ENGG.	AHMEDABAD	A		
		I				MEGOTTEAUX	RAJKOT	A		
5	MILL HANDLING	I								MAIN BOIs eg. Hook, motors and C&I item from NTPC approved sources
		I				POWER BUILT	V V NAGAR	A		Upto 10 Tons
		I				UNIVERSAL HOIST FABRIK	THANE/ MUMBAI	A		upto 20T Conditions
		I				DYNAMECH CRANES	THANE MUMBAI	A		upto 20T Conditions
		I				ANUPAM INDUSTRIES	V V MAGAR	A		EOT Cranes upto 50 Tons

Bharat Heavy Electricals Limited PS-MKTG Delhi

Patratu Vidyut Utpadan Nigam Limited C & M Deptt. Distt-Ramgarh(Jharkhand)

05.04.17
(Chittaranjan Samal, BHEL/Hyd

	Project:	PATRATU	3x800	MW	LIST OF ITEMS REQUIRING QUALITY PLAN			DOC. NO.:	CS-9585-001-2	
					AND SUB-SUPPLIER APPROVAL			REV. NO. :	0	
	Package:	EPC (SG SCOPE)						DATE:	05.04.2017	
	Supplier:	BHEL				BHEL, HYDERABAD				
	Contract No.:	CS-9585-001-2			SUB-SYST	MILLS				
S.No.	ITEM	QP/Insp. Cat.	QP No.	QP Sub-Schedule	QP approval schedule	Proposed sub-supplier	Place	Suppliers approval status/ category	Sub-supplier Details submission schedule	Remarks
		I				GRIP ENGINEERS	HYDERABAD	A		Electrical hoist with trolley, under slung crane up to 40 Ton
		I				ARESEL MHE PVT LTD	BANGALROE	A		upto 20T
		I				CONSOLIDATED HOIST	PUNE	A		upto 20T Conditions
		I				CONSOLIDATED HOIST	SATARA	A		EOT CRANES UPTO 40 TONS & HOISTS ABOVE 15 TONS
		I				CENTURY CRANES	PALWAL	A		UPRO 30 MT EOT CRANES
		I				REVA INDUSTRIES	FARIDABAD	A		Upto25MT/Elec.Hoist
		I				GLOBAL TECHNOLOGY	HYDERABAD	DR		
		I				LIFTING EQUIPMENTS PVT. LTD.	DELHI	DR		
		I				SHIVAPRA CRANES	HYDERABAD	DR		
6	DYNAMIC CLASSIFIER	I				BHEL	HYDERABAD	DR		
7	LUB OIL SYSTEM	I				LINCOLN HELIOS	BANGALORE	A		
		I				T A HYDRAULICS	HYDERABAD	A		
		I				CENLUB INDUSTRIES	FARIDABAD	A		
		I				UNIQUE ENGINEERING ENTERPRISE P LTD	HYDERABAD	A		
		I				SOUTHERN LUB	BANGALORE	A		

Bharat Heavy Electricals Limited PS-MKTG Delhi

Patratu Vidyut Utpadan Nigam Limited C & M Deptt. Dist-Ramgarh(Jharkhand)

	Project:	PATRATU	3x800	MW	LIST OF ITEMS REQUIRING QUALITY PLAN			DOC. NO. :	CS-9585-001-2	
					AND SUB-SUPPLIER APPROVAL			REV. NO. :	0	
	Package:	EPC (SG SCOPE)						DATE:	05.04.2017	
	Supplier:	BHEL				BHEL, HYDERABAD				
	Contract No.:	CS-9585-001-2			SUB-SYST	MILLS				
S.No.	ITEM	QP/Insp. Cat.	QP No.	QP Sub-Schedule	QP approval schedule	Proposed sub-supplier	Place	Suppliers approval status/ category	Sub-supplier Details submission schedule	Remarks
		I				HYDAC	MUMBAI	DR		
		I				BHEL -HPEP	HYDERABAD	A		
8	RTD AND THERMOCOUPLE									DURING QP FINALISATION FROM C&I/ELECT LIST
9	SOLENOID VALVE									DURING QP FINALISATION FROM C&I/ELECT LIST
11	LIMIT SWITCH									DURING QP FINALISATION FROM C&I/ELECT LIST
12	SEPARATOR BODY	I				KCP	CHENNAI	A		
		I				SIMPLEX	BHILAI	A		
		I				NS ENGG.	HYDERABAD	A		
		I				ALSTOM PROJECTS INDIA LTD.	SHAHABAD	A		
		I				PREMIER ENGG. INDUSTRIES	JEEDIMETLA	A		
		I				SAI SARANG ENGINEERS	JEEDIMETLA	A		
		I				SWATHI INDUSTRIES	HYDERABAD	A		
		I				BHEL HPVP	VISAKHAPATNAM	A		
		I				GODREJ	MUMBAI	DR		
		I				BHEL CFU	JAGDISHPUR	DR		

Bharat Heavy Electricals Limited ★ PS-MKTG Delhi ★

Patratu Vidyut Utpadan Nigam Limited (Distt.-Ramgarh (Jharkhand)) C & M Deptt.

	Project:	PATRATU	3x800	MW	LIST OF ITEMS REQUIRING QUALITY PLAN			DOC. NO.:	CS-9585-001-2	
					AND SUB-SUPPLIER APPROVAL			REV. NO.:	0	
	Package:	EPC (SG SCOPE)						DATE:	05.04.2017	
	Supplier:	BHEL				BHEL, HYDERABAD				
	Contract No.:	CS-9585-001-2			SUB-SYST	MILLS				
S.No.	ITEM	QP/Insp. Cat.	QP No.	QP Sub-Schedule	QP approval schedule	Proposed sub-supplier	Place	Suppliers approval status/ category	Sub-supplier Details submission schedule	Remarks
		I				ISGEC	YAMUNANAGAR	DR		
13	PGB HOUSING	I				KCP	CHENNAI	A		
		I				SIMPLEX	BHILAI	A		
		I				NS ENGG.	HYDERABAD	A		
		I				GODREJ	MUMBAI	DR		
		I				ISGEC	MUMBAI	DR		
		I				BROWN'S HITECH STRUCTURES BHEL ANC.	HYDERABAD	A		
		I				SRI SRI ENGINEERING WORKS	HYDERABAD	A		
		I				TRIOMECH ENGINEERING	HYDERABAD	A		
		I				SWATHI INDUSTRIES	HYDERABAD	A		
		I				ALSTOM PROJECTS INDIA LTD.	SHAHABAD	DR		
		I				BHEL-HPVP	VISAKHAPATNAM	DR		
		I				BHEL-CSU	JAGDISHPUR	DR		
14	AIR IINLET HOUSING	I				ALSTOM PROJECTS INDIA LTD.	SHAHABAD	A		
		I				KCP	CHENNAI	A		
		I				NS ENGG.	HYDERABAD	A		
		I				SIMPLEX	BHILAI	A		
		I				SWATHI INDUSTRIES	HYDERABAD	A		

Bharat Heavy Electricals Limited PS-MKTG Delhi

Patratu Vidyut Utpadan Nigam Limited C & M Deptt. Distt-Ramgarh(Jharkhand)

4/7

	Project:	PATRATU	3x800	MW	LIST OF ITEMS REQUIRING QUALITY PLAN			DOC. NO.:	CS-9585-001-2	
					AND SUB-SUPPLIER APPROVAL			REV. NO. :	0	
	Package:	EPC (SG SCOPE)						DATE:	05.04.2017	
	Supplier:	BHEL				BHEL, HYDERABAD				
	Contract No.:	CS-9585-001-2			SUB-SYST	MILLS				
S.No.	ITEM	QP/Insp. Cat.	QP No.	QP Sub-Schedule	QP approval schedule	Proposed sub-supplier	Place	Suppliers approval status/ category	Sub-supplier Details submission schedule	Remarks
		I				PREMIER ENGG. INDUSTRIES	JEEDIMETLA	A		
		I				SAI SARANG ENGINEERS	JEEDIMETLA	A		
		I				BHEL-HPVP	VISHAKHAPATNAM	A		
		I				HYDERABAD METCHAM	HYDERABAD	DR		
						GODREJ	MUMBAI	DR		
		I				BHEL CFU	JAGDISHPUR	DR		
		I				ISGEC	MUMBAI	DR		
15	SEPARATOR TOP	I				ALSTOM PROJECTS INDIA LTD.	SHAHABAD	A		
		I				KCP	CHENNAI	A		
		I				NS ENGG.	HYDERABAD	A		
		I				SIMPLEX	BHILAI	A		
		I				YOGASREE	BANGALORE	A		
		I				PREMIER ENGG. INDUSTRIES	JEEDIMETLA	A		
		I				SAI SARANG ENGINEERS	JEEDIMETLA	A		
		I				BHEL-HPVP	VISHAKHAPATNAM	A		
		I				GODREJ	MUMBAI	DR		
		I				BHEL CFU	JAGDISHPUR	DR		
		I				HYDERABAD METCHEM	HYDERABAD	DR		
16	MILL DISCHARGE VALVE (FABRICATED BODY & MPO) CERAMIC LINED	I				BHEL EPD	BANGALORE	A		

Bharat Heavy Electricals Limited PS-MKTG Delhi

DVC * Patratu Vidyut Utpadan Nigam Limited * Ramgarh (Jharkhand) C & M Deptt.

	Project:	PATRATU	3x800	MW	LIST OF ITEMS REQUIRING QUALITY PLAN			DOC. NO.:	CS-9585-001-2	
					AND SUB-SUPPLIER APPROVAL			REV. NO. :	0	
	Package:	EPC (SG SCOPE)						DATE:	05.04.2017	
	Supplier:	BHEL				BHEL, HYDERABAD				
	Contract No.:	CS-9585-001-2			SUB-SYST	MILLS				
S.No.	ITEM	QP/Insp. Cat.	QP No.	QP Sub-Schedule	QP approval schedule	Proposed sub-supplier	Place	Suppliers approval status/ category	Sub-supplier Details submission schedule	Remarks
17	MILL COUPLING	II				SIEMENS	GERMANY	A		
		II				WELLMAN WACOMA LTD.	KOLKATA	DR		
		II				RATHI TRANSPOWER	PUNE	DR		
18	KNIFE EDGE GATE VALVES	I				GALAXY CONTROLS PVT. LTD.	CHENNAI	A		UP TO SIZE 26".
		I				ORBINOX INDIA PVT. LTD.	COIMBATORE	A		UP TO SIZE 30".
		I				BRAY CONTROLS (EARLIER-VAAS INDUSTRIES PVT. LTD.)	CHENNAI	A		UP TO SIZE 28".
		I				JASH ENGG. LTD.	INDORE	A		UP TO SIZE 30
		I				GENERAL ENGG. CONSORTIUM	BANGALORE	DR		

Bharat Heavy Electricals Limited * PS-MKTG Delhi *

Patratu Vidyut Utpadan Nigam Limited * C & M Deptt. * Distt-Ramgarh(Jharkhand)

	Project:	PATRATU	3x800	MW	LIST OF ITEMS REQUIRING QUALITY PLAN			DOC. NO. :	CS-9585-001-2	
					AND SUB-SUPPLIER APPROVAL			REV. NO. :	0	
	Package:	EPC (SG SCOPE)						DATE:	05.04.2017	
	Supplier:	BHEL				BHEL, HYDERABAD				
	Contract No.:	CS-9585-001-2			SUB-SYST	MILLS				
S.No.	ITEM	QP/Insp. Cat.	QP No.	QP Sub-Schedule	QP approval schedule	Proposed sub-supplier	Place	Suppliers approval status/ category	Sub-supplier Details submission schedule	Remarks
LEGENDS 1	AS PER BHEL TRICHY VENDOR LIST									
NOTES : AS GIVEN IN BHEL TRICHY VENDOR LIST										

