

BOQ	Doc No:	PE-PF-415-164-A001
	Rev No:	0
	Date of issue	01-05-2020

NAME OF PROJECT:	1X660MW BHUSAWAL TPS-UNIT:6
NAME OF PACKAGE:	EFFLUENT TREATMENT PLANT
TECHNICAL SPECIFICATION:	PE-TS-415-164-A001

S. No.	DESCRIPTION	HSN/ SAC CODE	UNIT	QTY
1.0	Total lump sum firm price for SUPPLY PART , SERVICES PART & MANDATORY SPARES comprising of 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, mandatory spares alongwith spares for erection ,startup and commissioning as required, forwarding, proper packing, shipment and delivery at site,unloading, handling, transportation & storage at site, in site