Bharat Heavy Electricals Limited ★ PS-MKTG Delhi

★Patratu Vidyut Utpadan Nigam Limited★ C & M Deptt. ★Distt-Ramgarh(Jharkhand)★

	Project:	PATRATU	3x800	MW	LIST OF ITEMS REQUIRING QUALITY PLAN			DOC. NO.:	CS-9585-001-2	
					AND SUB-SUPPLIER APPROVAL			REV. NO. :	0	
	Package:	EPC						DATE:	04.04.2017	
	Supplier:	BHEL				BHEL RANIPET				
	Contract No.:	CS-9585-001-2			SUB-SYST	BOILER AUXILIARIES & ESP				
S.No.	ITEM	QP/Insp. Cat.	QP No.	QP Sub-Schedule	QP approval schedule	Proposed sub-supplier	Place	Suppliers approval status/ category	Sub-supplier Details submission schedule	Remarks
1	APH	I				REFER SUB QR LIST				VENDORS FOR MAIN STATIC AND ROTATING COMPONENTS SHALL BE TIED UP IN EXECUTION PLAN
2	STEAM COIL AIR PRE HEATER	III				MAIN CONTRACTOR'S APPROVED SOURCES				
3	AIR RECEIVER TANK	III				MAIN CONTRACTOR'S APPROVED SOURCES				
4	FD FAN	I				REFER SUB QR LIST				VENDORS FOR MAIN STATIC, ROTATING COMPONENTS, BLADES SHALL BE TIED UP IN EXECUTION PLAN
5	PA FAN	I				REFER SUB QR LIST				VENDORS FOR MAIN STATIC, ROTATING COMPONENTS, BLADES SHALL BE TIED UP IN EXECUTION PLAN
6	ID FAN	I				REFER SUB QR LIST				VENDORS FOR MAIN STATIC, ROTATING COMPONENTS, BLADES SHALL BE TIED UP IN EXECUTION PLAN
7	SEAL AIR FAN	I				CB DOCTOR & CO.	AHMEDABAD	A		
		I				BHEL	RANIPET	A		
		I				TLT INDIA	GUJARAT	A		
		I				ADREW YULE	KOLKATA	A		
		I				PATEL AIR TEMP	AHMEDABAD	A		
		I				ACCEL	AHMEDABAD	A		
		I				NADI TECHNOLOGIES PVT LTD	CHENNAI	DR		
		I				VACUNAIR ENGG. CO. PVT LTD	AHMEDABAD	DR		

Bharat Heavy Electricals Limited ★ PS-MKTG Delhi

Patratu Vidyut Utpadan Nigam Limited ★ Dist.-Ramgarh (Jharkhand) C & M Deptt.

4/4/17.
R. ARUMACHALAM
BHEL (Ranipet

	Project:	PATRATU	3x800	MW	LIST OF ITEMS REQUIRING QUALITY PLAN			DOC. NO.:	CS-9585-001-2	
					AND SUB-SUPPLIER APPROVAL			REV. NO.:	0	
	Package:	EPC						DATE:	04.04.2017	
	Supplier:	BHEL				BHEL RANIPET				
	Contract No.:	CS-9585-001-2			SUB-SYST	BOILER AUXILIARIES & ESP				
S.No.	ITEM	QP/Insp. Cat.	QP No.	QP Sub-Schedule	QP approval schedule	Proposed sub-supplier	Place	Suppliers approval status/ category	Sub-supplier Details submission schedule	Remarks
8	LUB OIL SYSTEM FOR FANS(ID,FD & PA)	I				PSI ENGG.	CHENNAI	A		
		I				CENLUB	FARIDABAD	A		
		I				LINCOLN HELIOS	BANGALORE	A		
		I				BHEL	RANIPET	A		
		I				SOUTHERN LUBRICATION	BANGALORE	A		
		I				TA HYDRAULICS	HYDERABAD	A		
		I				SPRAYING SYSTEM INDIA PVT. LTD.	BANGALORE	DR		
9	RIGIFLEX COUPLING FOR AXIAL FANS	III				MAIN CONTRACTOR'S APPROVED SOURCES				
10	COOLER FOR FAN LOS	III				MAIN CONTRACTOR'S APPROVED SOURCES				
11	SCREW PUMP FOR LOS	III				LEISSTRITZ	GERMANY	A		
		III				ALEKTON	CHENNAI	A		
		III				KRAL	AUSTRIA	A		
		III				TUSHACO(DELTA)	DAMAN	A		SUB. TO CONDITIONS
		III				DELTA PD PUMPS PVT. LTD.	MUMBAI	DR		
		III				UT PUMPS	FARIDABAD	DR		
12	EMITTING ELECTRODES FOR ESP	I				SIVA SPRINGS	MADURAI	A		

Bharat Heavy Electricals Limited PS-MKTG Delhi

Patratu Vidyut Utpadan Nigam Limited C & M Deptt.

4/4/17

	Project:	PATRATU	3x800	MW	LIST OF ITEMS REQUIRING QUALITY PLAN			DOC. NO. :	CS-9585-001-2	
					AND SUB-SUPPLIER APPROVAL			REV. NO. :	0	
	Package:	EPC						DATE:	04.04.2017	
	Supplier:	BHEL				BHEL RANIPET				
	Contract No.:	CS-9585-001-2			SUB-SYST	BOILER AUXILIARIES & ESP				

S.No.	ITEM	QP/Insp. Cat.	QP No.	QP Sub-Schedule	QP approval schedule	Proposed sub-supplier	Place	Suppliers approval status/ category	Sub-supplier Details submission schedule	Remarks
		I				VENKATESWARA STEEL & SPRINGS(INDIA) PVT. LTD.	COIMBATORE	A		
		I				NAGAPPASPRINGS	RANIPET	A		
		I				KWALITY COILS	MADURAI	A		
		I				BEST COILS	RANIPET	A		
		I				VISHNU WIRE FORMS (P) LTD.	MADURAI	A		
13	COLLECTING ELECTRODE FOR ESP	I				BHEL	RANIPET	A		
14	ESP SUPPORT STRUCTURE (COLUMNS & ROOF BEAMS)	I				NTPC APPD SUBCONTRACTORS OF BHEL WITH BHEL MATERIAL				PROJECT SPECIFIC APPROVAL TO BE TAKEN BY BHEL FROM NTPC; VENDOR TO MEET TECH. SPEC. REQUIREMENTS FOR STR. FABRICATION
15	ESP SUPPORT STRUCTURE (COLUMNS & ROOF BEAMS MANUFACTURED FROM ROLLED SECTIONS), CASING	III				BHEL APPD SUBCONTRACTORS WITH BHEL MATERIAL				VENDOR TO MEET TECH. SPEC. REQUIREMENTS FOR STR. FABRICATION
16	COLLECTING/EMITTING ELECTRODE SUSPENSION ASSY.	III				BHEL APPD SUBCONTRACTORS WITH BHEL MATERIAL				

Bharat Heavy Electricals Limited ★ PS-MKTG Delhi

Patratu Vidyut Utpadan Nigam Limited ★ Distt. Ramgarh (Jharkhand) ★ C & M Deptt.

4/4/17

	Project:	PATRATU	3x800	MW	LIST OF ITEMS REQUIRING QUALITY PLAN			DOC. NO.:	CS-9585-001-2	
					AND SUB-SUPPLIER APPROVAL			REV. NO. :	0	
	Package:	EPC						DATE:	04.04.2017	
	Supplier:	BHEL				BHEL RANIPET				
	Contract No.:	CS-9585-001-2			SUB-SYST	BOILER AUXILIARIES & ESP				
S.No.	ITEM	QP/Insp. Cat.	QP No.	QP Sub-Schedule	QP approval schedule	Proposed sub-supplier	Place	Suppliers approval status/ category	Sub-supplier Details submission schedule	Remarks
17	CE AND DE RAPPING MECHANISM	III				MAIN CONTRACTOR'S APPROVED SOURCES				
18	ELECTRICALLY OPERATED HOIST FOR ESP- UPTO 3 TON CAPACITY	III				MAIN CONTRACTOR'S APPROVED SOURCES				
19	GATES	I				NTPC APPD SUBCONTRACTORS OF BHEL WITH BHEL MATERIAL	RANIPET	A		
20	DAMPERS	I				NTPC APPD SUBCONTRACTORS OF BHEL WITH BHEL MATERIAL	RANIPET	A		
21	LRB MATERIALS	I				MINWOOL ROCK FIBRES LTD.	RAJNANDAON, BHILAI	A		
		I				LAPINUS ROCKWOOL LTD.	GWALIOR	A		
		I				LLOYDS INSULATION, CHENNAI	BHILAI	A		
		I				PUNJSTAR INSULATION	BHILAI	A		
		I				GOENKA ROCK WOOL	RAIPUR	A		
		I				THERMOCARE ROCKWOOL PVT. LTD. ES. LTD.	RAJNANDAON	A		
		I				SHREERAM EQUITECH	DURG	A		
		I				MINWOOL ROCK FIBRES LTD.	RAJNANDAON, BHILAI	A		
		I				ROCKWOOL INDIA LTD.	MEDAK-AP	A		
		I				DHANBAD ROCKWOOL INSULATION PVT. LTD.	DHANBAD	A		
		I				MINSULATE MFG. CO,	JAMSHEDPUR	A		
		I				POLYBOND PROJECTS PVT. LTD.	DURG	A		

Bharat Heavy Electricals Limited PS-MKTG Delhi

Patratu Vidyut Utpadan Nigam Limited C & M Deptt. Dist-Ramgarh(Jharkhand)

	Project:	PATRATU	3x800	MW	LIST OF ITEMS REQUIRING QUALITY PLAN			DOC. NO.:	CS-9585-001-2	
					AND SUB-SUPPLIER APPROVAL			REV. NO. :	0	
	Package:	EPC						DATE:	04.04.2017	
	Supplier:	BHEL				BHEL RANIPET				
	Contract No.:	CS-9585-001-2			SUB-SYST	BOILER AUXILIARIES & ESP				
S.No.	ITEM	QP/Insp. Cat.	QP No.	QP Sub-Schedule	QP approval schedule	Proposed sub-supplier	Place	Suppliers approval status/ category	Sub-supplier Details submission schedule	Remarks
		I				HI-TECH ROCK FIBRE LTD.	RAJNANDGOAN	A		
		I				ROCKWOOL INDUSTRIES	BHILAI	A		
22	VIS FOR FANS	I				GERB	BANGALORE	A		
NOTE 1:	VENDORS UNDER A(ACCEPTED CATEGORY) ARE APPROVED WITH OR WITHOUT CONDITIONS IN PAST. SIMILAR CONDITIONS AS THE CASE MAY BE FOR THE VENDORS SHALL BE APPLICABLE FOR THIS PROJECT AND TIED UP IN THE QUALITY.									
NOTE 2:	VENDORS UNDER DR (DETAILS REQUIRED) CATEGORY SHALL BE REQUIRED TO SUBMIT THE DETAILS IN NTPC QUESTIONNAIRE.									

Bharat Heavy Electricals Limited PS-MKTG Delhi

Patratu Vidyut Utpadan Nigam Limited Distt-Ramgarh(Jharkhand) C & M Deptt.

4.4.17

	Project:	PATRATU	3x800	MW	LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB-SUPPLIER APPROVAL		DOC. NO.: CS-9585-001-2	
							REV. NO.: 0	
	Package:	Steam Generator Island Package					DATE: 05.04.2017	
	Supplier:	BHEL						
	Contract No.:	CS-9585-001-2			SUB-SYST	SG & AUX.-FQP & ERECTION AGENCIES&ESP ERECTION AGENCIES		

S.No.	ITEM	QP/Insp. Cat.	QP No.	QP Sub-Schedule	QP approval schedule	Proposed sub-supplier	Place	Suppliers approval status/ category	Sub-supplier Details submission schedule	Remarks
1	BOILER & AUX.(PRESSURE PARTS, STRUCTURES,ROTATING EQUIPMENT)	I				DOWEL ERECTORS PVT. LTD.	CHENNAI	A		NOTE-1
		I				POWER MECH PROJECTS PVT. LTD.	VIJAYWADA	A		NOTE-1
		I				BRIDGE & ROOF	KOLKATA	A		NOTE-1
		I				KARPARA PROJECTS ENGG. PVT. LTD.	SURAT	A		NOTE-1
		I				IOTEP	MUMBAI	A		NOTE-1
		I				SUNIL HI-TECH ENGG.	NAGPUR	A		NOTE-1
		I				TATA PROJECTS LIMITED	HYDERABAD	A		NOTE-1
		I				TEXCEL ENGINEERS	CHENNAI	A		NOTE-1
		I				PCP INTERNATIONAL LTD.	CHANDIGARH	A		NOTE-1
		I				INDWELL CONSTN. LTD.	VIJAYWADA	A		NOTE-1
		I				EDAC ENGG. LTD.	CHENNAI	A		NOTE-1
		I				LARSEN & TUBRO LTD.	MUMBAI	A		NOTE-1
		I				BHAWANI ERECTORS	KARUNAGAPALLY	A		NOTE-1
		I				ESSAR PROJECTS (I) LTD.	MUMBAI	A		NOTE-1
		I				GOLDEN EDGE ENGG. PVT. LTD.	NEW DELHI	A		NOTE-1
		I				BROTHER ENGINEER	CENNAI	DR		NOTE-1
		I				ICS ENGG.	CHENNAI	DR		NOTE-1
						POWER MAX	KOLKATA	DR		NOTE-1
						SWAMIRA INTERNATIONALS PVT LTD.	NEW DELHI	DR		NOTE-1
2	POWER CYCLE PIPING	I				INDWELL CONSTR LTD.	VIJAYWADA	A		NOTE-1

Bharat Heavy Electricals Limited PS-MKTG Delhi

Rajiv Gandhi Rajiv Vidyut Utpadan Nigam Limited C & M Deptt. Distt. Ramgarh (Jharkhand)

G.V. Rao 12/04/17.

	Project:	PATRATU	3x800	MW	LIST OF ITEMS REQUIRING QUALITY PLAN			DOC. NO. :	CS-9585-001-2	
					AND SUB-SUPPLIER APPROVAL			REV. NO. :	0	
	Package:	Steam Generator Island Package						DATE:	05.04.2017	
	Supplier:	BHEL								
	Contract No.:	CS-9585-001-2			SUB-SYST	SG & AUX.-FQP & ERECTION AGENCIES&ESP ERECTION AGENCIES				

S.No.	ITEM	QP/Insp. Cat.	QP No.	QP Sub-Schedule	QP approval schedule	Proposed sub-supplier	Place	Suppliers approval status/ category	Sub-supplier Details submission schedule	Remarks
		I				POWER MECH PROJECTS PVT. LTD	VIJAYWADA	A		NOTE-1
		I				TEXCEL ENGINEERS	CHENNAI	A		NOTE-1
		I				BRIDGE & ROOF	KOLKATA	A		NOTE-1
		I				KARPARA PROJECTS ENGG. PVT. LTD.	SURAT	A		NOTE-1
		I				SUNIL HI-TECH ENGG.	NAGPUR	A		NOTE-1
		I				IOTEP	MUMBAI	A		NOTE-1
		I				PCP INTERNATIONAL LTD.	CHANDIGARH	A		NOTE-1
		I				LARSEN & TUBRO LTD.	MUMBAI	A		NOTE-1
		I				EDAC ENGG. LTD.	CHENNAI	A		NOTE-1
		I				TATA PROJECTS LTD.	HYDERABAD	A		NOTE-1
		I				BHAWANI ERECTORS	KERALA	A		NOTE-1
		I				U B ENGG.	PUNE	DR		NOTE-1
		I				DOWEL ERECTORS	CHENNAI	A		NOTE-1
		I				GOLDEN EDGE ENGG.	NEW DELHI	A		NOTE-1
3	LP PIPING	I				NOTE-2				
4	HT MOTORS	I				NOTE-2				
5	COMPRESSED AIR SYSTEM	I				NOTE-2				
6	MILL REJECT HANDLING SYSTEM	I				NOTE-2				
7	PASSENGER CUM GOODS ELEVATOR	I				NOTE-2				

Bharat Heavy Electricals Limited PS-MKTG Delhi

Patratu Vidyut Utpadan Nigam Limited C & M Deptt. Distt-Ramgarh(Jharkhand)

G.V. Rattesh 12/04/17

	Project:	PATRATU	3x800	MW	LIST OF ITEMS REQUIRING FIELD QUALITY PLAN AND ERECTION SUBCONTRACTOR APPROVAL			DOC. NO.:	CS-9585-001-2	
								REV. NO.:	0	
	Package:	Steam Generator Island Package						DATE:	05.04.17	
	Supplier:	BHEL								
	Contractor No.:	CS-9585-001-2			SUB-SYSTEM	ESP ERECTION AGENCY				

S.No.	ITEM	QP/Insp. Cat.	QP No.	QP Sub-Schedule	QP approval schedule	Proposed sub-supplier	Place	Suppliers approval status/ category	Sub-supplier Details submission schedule	Remarks
1	ESP	I				BROTHERS ENGG. & ERECTORS	VIJAYAWADA	A		NOTE 1
		I				POWER MECH PROJECTS	VIJAYAWADA	A		NOTE 1
		I				BRIDGE & ROOF	KOLKATA	A		NOTE 1
		I				BHAVANI ERECTORS PVT. LTD.	KERLA	A		NOTE 1
		I				L&T LTD.	MUMBAI	A		NOTE 1
		I				PCP INTERNATIONAL LTD.	CHANDIGARH	A		NOTE 1
		I				SUNIL HI-TECH	NAGPUR	A		NOTE 1
		I				DOWEL ERECTORS PVT. LTD.	CHENNAI	A		NOTE 1
		I				INDWELL CONSTR. LTD.	VIJAYAWADA	A		NOTE 1
		I				KARPARA PROJECTS ENGG.	SURAT	A		NOTE 1
		I				TEXCEL ENGINEERS PVT. LTD.	CHENNAI	A		NOTE 1
		I				TATA PROJECTS LTD.	HYDERABAD	A		NOTE 1
		I				IOTEP	MUMBAI	A		NOTE 1
		I				EDAC	CHENNAI	A		NOTE 1
		I				ZILLION	NEW DELHI	A		NOTE 1
		I				GOLDEN EDGE ENGG. PVT.LTD.	DELHI	A		NOTE-1
						P E ERECTORS	KOLKATA	A		NOTE-1
		I				UB ENGG.	PUNE	DR		NOTE-1

EGENDS

1	SYSTEM SUPPLIER / SUB-SUPPLIER APPROVAL STATUS CATEGORY (SHALL BE FILLED BY NTPC)
A -	For these items proposed vendor is acceptable to NTPC. To be indicated with letter "A" in the list alongwith the condition of approval, if any. The same conditions shall be applicable here as well.
DR -	For these items "Detailed required" for NTPC review. To be identified with letter "DR" in the list.
2	Notes
Note - 1	Additional vendors may be considered as per MOM provisioon, rganizational , financial & technical aspects will be taken care by BHELbefore award of the jobs to the sub contractors. Mobilisation of manpower, tools, tackles to suit the requirements of job schedule shall be tied up by BHEL in consultation with NTPC site before award for which the details of sub contractors shall be forwarded to respective GM I/C (NTPC-SITE). I. M/s BHEL to ensure that the requirements of NTPC regarding the deployment of erection Agency in connection with the work schedule for the subject project and package is met.
Note - 2	BHEL approved sub contractors for erection – would mean NTPC approval is not required
NOTE 3:	BHEL WILL FOLLOW THEIR STANDARD PROCEDURE, CORPORATE GUIDELINES AND SHALL COMPLY WITH CIRCULARS/INSTRUCTIONS ETC. ISSUED BY GOVT./RELEVANT STATUTORY BODIES WHILE TENDERING. HOWEVER FOR NEW VENDOR, BHEL SHALL TAKE APPROVAL FROM NTPC PRIOR TO ORDER PLACEMENT.

Bharat Heavy Electricals Limited ★ PS-MKTG Delhi

Patratu Vidyut Utpadan Nigam Limited * Distt-Ramgarh(Jharkhand) * C & M Deptt.

12/04/17
(G.V.RAJASEKHAR)
/BHEL-PSNR)

	Project:	PATRATU	3X800	MW	LIST OF ITEMS REQUIRING QUALITY PLAN			DOC. NO.:	CS-9585-001-2	
					AND SUB-SUPPLIER APPROVAL			REV. NO. :	0	
	Package:	EPC/SG						DATE:	12.05.2015	
	Supplier:	BHEL								
	Contract No.:	CS-9585-001-2			SUB-SYST	BHEL PIPING CENTRE, CHENNAI				
S.No.	ITEM	QP/Insp. Cat.	QP No.	QP Sub-Schedule	QP approval schedule	Proposed sub-supplier	Place	Suppliers approval status/ category	Sub-supplier Details submission schedule	Remarks
	NOTE: FABRICATION OFFLOADING SHALL BE AS PER AGREED LIST BETWEEN NTPC & BHEL									
1	AUX PRDS UNIT (INCLUDING CONTROL VALVE)	I								VENDORS TIED UP BHEL PEM VENDOR LIST
2	LIGHTLY BONDED WOOL MATTRESS CONVENTIONAL	I								VENDORS AS PER BHEL TRICHY BOILER LIST
3	CONVENTIONAL VALVES OTHER THAN BHEL	I								VENDORS AS PER BHEL TRICHY BOILER LIST
4	HANGERS & SUPPORTS WITH SPRING ARRANGEMENT(INCLUDING CLH/VLH)	I				PIPE SUPPORTS	UK	A		
		I				LISEGA	GERMANY, CHINA	A		Lisega, China approval conditions as per NTPC approval letter
		I				CARPENTER & PATTERSON	UK	A		
		I				MANNESMANN	GERMANY	A		
		I				SANWA TAKI	JAPAN	A		
		I				BROWICK	UK	A		
		I				GILLARDINI	ITALY	A		
		I				ITT	GERMANY	A		
		I				MH	SPAIN	A		

Bharat Heavy Electricals Limited ★ PS-MKTG Delhi

★ Patratu Vidyut Utpadan Nigam Limited ★ Distt-Ramgarh (Jharkhand) ★ C & M Deptt.

(NITIN KUMAR) PS-M BHEL

	Project:	PATRATU	3X800	MW	LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB-SUPPLIER APPROVAL		DOC. NO. :	CS-9585-001-2	
							REV. NO. :	0	
	Package:	EPC/SG					DATE:	12.05.2015	
	Supplier:	BHEL							
	Contract No.:	CS-9585-001-2			SUB-SYST	BHEL PIPING CENTRE, CHENNAI			

S.No.	ITEM	QP/Insp. Cat.	QP No.	QP Sub-Schedule	QP approval schedule	Proposed sub-supplier	Place	Suppliers approval status/ category	Sub-supplier Details submission schedule	Remarks
5	HANGERS & SUPPORTS (RIGID TYPE) WITHOUT SPRING ARRANGEMENT	III				MAIN CONTRACT APPROVED VENDORS				
6	PIPING FABRICATION-P91 MATERIAL	I				BHEL	TRICHY	A		
7	PIPING FABRICATION (IBR)	I				BHEL	CHENNAI	A		
8	PIPING FABRICATION (NON-IBR)	I				BHEL	CHENNAI	A		
9	BUILT UP BEAMS/FABRICATED BEAMS-AUTO WELDING	I				AS PER BHEL-TRICHY LIST				
10	CONSTANT/VARABLE LOAD HANGERS (BHEL MAKE)	I				BHEL	TRICHY	A		
11	TANKS AND VESSELS	I				BHEL CHENNAI	CHENNAI	A		
12	NON IBR PIPING / LP PIPING - PR. BELOW 10	III				BHEL APPROVED SOURCES				
13	STRUCTURE FABRICATION (ROLLED SECTION)	III				BHEL	CHENNAI	A		
14	DEAD WEIGHT CLH	III				BHEL	CHENNAI	A		
15	SHOP MANUFACTURED FITTINGS OF 91 GR.MATL.	I				BHEL	TRICHY	A		
16	FLOW ELEMENTS - OTHER THAN BHEL	I								Refer BHEL, Trichy C&I list for Sub-vendors
17	AIR TRAPS	III								BHEL Approved Vendors
18	BEARINGS	III								BHEL Approved Vendors

Bharat Heavy Electricals Limited PS-MKTG Delhi

Patratu Vidyut Utpadan Nigam Limited C & M Deptt. Distt-Ramgarh(Jharkhand)

	Project:	PATRATU	3X800	MW	LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB-SUPPLIER APPROVAL			DOC. NO.:	CS-9585-001-2	
								REV. NO.:	0	
	Package:	EPC/SG						DATE:	12.05.2015	
	Supplier:	BHEL								
	Contract No.:	CS-9585-001-2			SUB-SYST	BHEL PIPING CENTRE, CHENNAI				
S.No.	ITEM	QP/Insp. Cat.	QP No.	QP Sub-Schedule	QP approval schedule	Proposed sub-supplier	Place	Suppliers approval status/ category	Sub-supplier Details submission schedule	Remarks
19	CHEMICALDOSING TANK (HP/LP)	III								BHEL Approved Vendors
20	COOLING WATER VALVES	III								BHEL Approved Vendors
21	FITTINGS-P91/92	I				VENDORS AS PER BHEL TRICHY VENDORS LIST				
22	FITTIINGS (CS,SS & AS UPTO GR22	II								PROCUREMENT FROM BHEL APPROVED VENDORS
23	FIXING COMPONENTS, SEALING COMPOUND FOR INISULATION	III								BHEL Approved Vendors
24	HANGER CONNECT COMP. (CLEVIS, EYENUT, TURNBUCKLE, TIEROD, WELD ON BRACKET ETC	III								BHEL Approved Vendors
25	INSULATION CLAMPS	III								BHEL Approved Vendors
26	LEVEL GAUGE GLASS (FOR CBD, IBD, FLASH CHEM. DOSING TANKS	III								BHEL Approved Vendors
27	PLUG & BALL VALVES (COOLING WATER AND AIR LINES)	III								BHEL Approved Vendors
28	SIGHT FLOW INDICATORS	III								BHEL Approved Vendors
29	SNUBERS (IMPORTED)	III								BHEL Approved Vendors
30	STEAM TRAPS	III								BHEL Approved Vendors

Bharat Heavy Electricals Limited * PS-MKTG Delhi

Patratu Vidyut Utpadan Nigam Limited * C & M Deptt. * Distt-Ramgarh(Jharkhand)

	Project:	PATRATU	3X800	MW	LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB-SUPPLIER APPROVAL			DOC. NO.:	CS-9585-001-2	
								REV. NO.:	0	
	Package:	EPC/SG						DATE:	12.05.2015	
	Supplier:	BHEL								
	Contract No.:	CS-9585-001-2			SUB-SYST	BHEL PIPING CENTRE, CHENNAI				

S.No.	ITEM	QP/Insp. Cat.	QP No.	QP Sub-Schedule	QP approval schedule	Proposed sub-supplier	Place	Suppliers approval status/ category	Sub-supplier Details submission schedule	Remarks
31	STEAM TRAPS THERMODYNAMIC TYPE	III								BHEL Approved Vendors
32	STRAINERS	III								BHEL Approved Vendors
33	COOLING WATER PUMP	III				SULZER INDIA	NAVI MUMBAI	A		
		III				KSB	PUNE	A		
		III				KIRLOSKAR	WADI	A		
		III				MATHER AND PLATT	PUNE	A		
		III				BECON WEIR	CHENNAI	A		
		III				SAM PUMPS	COIMBATORE	A		
		III				JYOTI	BARODA	A		
34	LP CHEMICAL DOSING SYSTEM	II				Power Piping	Trichy	A		
		II				V.K.Pumps	Mumbai	A		
		II				Milton Roy	Chennai	A		
		II				Techno Consultants	Mumbai	A		
		II				Positive Metering System	Nasik	A		
		II				PSI Engg System	Chennai	A		
		II				Matz Pump	Ahmedabad	DR		
		II				DEE DEVELOPMENT	HARYANA	DR		
35	LP CONDENSATE TRANSFER PUMP	I				ITT GOULD	USA	A		
		I				FLOWSERVE	USA	A		

Bharat Heavy Electricals Limited PS-MKTG Delhi

Patratu Vidyut Utpadan Nigam Limited C & M Dept. Distt-Ramgarh (Jharkhand)

	Project:	PATRATU	3X800	MW	LIST OF ITEMS REQUIRING QUALITY PLAN			DOC. NO.:	CS-9585-001-2	
					AND SUB-SUPPLIER APPROVAL			REV. NO. :	0	
	Package:	EPC/SG						DATE:	12.05.2015	
	Supplier:	BHEL								
	Contract No.:	CS-9585-001-2			SUB-SYST	BHEL PIPING CENTRE, CHENNAI				
S.No.	ITEM	QP/Insp. Cat.	QP No.	QP Sub-Schedule	QP approval schedule	Proposed sub-supplier	Place	Suppliers approval status/ category	Sub-supplier Details submission schedule	Remarks
						CLYDE PUMPS	GHAZIABAD	A		
		I				SULZER	NAVI MUMBAI	A		
36	BUTTERFLY VALVES(upto 1400NB-PN10 & upto 300NB-PN16)					R&D Multiple	Valsad	A		
						Fouress Engg.	Bangalore	A		
						Weir BDK	Hubli	A		UPTO1050NB PN-16
						IL	Palghat	A		
						Intervalve	Pune	A		
						KBL	Kondhapuri	A		
						PENTAIR	Kondhapuri	A		UPTO 900NB PN-16
						FLOSERVE	Coimbatore	A		
						L&T		DR		
37	BOILER FEED PUMP(AUX.BOILER)	III								BHEL Approved Vendors

NOTES :A - APPROVED, DR - DETAIL REQUIRED, N - NOTED. REFER TRICHY BOILER LIST FOR OTHER NOTES.

Bharat Heavy Electricals Limited PS-MKTG Delhi

Patratu Vidyut Utpadan Nigam Limited C & M Deptt. Distt-Ramgarh(Jharkhand)

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	Project:	PATRATU	3X800	MW	LIST OF ITEMS REQUIRING QUALITY PLAN			DOC. NO.:	CS-9585-001-2		
					AND SUB-SUPPLIER APPROVAL			REV. NO.	0		
	Package:	EPC/SG						DATE:	12.05.2015		
	Supplier:	BHEL									
	Contract No.:	CS-9585-001-2			SUB-SYSTE	PEM SCOPE					

S.No.	ITEM	QP/Insp. Cat.	QP No.	QP Sub Schedule	QP approval schedule	Proposed sub-supplier	Place	Sub-Suppliers approval status/ category	Sub-supplier Details submission schedule	SQP Status	Remarks
1	AUX PRDS UNIT (INCLUDING CONTROL VALVE)	I				INSTRUMENTATION LTD	PALGHAT	A			Steam conditioning valve from Hora Germany & Desuperheater from Copes Vulcan
		I				PARCOL	ITALY	A			
		I				HORA (HOLTER)	GERMANY	A			
		I				MIL	THRISSUR	A			WITH W&T GERMANY
		I				DAUME	GERMANY	A			
		I				CCI	SRICITY	DR			
		I				KOSO INDIA PVT. LTD.	NASIK	DR			

NOTES AND LEGEND AS PER BHEL TRICHY VENDOR LIST

Bharat Heavy Electricals Limited * PS-MKTG Delhi

(Nilesh Kamal)

* Patratu Vidyut Utpadan Nigam Limited * C & M Deptt. * Distt-Ramgarh (Jharkhand) *

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NTPC	PROJECT : PATRATU PACKAGE : EPC (FGD) Package MAIN CONTRACTOR : M/s BHEL CONTRACT NO : CS-9585-001-2	LIST OF ITEMS REQUIRING QP APPROVAL & ACCEPTABLE VENDOR AS APPROVED BY	REF. NO : REVISION NO : 00 DATE : 16-05-17

No.	Major Equipment	QP Inspection Category	QP No.	QP Submission SCH	QP Approval SCH	Proposed Sub Supplier	Place	SS Approval Status	SS Detail Sub. SCH	SS Approval SCH	Remark
1	Slurry re-circulation Pumps	I									Refer Sub.QR List
2	Oxidation Blowers	I									Refer Sub.QR List
3	Wet Limestone Grinding Mill	I									Refer Sub.QR List
4	Slurry Pumps	I									Refer Sub.QR List
5	Agitators	I									Refer Sub.QR List
6	Vacuum Belt Filters	I									Refer Sub.QR List
9	Bucket Elevator	I				Indiana Conveyors Pvt.Ltd.	Jejori, Pune	A			
						Bevcon Wayors Pvt.Ltd	HYDERABAD	DR			
10	Absorber Tank	I				BHEL	Ranipet	DR			
11	Atmospheric Tanks	III				Main Contractor approved sub contractor					
12	Structural Items(Columns,Beams & Bracings) Built up section .					BHEL	Ranipet	DR			
		I				Jindal	Ghaziabad	A			UP TO 350NB (Black & GI)
		III				TATA STEEL	Jamshedpur	A			UP TO 150 NB (Black & GI)
		III				SAIL	Rourkela	A			
		I				Surya Roshni	Bahadurgarh	A			UP TO 400NB (Black & GI)
		I				Welspan	Anjar	A			UP TO 400NB (Black)

Patratu Vidyut Utpadan Nigam Limited * Distt-Ramgarh(Jharkhand) * C & M Deptt.

Bharat Electricals Limited PS-MKTG Delhi

BHEL
(SASHI KUMAR)

NTPC	PROJECT : PATRATU	LIST OF ITEMS REQUIRING QP	REF. NO :
	PACKAGE : EPC (FGD) Package	APPROVAL & ACCEPTABLE	REVISION NO : 00
	MAIN CONTRACTOR : M/s BHEL	VENDOR AS APPROVED BY	DATE : 15-05-17
	CONTRACT NO : CS-9585-001-2		

No.	Major Equipment	QP Inspection Category	QP No.	QP Sub missi on SCH	QP Approval SCH	Proposed Sub Supplier	Place	SS Approval Status	SS Detail Sub. SCH	SS Approval SCH	Remark
13	MS Pipes (ERW)	I				MSL	Raigad	A			200 to 500 NB (Black)
		I				Indus Tube	G. B. Nagar	A			UP TO 300 NB (Black & GI)
		I				Jindal Industries	Hissar	A			UP TO 300 NB (Black & GI)
		I				AFL Apollo	Sikandrabad	A			UP TO 300NB (Black)
		I				Dadu Pipes	Sikandrabad	A			UP TO 300 NB (Black)
		I				ISMT	Ahmedabad	A			
14	Spiral Welded upto [illegible]	I				Ratnamani	Anjar / Chatral	A			
						JCO Gas Pipes	Chindwara	A			
						SAIL	Raurkella	A			
						Surya Global	Kutch	A			
15	LRB Insulation	I				Lloyd Insulation	Chennai	A			
		I				Rockwool Industries	Bhilai / Medak	A			
		I				Minwool Rock Fibres Ltd.	Rajnandgaon	A			
		I				Lapinus Rockwool Ltd.	Gwalior	A			
		I				Punjstar(PIFCO)	Bhilai	A			
		I				Goenka Rockwool	Raipur	A			
		I				Rockwool India Ltd.	Medak-AP	A			
		I				Thermocare Rockwool Pvt.Ltd.	Rajnandgaon	A			
		I				Minsulate Mfg.Co	Jamshedpur	A			
		I				Dhanbad Rockwool	Dhanbad	A			
		I				Hitech Rockwool Fibre	Rajnandgaon	A			
		I				Roxul RockwoolInsulation	Dahej(Bharuch)	A			
16	Gates & Dampers	I				Indra Damper	Ranipet	A			
		I				Bachmann	Faridabad	A			
		I				Fouress	Bengaluru	A			
		I				BHEL	Ranipet	A			
		I				Clyde Burgmann Bachmann	USA	A			
17	Valves for FGD application#	I				BHEL	Trichy	A		As per approval (Type/Class/Rating & Material	
		I				Bankim Valves	Howrah	A		CI Gate/Check/Globe upto600NB,PN16.	
		I				H.Sarkar & Co	Howrah	A		CI Gate/Check/Globe upto 700NB,PN16	

Bharat Heavy Electricals Limited PS-MKTG Delhi

Patratu Vidyut Utpadan Nigam Limited Distt-Ramgarh(Jharkhand) C & M Deptt.

BHEL

NTPC	PROJECT : PATRATU	LIST OF ITEMS REQUIRING QP	REF. NO :
	PACKAGE : EPC (FGD) Package	APPROVAL & ACCEPTABLE	REVISION NO : 00
	MAIN CONTRACTOR : M/s BHEL	VENDOR AS APPROVED BY	DATE : 16-05-17
	CONTRACT NO : CS-9585-001-2		

No.	Major Equipment	QP Inspection Category	QP No.	QP Submission SCH	QP Approval SCH	Proposed Sub Supplier	Place	SS Approval Status	SS Detail Sub. SCH	SS Approval SCH	Remark
		I				Leader	Jalandhar	A		CI Gate/Check/Globe upto 300NB,PN10.SS upto 300NB & CS upto 300NB,Class 150, GM Valve upto 150NB	
		I				Weir BDK	Hubli	A		Gate/Globe/Check Valves upto300NB,Class300 for SS,CI&CS	
		I				KBL	Kondapuri	A		Valve upto	
		I				A.V Valves	Agra	A		CI Gate/Globe/Check Valves upto 300NB,PN10	
		I				Tyco Valves / Pentair Valves	Halol(Gujarat)	A		For CS,CI&SS Butterfly Valve	
		I				L&T	Coimbatore	A		CS&AS-Low Pr. Valves-Gate/Globe/Check Valves upto 26",class600, High Pr. Upto20",2500class Forged Steel upto 1" 4500 class.	
		I				Weir BDK	Hubli	A		CS Ball Valves(upto 350NB-class150)	
		I				Leader	Jalandhar	A		Valve(upto350NB,class15	
		I				Leader	Jalandhar	A		Forged Steel(CS) upto300NB,class150.	
		I				Fouress Engineering	Thane,Aurangabad	A		Forged Steel(CS)upto 300NB,Class150)	
		I				Weir BDK	Hubli	A		Diaphgram Valves	
		I				Advance Valve	Noida	A		CI Butterfly valves 1400 NB, PN 10; 300 NB PN16	
		I				Fouress Engineering	Bangalore	A		Knife Gate valves	
		I				Micro Finish	Hubli	A		Ball Valve 350 NB Class 150, upto 50 NB Class 800	
		II				Inter Valves	Pune	A		CI Butterfly valves 1400 NB, PN 10; 300 NB PN16	
		II				Xomos Sanmar	Pune / Chennai	A		Forged Steel Gate globe check valve upto 50 NB Class 800	
		II				Dembla	Pune	A		CI Butterfly valves 1400 NB, PN 10; 300 NB PN16	

Bharat Heavy Electricals Limited * PS-MKTG Delhi

Patratu Vidyut Utpadan Nigam Limited * Distt.Ramgarh(Jharkhand) C & M Deptt.

BHEL

NTPC	PROJECT : PATRATU	LIST OF ITEMS REQUIRING QP	REF. NO :
	PACKAGE : EPC (FGD) Package	APPROVAL & ACCEPTABLE	REVISION NO : 00
	MAIN CONTRACTOR : M/s BHEL	VENDOR AS APPROVED BY	DATE : 16-05-17
	CONTRACT NO : CS-5585-001-2		

No.	Major Equipment	QP Inspection Category	QP No.	QP Sub mission SCH	QP Approval SCH	Proposed Sub Supplier	Place	SS Approval Status	SS Data II Sub. SCH	SS Approval SCH	Remark
		I				Hawa Engineers	Ahmedabad	A		Forged Steel Gate globe check valve upto 50 NB Class 800	
		I									
		I									
		I									
18	Flap Gate, R&P Gate,										
		I				TKII	Pune	A			
		I				Mining&Material Handling	Kolkata	A			
						United Technomac	Pune	A			
		I				MBE	Kumardhubi	A			
		I				Prepec	Howrah	A			
						HMTC	Kolkata	A			
		I				Elecon	VV Nagar	A			
		I				Indiana Conveyor	Jejori, Pune	A			
		I						DR			
		I						DR			
		I						DR			
		I				Kirloskar Brothers	Pune	A			
		I				Sam Turbo	Coimbatore	A			
		I				Mather & Platt	Pune	A			
19	Water Pumps(process water)	I				KSB	Pune	A			
		I				Weir Minerals	Bangalore	A			
		I				WPIL	Kolkata/Gaziabad	A			
		I				Kishore	Pune	A			
		I				Flow More	Ghaziabad	A			
20	Metallic Expansion Joints	I				Lonestar Industries	Chennai	A			
		I				Mechwell	Nasik	A			
		I				BHEL	Ranipet	A			
		I				Keld Ellenloff	Chennai	A			
		I				Eagle Burgmann	Chennai / Denmark	A			
21	Non-Metallic Expansion Joints for Ducts	I				HKR	Kolcata	A			
		I				Safetech	Delhi	A			
		I				Bachmann Industries(India) Ltd.	New Delhi	DR			
		I				Elastomeric Engineers	Salem	DR			
		I				Urja Products Pvt.Ltd.	Ahmedabad	DR			

Bharat Heavy Electricals Limited PS-MKTG Delhi

Deptt.

BHEL

NTPC	PROJECT : PATRATU	LIST OF ITEMS REQUIRING QP	REF. NO :
	PACKAGE : EPC (FGD) Package	APPROVAL & ACCEPTABLE	REVISION NO : 00
	MAIN CONTRACTOR : M/s BHEL	VENDOR AS APPROVED BY	DATE : 16-05-17
	CONTRACT NO : CS-9585-001-2		

No.	Major Equipment	QP Inspection Category	QP No.	QP Submission SCH	QP Approval SCH	Proposed Sub Supplier	Place	SS Approval Status	SS Detail Sub. SCH	SS Approval SCH	Remark
		I				Hercules Hoist Ltd.	Mumbai	A		Electric Hoist upto 15MT	CAT - III upto 5 T capacity Hoist,
		I				Reva Industries	Faridabad	A		Upto 40MT	
		I				Consolidated Hoist	Satara / Pune	A		EOT Cranes upto 40MT and Hoists above 15MT	
		I				Lifting Equipment and Accessories	New Delhi	A		Hoists upto 5MT	
		I				Grip Engineering Pvt.Ltd	Faridabad	A		EOT upto 5MT & Hoist upto 20MT	
		I				Brady & Morris	Ahmedabad	A		Upto 10 Tons	
22	Electrical Hoist	I				Consolidated Hoist	Pune	A		Upto 35 Tons at Satara & Upto 15 Tons at Pune works	
		I				Tuobro Furguson India Pvt. Ltd	Kolkata	A		Upto 5 Tons	
		I				Grip Engineers	Faridabad	A		Upto 20 Tons	
		I				Tractel Tirfor India Pvt. Ltd	Palwal	A		Upto 15 Tons	
		I				Universal Hoist Fabrik	Thane	A		Upto 20 Tons	
		I				Mangla Hoist	Greater Noida	A		Upto 10 Tons	
		I				Reva Industries	Faridabad	A		Upto 25 Tons	
		I				Eddy Cranes	Pune	A		Upto 14 Tons	
		I				Alpha Services	Bhiwadi	A		Upto 15 Tons	
		I				Century Crane Engineers	Ballabhgarh	A		Upto 25 Tons	
		I				Grip Engineers	Hyderabad	A		Upto 40 Tons	
		I				Anmsel MHE Pvt.Ltd.	Bangalore	A		Hoist upto 15MT,EOT upto 10MT	
		I				Century Crane Engineers	Ballabhgarh	A		Upto 15 Tons	
		I				Tractel Tirfor India Pvt. Ltd	Kalyani	A		Upto 20 Tons	

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Patratu Vidyut Utpadan Nigam Limited C & M Deptt. Distt-Ramgarh(Jharkhand)

BHEL

NTPC	PROJECT : PATRATU	LIST OF ITEMS REQUIRING QP	REF. NO :
	PACKAGE : EPC (FGD) Package	APPROVAL & ACCEPTABLE	REVISION NO : 00
	MAIN CONTRACTOR : M/s BHEL	VENDOR AS APPROVED BY	DATE : 16-05-17
	CONTRACT NO : CS-5585-001-2		

No.	Major Equipment	QP Inspection Category	QP No.	QP Submission SCH	QP Approval SCH	Proposed Sub Supplier	Place	SS Approval Status	SS Detail Sub. SCH	SS Approval SCH	Remark
23	Hydro Cyclone	I				FL Smidth	Chennai	DR			
		I				Weir Minerals	Bangalore	A			
		I				Multo Tech	S.Africa	A			
		I				McNally Bharat	Bangalore	DR			
24	Rubber Lining of Pipes	I				Jasmino Polymertech	Taloja	A			
		I				CORI Engineers	Chennai	A			
		I				Western Rubber	Mumbai	A			
		I				Elastomer Lining	Ambernath	A			
		I				Emkay Rubber	Mumbai	A			
		I				Rishi	Bahalgarh	A			
		I				Poly Rubber	Mumbai	A			
		I				Temsec Rubber	Kolkata	A			
		I				Presidency Rubber	Howrah	A			
		I				Arul Rubber Pvt.Ltd	Hosur	A			
		I				Industrial Moulders	Vadodara	A			
		I				MILL Industries	Chennai	DR			
		I				Lebracs rubber	Pondicherry	DR			
25	FRP PIPE with fittings	III				Main contractor approved source		A		upto 3"	
26	Rubber Lining for Tank and absorber	III				MIL Industries	Chennai	A			
		III				TIP TOP	Germany	A			
		III				Steatuer	Germany	A			
		III				Arul Rubber	Hosur	A			
		III				Temsec Rubber	Kolkata	A			
						Lebracs Rubber	Pondicherry	DR			
						CORI Engineers	Chennai	DR			
27	Ventillation Fans	I				Patel Air	Ahmedabad	A			
		I				Marathan Electric	Kolkata	A			
		I				Howden	Kolkata / Chennai	A			
		I				SK System	Sonepat	A			
		I				Andrew Yule	Kolkata	A			
		I									

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Patratu Vidyut Utpadan Nigam Limited ★ Distt-Ramgarh(Jharkhand) C & M Deptt.

BHEL

NTPC	PROJECT : PATRATU	LIST OF ITEMS REQUIRING QP	REF. NO :
	PACKAGE : EPC (FGD) Package	APPROVAL & ACCEPTABLE	REVISION NO : 00
	MAIN CONTRACTOR : M/s BHEL	VENDOR AS APPROVED BY	DATE : 15-05-17
	CONTRACT NO : CS-9585-001-2		

No.	Major Equipment	QP Inspection Category	QP No.	QP Submission SCH	QP Approval SCH	Proposed Sub Supplier	Place	SS Approval Status	SS Detail Sub. SCH	SS Approval SCH	Remark
28	Air receiver	I				Abacus Heat Transfer	Faridabad	A			
						KBL	Kondhapuri	A			
						Diamond Fabricators	Pune	A			
						Integrated Engineers	Mumbai	A			
						United Engineering Works	Nasik	A			
						Parkaire	Delhi	A			
						Temasmo Vesselex	Noida	A			
						GEM	Coimbatore	A			
						Vee Sons	Trichy	DR			
						Patel Air temp Ltd	Ahmedabad	DR			
						G B Industries	Trichy	DR			
						Par Energy Infra Pvt Ltd	Hyderabad	DR			
						Janta Engineering & Company	Faridabad	DR			
						Sri Rang Indsutries	Coimbatore	DR			
						C Doctor	Ahmedabad	DR			
29	Structual Steel Rolled /Plate Sections(CS)	$				SAIL		A			
		$				Ispat Industries		A			
		$				Lloyeds Steel		A			
		$				JSW		A			
		$				RINL		A			
30	Structural Steel – Pipes IS 1161	III				Main Contractor approved sources					
31	S S plates	$				JSL Stainless	Hisar	A			Upto 20 mm thick
		$				Industeel Loire	France	A			Liner SS 304
		$				Industeel Belgium	Belgium	A			GR -304,309,310,316
		$				Columbus Steel (Acrinox)	South Africa	A			GR -304,309,310,316
		$				SAIL	Bhilai/Salem	A			GR -304,309,310,316

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Utpadan Mukhyalaya Patratu Dist-Ramgarh(Jharkhand)

BHEL

NTPC	PROJECT : PATRATU	LIST OF ITEMS REQUIRING QP	REF. NO :
	PACKAGE : EPC (FGD) Package	APPROVAL & ACCEPTABLE	REVISION NO : 00
	MAIN CONTRACTOR : M/s BHEL	VENDOR AS APPROVED BY	DATE : 16-05-17
	CONTRACT NO : CS-9585-001-2		

No.	Major Equipment	QP Inspection Category	QP No.	QP Submission SCH	QP Approval SCH	Proposed Sub Supplier	Place	SS Approval Status	SS Detail Sub. SCH	SS Approval SCH	Remark
32	Insulation Cladding	III				Nalco	India	A			
		III				Hindalco	India	A			
		III				Jindal	India	A			
	LEGENDS										
	SYSTEM SUPPLIER/SUB-SUPPLIER APPROVAL STATUS CATEGORY (SHALL BE FILLED BY NTPC)										
	A – For these items proposed vendor is acceptable to NTPC. To be indicated with letter "A" in the list alongwith the condition of approval, if any.										
	DR – For these items "Detailed required" for NTPC review. To be identified with letter "DR" in the list.										
	* For the items not appearing in the preaward list, bidder and NTPC will mutually discussed in future.										
	QP/INSPN CATEGORY:										
	CAT-I : For these items the Quality Plans are approved by NTPC and the final acceptance will be on physical inspection witness by NTPC.										
	CAT-II : For these items the Quality Plans approved by NTPC. However no physical inspection shall be done by NTPC. The final acceptance by NTPC shall be on the basis review of documents as per approved QP.										
	CAT-III : For these items Main Supplier approves the Quality Plans. The final acceptance by NTPC shall be on the basis certificate of conformance by the main supplier.										
	UNITS/ WORKS : Place of manufacturing Place of Main Supplier of multi units/works.										
	* - Engg. clearance is also required being a Sub-QP. \$- Review of Mill TC for RAW Material to be done by NTPC and shall be included in the QP of corresponding equipment.										

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★ Patratu Vidyut Utpadan Nigam Limited ★ C & M Deptt.

BHEL

NTPC	PROJECT: PATRATU 3X800 MW		LIST OF ITEMS REQUIRING QUALITY PLAN AND				REF NO. :
	PACKAGE: TG		SUBCONTRACTOR APPROVAL SUB SYSTEM: ST& AUX				REV NO.:
	CONTRACTOR: BHEL HARIDWAR CONTRACT NO.:						DATE: 05.04.2017

Sl No.	Item	QP Insp. Cat.	NTPC QP No. QVE-Q	Vendor/ Manufacturer Name	Place	SC_AP PL_ST ATUS	Remarks
1	HP OUTER CASING CASTING (EXHAUST)	I	QVM-Q-	JAPAN CASTING AND FORGING	JAPAN	A	NO SEPARATE VENDOR QP (ALREADY COVERED IN NTPC APPROVED BHEL MQP)
				THE JAPAN STEEL WORKS LTD.	JAPAN	A	
				LITOSTROJ STEEL LTD.	SLOWENIA	DR	
				STAR WIRE (INDIA) LTD.	INDIA	DR	
				ACCIAIERIA FONDERIA CIVIDALE	ITALY	A	
				VOESTALPINE GIESSEREI LINZ	AUSTRIA	A	
				SANDE STAHLGUSS GMBH	GERMANY	A	
				CFFP, BHEL	Haridwar	A	
				HANWA CO. LTD. (MANUFACTURER: UBE STEELS, JAPAN)	JAPAN	DR	
				LUCCHINI RS S.P.A.	ITALY	DR	
2	HP OUTER CASING CASTING (INLET)	I	QVM-Q-	ACCIAIERIA FONDERIA CIVIDALE	ITALY	A*	NO SEPARATE VENDOR QP (ALREADY COVERED IN NTPC APPROVED BHEL MQP) A* as per approval conditions
				THE JAPAN STEEL WORKS LTD.	JAPAN	A	
				JAPAN CASTING AND FORGING	JAPAN	A	
				VOESTALPINE GIESSEREI LINZ	AUSTRIA	A	
				CFFP, BHEL	Haridwar	DR	
3	EXHAUST HP OUTER CASING M/C	I	QVM-Q-	HEEP	Hardwar	A	
4	INLET HP OUTER CASING M/C			Rossi And Duso	Italy	A	
				MCE (New name BILFINGER MASCHINENBAU GMBH)	Austria	A	
				Bruno Presezzi	Italy	A	
				Nugo Romano	Italy	A	
5	HP INNER CASING CASTING	I	QVM-Q-	VOESTALPINE GIESSEREI LINZ	AUSTRIA	A	NO SEPARATE VENDOR QP (ALREADY COVERED IN NTPC APPROVED BHEL MQP) A* :Approved for wt. upto 20.5T
				ACCIAIERIA FONDERIA CIVIDALE	ITALY	A*	
				THE JAPAN STEEL WORKS LTD.	JAPAN	A	
				JAPAN CASTING AND FORGING	JAPAN	A	
				HANWA CO. LTD. (MANUFACTURER: UBE STEELS, JAPAN)	JAPAN	DR	
				SANDE STAHLGUSS GMBH	GERMANY	A*	
				SIEMENS AG	GERMANY	DR	
				ISGEC HEAVY ENGINEERING LTD	MUZZAFANAGAR	DR	
				LITOSTROJ STEEL LTD.	SLOVENIA	DR	
				STAR WIRE (INDIA) LTD.	Ballabhgarh	DR	
				CFFP, BHEL	Haridwar	A	
6	HP INNER CASING M/C	I	QVM-Q-	HEEP, BHEL	Hardwar	A	

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(SK Chauhan)
BHEL/ Haridwar

				Rossl And Duso	Italy	A	
				MCE (New name BILFINGER MASCHINENBAU GMBH)	Austria	A	
				Bruno Presezzi	Italy	A	
				Nugo Romano	Italy	A	
7	HP TURBINE SHAFT FORGING 9-10% Cr	II	QVM-Q-	SAARSCHMIEDE GMBH	Germany	A	NO SEPARATE VENDOR QP (ALREADY COVERED IN NTPC APPROVED BHEL MQP)
				SCHMIEDEWERKE GRODITZ GMBH	Germany	DR	
				JAPAN CASTING AND FORGING	Japan	A	
				THE JAPAN STEEL WORKS LTD.	Japan	A	
				SDF, Terni	ITALY	A	
				BOHLER EDELSTAHL GMBH & CO. KG	AUSTRIA	DR	
				UMP TRADING S.A. (SUPPLY THRU ENERGOMASH, UKRAINE)	SWITZERLAND	DR	
8	HP TURBINE SHAFT M/C	I	QVM-Q-	- HEEP	Hardwar	A	
				- Rossl And Duso	Italy	A	
				-Bruno Presezzi	Italy	A	
				-Nugo Romano	Italy	A	
				-Siemens AG	Germany	A	
9	HP TURBINE ROTOR	I	QVM-Q-	HEEP	Haridwar	A	
10	HP STATIONARY & MOVING BLADES BAR STOCK	II	QVM-Q-	Böhler	Austria	A	NO SEPARATE VENDOR QP A*: ONLY FOR HW10687 & HW10786
				Walzwerke	Germany	A	
				Metal Ravne	Slovenia	A	
				Starwire	Ballabhgarh	A	
				Kalyani Carpenter	Pune	A*	
				BGH	GERMANY	A	
11	HP STATIONARY & MOVING BLADES (M/C)	II	QVM-Q-	Leistritz	Germany	A	
				EnergietechnikEinsal	Germany	A	
				Wuxi Turbine Blade	China	A	
				Officine Meccaniche Zema	Italy	A	
				Wiromet	Poland	A	
				CMSNC Di Menegazzi	Italy	DR	
				HEEP	Hardwar	A	
				Praewest Praezisionswerkstaett	Germany	DR	
				Siemens Ltd	India	DR	
				Euroflex Transmissions (India) Pvt. Ltd.	Hyderabad	DR	
12	ESV & CV CASING CASTING (HP VALVES) MAT 9-10% Cr		QVM-Q-	VOESTALPINE GIESSEREI LINZ	AUSTRIA	A	QP APPROVAL REQD. FOR STARWIRE, ISGEC and CFFP ONLY
				ACCIAIERIA FONDERIA CIVIDALE	ITALY	A	
				THE JAPAN STEEL WORKS LTD.	JAPAN	A	
				JAPAN CASTING AND FORGING	JAPAN	A	

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				HANWA CO. LTD. (MANUFACTURER: UBE STEELS, JAPAN)	JAPAN	DR	
				SANDE STAHLGUSS GMBH	GERMANY	A	
				LITOSTROJ STEEL LTD.	SLOWENUA	DR	
				STAR WIRE (INDIA) LTD.	BALLABHAGARH	A	
				CFFP, BHEL	Haridwar	A	
13	ESV & CV CASING (HP VALVES) M/C	I	QVM-Q-	-HEEP + NTPC approved sub-vendors	Haridwar	A	
				-Energy Machines	Ahemdabad	A	
14	CASTING FOR DIFFUSER / HP VALVE COVER / OVERLOAD VALVE CASING	II	QVM-Q-	INOSSMAN FONDERIE ACCIAIO MANI	ITALY	A	(QP APPROVAL REQD. FOR STARWIRE, ISGEC and CFFP ONLY)
				VOESTALPINE GIESSEREI TRAISEN	AUSTRIA	A	
				EMIRATES TECHNO CASTING FZE	SHARJAH	DR	
				LUCCHINI RS S.P.A.	ITALY	DR	
				THE JAPAN STEEL WORKS LTD.	JAPAN	A	
				JAPAN CASTING AND FORGING	JAPAN	A	
				SCHMOLZ + BICKENBACH GUSS GMBH	GERMANY	DR	
				STAHLGUSS SAAR GMBH	GERMANY	DR	
				GOODWIN STEEL CASTINGS LTD.	UK	DR	
				PEEKAY STEEL CASTINGS PVT LTD	CALICUT	DR	
				ISGEC HEAVY ENGINEERING LTD	MUZZAFANAGAR	A	
				LITOSTROJ STEEL LTD.	SLOWENIA	A	
				STAR WIRE (INDIA) LTD.	BALLABHAGARH	A	
				CFFP, BHEL	Haridwar	A	
15	HP VALVE ASSEMBLY	I	QVM-Q-	- HEEP	Hardwar	A	
16	HP JOINT BOLTS	I	QVM-Q-	- HEEP + NTPC approved sub-vendors #	Hardwar	A	#REFER NOTE 3
17	HP TURBINE ASSLY	I	QVM-Q-	- HEEP	Hardwar	A	
18	STEAM INLET / BREECH BLOCK / INLET CONNECTION / OVERLOAD CONNECTION / VALVE COVER / ALL RINGS & FORGINGS MAT 9-10%Cr	II	QVM-Q-	STARWIRE	Ballabhgarh	A	QP APPROVAL REQD. FOR CFFP ONLY AND FOR OTHERS BHEL APPROVED QAP TO BE FOLLOWED
				KISAAN STEEL	GHAZIABAD	DR	
				CHW FORGE	GHAZIABAD	A	
				GOODLUCK ENGINEERING	GHAZIABAD	DR	
				CFFP,BHEL	Haridwar	A	
				MIDHANI	HYDERABAD	A	
				BAY FORGE	Chennai	A	
				FORGITAL	ITALY	A	
				BOHLER	AUSTRIA	A	
19	FORGING FOR THREADED RING / SHAFT SEAL RING / RING / EXTRACTION INSERT / FLANGE MAT 1Cr 1Mo	II	QVM-Q-	MACKEIL ISPAT AND FORGINGS LTD	INDIA	DR	QP APPROVAL REQD. FOR CFFP ONLY AND FOR OTHERS BHEL APPROVED QAP TO BE FOLLOWED
				STAR WIRE (INDIA) LTD.	Ballabhgarh	A	
				KISAAN STEELS (PVT.) LTD.	GHAZIABAD	A	
				CHW FORGE (P) LTD	GHAZIABAD	A	
				GOOD LUCK ENGINEERING CO.	GHAZIABAD	A	
				GHAZIABAD FORGINGS PVT LTD	GHAZIABAD	DR	
				R. D. FORGE	GHAZIABAD	DR	
				CFFP,BHEL	Haridwar	A	

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				VISHNU FORGE	Bangalore	A	
				RING FORGINGS PVT LTD	Bangalore	DR	
				GHAZIABAD ISPAT UDYOG LTD.	GHAZIABAD	DR	
				VIKRANT FORGE LIMITED	KOLKATA	DR	
				BAY-FORGE LIMITED	Chennai	A	
				FORGITAL ITALY S.P.A.	ITALY	A	
20	IP OUTER CASING CASTING (NODULAR CASTING) BEARING PEDESTAL WITH COVER (NODULAR CASTING)	II	QVM-Q-	HANWA CO. LTD. (MANUFACTURER: UBE STEELS, JAPAN)	JAPAN	DR	NO SEPARATE VENDOR QP (ALREADY COVERED IN NTPC APPROVED BHEL MQP)
				FRIEDRICH WILHELM-HUETTE EISEN(BUDERGUSS)	GERMANY	A	
				ERGOCAST GUSS GMBH	GERMANY	A	
				SPEZIALGUSS WETZLAR GMBH	GERMANY	A	
				ACCIAIERIA FONDERIA CIVIDALE	ITALY	A	
				DALIAN HUARUI HEAVY INDUSTRY	CHINA	A	VENDOR QP REQUIRED ONLY FOR M/s ISGEC
		I		ISGEC HEAVY ENGINEERING LTD	Mujaffarnagar	DR	
				KOCEL MACHINERY CO. LTD	CHINA	DR	
21	IP OUTER CASING M/C	I	QVM-Q-	- HEEP	Hardwar	A	
				- Rossl And Duso	Italy	A	
				-MCE (New name BILFINGER MASCHINENBAU GMBH)	Austria	A	
				-Bruno Presezzi	Italy	A	
				-Nugo Romano	Italy	A	
22	IP INNER CASING CASTING (9% Cr)	I	QVM-Q-	ACCIAIERIA FONDERIA CIVIDALE	ITALY	DR	NO SEPARATE VENDOR QP EXCEPT FOR CFFP
				THE JAPAN STEEL WORKS LTD.	JAPAN	A	
				JAPAN CASTING AND FORGING	JAPAN	A	
				SIEMENS AG	GERMANY	DR	
				VOESTALPINE GIESSEREI LINZ	AUSTRIA	A	
				ISGEC HEAVY ENGINEERING LTD	MUJAFFARNAGAR	DR	
				CFFP,BHEL	Hardwar	A	
23	IP INNER CASING M/C	I	QVM-Q-	HEEP	Hardwar	A	
				Rossl And Duso	Italy	A	
				MCE (New name: BILFINGER MASCHINENBAU GMBH)	Austria	A	
				Bruno Presezzi	Italy	A	
				Nugo Romano	Italy	A	
24	IP ROTOR FORGING 9-10% Cr	II	QVM-Q-	SDF .TERNI	Germany	A	NO SEPARATE VENDOR QP (ALREADY COVERED IN NTPC APPROVED BHEL MQP)
				JAPAN CASTING AND FORGING,JAPAN	Italy	A	
				SAARSCHMIEDE GMBH, GERMANY	Japan	A	
				THE JAPAN STEEL WORKS LTD.,	JAPAN	A	
25	IP TURBINE SHAFT M/C	I	QVM-Q-	- HEEP	Hardwar	A	
				- Rossl And Duso	Italy	A	
				-Bruno Presezzi	Italy	A	
				-Nugo Romano	Italy	A	
				-Siemens AG	Germany	A	
26	IP TURBINE ROTOR		QVM-Q-	Siemens AG Energy Sector	GERMANY	A	
				HEEP	Haridwar	A	

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27	IP STATIONARY & MOVING BLADES BAR STOCK	II	QVM-Q-	Böhler	Austria	A	NO SEPARATE VENDOR QP A*:ONLY FOR HW10687 & HW10786
				Walzwerke	Germany	A	
				Metal Ravne	Slovenia	A	
				Starwire	Ballabhgarh	A	
				Kalyani Carpenter	Pune	A*	
				BGH	GERMANY	A	
28	IP STATIONARY & MOVING BLADES (M/C)	II	QVM-Q-	Leistritz-Nürnberg	Germany	A	
				EnergietechnikEinsal	Germany	A	
				Wuxi Turbine Blade	China	A	
				Officine Meccaniche Zema	Italy	A	
				Wiromet	Poland	A	
				CMSNC Di Menegazzi	Italy	DR	
				Praewest Praezisionswerkstaett	Germany	DR	
				HEEP	Hardwar	A	
				Siemens Ltd	India	DR	
				Euroflex Transmissions (India) Pvt. Ltd.	Hyderabad	DR	
29	IV CV VALVE CASING (MAT) 9-10 %Cr	I	QVM-Q-	VOESTALPINE GIESSEREI LINZ	AUSTRIA	A	QP APPROVAL REQD. FOR STARWIRE, CFFP , ISGEC
				ACCIAIERIA FONDERIA CIVIDALE	ITALY	A	
				LUCCHINI RS S.P.A.	ITALY	DR	
				THE JAPAN STEEL WORKS LTD.	JAPAN	A	
				JAPAN CASTING AND FORGING	JAPAN	A	
				HANWA CO. LTD. (MANUFACTURER: UBE STEELS, JAPAN)	JAPAN	DR	
				SCHMOLZ + BICKENBACH GUSS GMBH	GERMANY	DR	
				STAHLGUSS SAAR GMBH	GERMANY	DR	
				ISGEC HEAVY ENGINEERING LTD	MUJAFFARNAGAR	A	
				LITOSTROJ STEEL LTD.	Slovenia	DR	
				STAR WIRE (INDIA) LTD.	Ballabhgarh	A	
				CFFP, BHEL	Haridwar	A	
30	IV CV CASING M/C	I	QVM-Q-	- HEEP	Haridwar	A	
				- Energy Machines	Ahemdabad	A	
				- Siemens AG Energy Sector	Germany	A	
31	IV CV VALVE ASSEMBLY	I	QVM-Q-	- HEEP	Hardwar	A	
32	IP JOINT BOLTS	I	QVM-Q-	- HEEP + NTPC approved sub-vendors #	Hardwar	A	# REFER NOTE 3
33	IP TURBINE ASSLY	I	QVM-Q-	- Siemens AG Energy Sector	Germany	A	
				HEEP	HARIDWAR	A	
34	IP SHAFT SEALING RING			- HEEP + NTPC approved sub-vendors #	Hardwar	A	# REFER NOTE 3
35	LP TURBINE SHAFT FORGING	II	QVM-Q-	UMP TRADING S.A. (SUPPLY THRU ENERGOMASH, UKRAINE)	SWITZERLAND	DR	NO SEPARATE VENDOR QP (ALREADY COVERED IN NTPC APPROVED BHEL MQP)
				SDF TERNI	Italy	A	
				THE JAPAN STEEL WORKS LTD., JAPAN	Japan	A	
				JAPAN CASTING AND FORGING, JAPAN	Japan	A	
				SAARSCHMIEDE GMBH, GERMANY	GERMANY	A	
				CHINA FIRST HEAVY INDUSTRIES, CHINA	CHINA	DR	
				SC DOOSAN IMGB SA, ROMANIA	ROMANIA	DR	

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				CHINA NATIONAL ERZHONG GROUP, CHINA	CHINA	DR	
				SHANGHAI HEAVY MACHINERY PLANT, CHINA	CHINA	DR	
36	LP TURBINE SHAFT M/C	I	QVM-Q-	- HEEP	Hardwar	A	
				- Rossl And Duso	Italy	A	
				- Nugo Romano	Italy	A	
				- Siemens AG	Germany	A	
37	LP TURBINE ROTOR	I	QVM-Q-	HEEP	Haridwar	A	
38	LP INNER CASING FABRICATION	I	QVM-Q-	- HEEP + NTPC approved sub-vendors#	Haridwar	A	# REFER NOTE 3
39	LP INNER CASING M/C	I	QVM-Q-	- HEEP + NTPC approved sub-vendors#	Haridwar	A	# REFER NOTE 3
40	LP INNER CASING ASSLY	I	QVM-Q-	- HEEP	Haridwar	A	
41	CASING UPPER PART, CASING SIDE WALL (L&R), FRONT WALL (TS&GS)	I	QVM-Q-	- HEEP + NTPC approved sub-vendors#	Haridwar	A	# REFER NOTE 3
42	GUIDE BLADE CARRIER (1L & 1R)	I	QVM-Q-	- HEEP + NTPC approved sub-vendors#	Hardwar	A	# REFER NOTE 3
43	LPT COMPENSATORS	I	QVM-Q-	BOA Bellows and expansion joints	Germany	A	
				Flexatherm expanllow Pvt.Ltd.	VADODRA	A	
				SHANGHAI YONGXIN CORRUGATE PIPE CO LTD	CHINA	A	
				Lonestar Industries	Chennai	A	
				NANTONG SHUGUANG EXPANSION JOINT	CHINA	DR	
				Belman A/S	Denmark	DR	
				Siemens Limited	India	DR	
44	COMPENSATOR PIPING (LP CROSS OVER PIPE, LP EXTRACTION PIPING A1, A2, A3, LP SHAFT SEAL COMPENSATOR, LPT COMPENSATOR FOR CASING	I	QVM-Q-	HATEC HAAG- TECHNISCHER HANDEL	Germany	A	
				LONESTAR INDUSTRIES	India	A	
				SHANGHAI YONGXIN CORRUGATE PIPE CO LTD	CHINA	A	
				UNITECH MACHINES LTD	India	DR	
45	LP STATIONARY/ MOVING BLADE BARS	II	QVM-Q-	- Böhler	Austria	A	NO SEPARATE VENDOR QP A*:ONLY FOR HW10687 & HW10786
				- Walzwerke	Germany	A	
				- Metal Ravne	Slovenia	A	
				-Starwire	Ballabhgarh	A	
				- Kalyani Carpenter	Pune	A*	
				BGH	GERMANY	A	
46	LP ROTOR & CASINGS BLADES FROM BAR (M/C)	I	QVM-Q-	- Leistritz-Nürnberg	Germany	A	
				- Energietechnik Einsal	Germany	A	
				- Wuxi Turbine Blade	China	A	
				Officine Meccaniche Zema	Italy	A	
				Wiromet	Poland	A	
				CMSNC Di Menegazzi	Italy	DR	
				HEEP	Hardwar	A	
47	LP CAST BLADES (CASTED)	I	QVM-Q-	- Consolidated Precision Product	Belgium	A	

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				- PTC	Mehsana	A	
				- IPCL	Bhavnagar	A	
				- PCI Ltd	India	DR	
48	LP BLADES (HOLLOW)	I	QVM-Q-	- Binder	Switzerland	A	
				- Cave	Italy	DR	
				- Wuxi Turbine Blade	China	A	
				- Prime Hitech Engineering Ltd	India	A	
				- VRK Industries	India	DR	
49	LP FORGED BLADES (DROP)	II	QVM-Q-	- Wuxi	China	A	NO SEPARATE VENDOR QP (ALREADY COVERED IN NTPC APPROVED BHEL MQP)
				- C Blade	Italy	A	
				- Piertro Rosa	Italy	A	
				- Siemens Ltd	Gurgaon	DR	
				- Bohler	Austria	A	
50	LP FORGED BLADES (DROP) M/c	II	QVM-Q-	- Pietro Rosa	Italy	A	
				- Wuxi Turbine Blade	China	A	
				- C Blade	Italy	A	
				- Bohler	Austria	A	
				-Siemens Ltd	Gurgaon	DR	
51	LP ASSEMBLY	I	QVM-Q-	- BHEL	Hardwar	A	
52	COUPLING BOLTS & NUTS (HP/IP/LP)	I	QVM-Q-	- HEEP + NTPC approved sub-vendors #	Hardwar	A	# REFER NOTE 3
53	BRG. SHELL FOR JOURNAL BRG (Forging)	II	QVM-Q-	MACKEIL ISPAT AND FORGINGS LTD	KOLKATA	DR	NO SEPARATE VENDOR QP EXCEPT FOR CFFP
				STAR WIRE (INDIA) LTD.	Ballabhgarh	A	
				KISAAN STEELS (PVT.) LTD.	GHAZIABAD	A	
				CHW FORGE (P) LTD	GHAZIABAD	A	
				GOOD LUCK ENGINEERING CO.	GHAZIABAD	A	
				GHAZIABAD FORGINGS PVT LTD	GHAZIABAD	DR	
				R. D. FORGE	GHAZIABAD	DR	
				CFFP, BHEL	HARIDWAR	DR	
				VISHNU FORGE INDUSTRIES LTD.	Bangalore	A	
				RING FORGINGS PVT LTD	Bangalore	DR	
				GHAZIABAD ISPAT UDYOG LTD.	GHAZIABAD	DR	
				VIKRANT FORGE LIMITED	KOLKATA	DR	
				BAY-FORGE LIMITED	TAMIL NADU	A	
54	JOURNAL BEARING	II	QVM-Q-	DAEDONG METAL INDUSTRY CO. LTD	South Korea	DR	
				EURO BEARINGS SRL	Italy	A	
				GFM S.R.L. (SOCIO UNICO)	Italy	DR	
				JOHN CRANE BEARING TECHNOLOGY	Germany	A	
				OMEGA INDUSTRIES (P) LTD	Bhopal	A	
				SHENKE SLIDE BEARING CORPORATI	China	DR	
				SIEMENS LIMITED	India	DR	(Main supplier ; Siemens Germany)
				HEEP	HARIDWAR	A	
				TURBOLINK CO.LTD	Korea	DR	

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55	BEARING PEDESTAL WITH COVER (M/C)	I		- HEEP + NTPC approved sub-vendors	Hardwar	A	
56	EHA FOR TURBINE VALVES	II	QVM-Q-	- Bosch Rexroth AG	Germany	A	
				- Horst Thiele Maschinenbau	Germany	DR	
57	HPSU FOR EHA	II	QVM-Q-	- Bosch Rexroth	Germany*	A	*Supply from Bosch Rexorth Sanand Gujrat
				- Hydac	Germany	A	
				-Reineke Mess-und Regeltechnik	Germany	DR	
				-Keicher Engg	Germany	DR	
				- Hydac	India	DR	
58	NON RETURN VALVE-CRH	I	QVM-Q-	- Sempell	Germany	A	
				- BHEL	Tiruchi	A	
59	AIR COOLED CONDENSOR (Sub-QR Item)	I	QVM-Q-	SPX, Dry Cooling	BELGIUM	A	
				Shuanliang Eco-Energy System Co. Ltd. Jiangsu	CHINA	A	
				Harbin Air Conditioning Co. Ltd	CHINA	A	
				Enexio Germany GmBH	GERMANY	A	
				Beijing Shouhang Resources Saving Co. Ltd	CHINA	A	
				SPIG SPA	ITALY	DR	
				Enexio Cooling Tower Technologies(India) Pvt Ltd	INDIA	DR	
				Paharpur Cooling Tower	INDIA	DR	
				Innospin AG	Switzerland	DR	
				Beijing Longyuan Cooling Technologies	CHINA	DR	
				Hamon Shriram Cottrell	INDIA	DR	
				Hamon Cooling System (Tianjin) Co., Ltd.	CHINA	DR	
				Luoyang LONGHUA Heat Transfer & Energy saving conser	CHINA	DR	
				HHI, China	CHINA	DR	
60	CONDENSOR AIR EVACUATION PACKAGE	I	QVM-Q-	Gardner Denver Nash Machinery	CHINA	A	
				Edwards Ltd	UK	A	
				Guangdong Foshan Pump Factory, Guangdong	CHINA	A	
61	LP HEATER TUBES	I	QVM-Q-	- Apex Tubes Pvt Ltd	India	A	
				- Ratnamani	Ahmedabad& Kutch	A	
				- NEOTISS LTD (OLD NAME: Vallourec Heat Exchanger Tubes Limited)	Hyderabad	A	
				- Remi	Mumbai	A	

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				- Ratandeep	Ahmedabad	A	
				MAXIM TUBES CO. LTD	GUJRAT	DR	
				- Heavy Metals	Ahmedabad	DR	
62	GSC TUBES	I	QVM-Q-	- Ratnamani	Ahmedabad & Kutch	A	
				NEOTISS LTD (OLD NAME: Vallourec Heat Exchanger Tubes Limited)	Hyderabad	A	
				- Remi	Mumbai	A	
				- Ratandeep	Ahmedabad	A	
				- Heavy Metals& Tubes	Ahmedabad	DR	
				- Apex Tubes Pvt Ltd	BEHROR	A	
				- Quality Stainless	HISAR	DR	
				- Bhandari Foils & Tubes	DEWAS, MP	DR	
				- Prakash Steelage	Mumbai	DR	
65	GLAND STEAM CONDENSER	I	QVM-Q-	- HEEP + NTPC approved sub-vendors#	Hardwar	A	# Refer Note 3
66	LP HEATER	I	QVM-Q-	- HEEP + NTPC approved sub-vendors#	Hardwar	A	# Refer Note 3
67	TURBINE INTEGERAL PIPING	I	QVM-Q-	BHEL Piping Centre	Chennai	A	A* means as per approval conditions
				Unitech	Saharanpur	A	
				Bend Joints	Bhopal	A	
				Pal Engg.	Yamunanagar	A	
				Dee Development	Faridabad	A	
				Flash Forge Pvt Ltd	Vishakhapatnam	DR	
				BABY ENGINEERING PVT LTD	TRICHY	DR	
				S & G ENGINEERS PVT LTD	Faridabad	DR	
				GUJRAT INFRA PIPES	BARODA	A*	
				Steel Craft Industries	Yamunanagar	DR	
68	OIL MODULE	II	QVM-Q-	Kelag	Switzerland	A	
				VDL Delmas	Germany	A	
				BARIC	UK	A	
				Hydac India Pvt Ltd	Navi Mumbai	DR	
				AEL	Germany	A	
				Flenco	Italy	A	
				Hydac	Germany	A	
				King Dynamics	Switzerland	A	
69	OIL PURIFICATION SYSTEM	I	QVM-Q-	GEA Westfalia Seperator	Bangalore	A	Centrifuge from Germany
				Alfa Laval (India)	Pune	A	
70	HANGERS & SUPPORT (Fabricated Type)	I	QVM-Q-	Pal Engg.	Yamunanagar	A	
				Darshan	Yamunanagar	A	
				Shree Engg.	Haridwar	A	
				Bend Joints	Bhopal	A	

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					Shape Engg.	Haridwar	A	
					Bend Joints	Bhopal	A	
					Spring Supports Mfg co.	HOWRAH	DR	
					Pipe Supports Co.	Hyderabad	DR	
					Hesterberg Gmbh & Co. Kg	Germany	DR	
					Fast Tech Engineers Pvt. Ltd.	India	DR	
					Bergen Pipe Supports India Pvt Ltd	Chittor, AP	A	
					AAA SUPPORTS PVT LTD	VADODRA	DR	
					Unison Etech	Korea	DR	
71	LP BYPASS SYSTEM	II		QVM-Q-	- CONTROL COMPONENT INDIA PRIVATE LTD.	SRICITY , AP INDIA	A	SUB QR ITEM
					- Bomafa	Germany	A	
					- Welland &Tuxhorn	Germany	A	
					- Parcol S.P.A	Italy	DR	
72	THERMAL INSULATION MATERIAL FOR TURBINE	III		QVM-Q-	Heinrich Tapp Gmbh	Germany	A	
		III			Eugen Arnold Gmbh	Germany	A	
		I			Lloyds Insulations (India) Ltd	India	DR	
73	THERMAL INSULATION MATERIAL FOR TIP	I		QVM-Q-	Lloyds Insulation	India	A	
		I			SHREE ENGINEERS	INDORE	DR	
		I			Indo Bell Insulation (Applicator)	India	DR	
74	VARIABLE LOAD SPRING CAGES	I		QVM-Q-	- Spring Support	Kolkata	A	
		III			- Usega	Germany	A	
		II			- Dee Development	India	DR	
		II			- Pipe Supports Co	Hyderabad	DR	
		I			- Bergen Pipe Supports India Pvt Ltd	Chittor, AP	A	
		II			AAA SUPPORTS PVT LTD	VADODRA	DR	
		II			-Unison Etech	Korea	DR	
75	GLAND STEAM EXHAUSTER WITH MOTOR	I		QVM-Q-	Air MOVEMNET AND CONTROL SYSTEMS	India	DR	
					SK System PVT LTD	India	A	
					DUSTECH ENGINEERS PVT LTD		DR	
					CB Doctor	India	A	
79	HP U-SEAL (NIMONIC) RING FORGING	III		QVM-Q-	SMT EXPORT (M/S FRISA FORJADOS, MEXICO)	INDIA	DR	
					MIDHANI	INDIA	A	
					WARTON IMPORT (M/S SHANGHAI TENGHUI, CHINA)	China	DR	
					FORGITAL	Italy	A	
80	STELLITED/COATED FINISH MACHINED VALVE SEAT / VALVE CONE / VALVE SPINDLE / DIFFUSER	I		QVM-Q-	Sai Surface coating	India	A	QP APPROVAL REQD. FOR INDIAN VENDORS ONLY
		III			Kennametal Stellite GMBH	Germany	A	
		III			Stellba AG	Germany	A	
		I			ATS Techno Pvt. Ltd.	Ahmedabad	A	
		I			Associated Plasmatron Pvt.Ltd.,	THANE	A	
		I			ASM ThermalSpray,	Medak, Telangana	DR	

NOTE 1: IN ADDITION TO ABOVE SOURCES BHEL MAY PROCURE ITEMS FROM SIEMENS, SIEMENS APPROVED SOURCES . BHEL TO SUBMIT DOCUMENTS IN SUPPORT OF SIEMENS APPROVED SOURCE.

NOTE 2: QP/INSPECTION CAT-I QP APPROVAL AND INSPECTION BY NTPC: QP/INSPECTION CAT-II QP APPROVAL BY NTPC,NO PHYSICAL INSPECTION BY NTPC.ACCEPTANCE BASED ON REVIEW OF CONTRACTOR INSPECTION REPORT/ TC. : QP/INSPECTION CAT-III NO QP APL AND INSPECTION BY NTPC, ACCEPTANCE

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BASED ON REVIEW OF COC BY BHEL.

NOTE 3: MQP APPROVED FOR BHEL HARIDWAR SHALL BE USED ON SUB-VENDOR'S WORKS. FABRICATION AND MACHINING VENDORS FOR BHEL TURBINE COMPONENTS AS PER ANNEXURE XXX

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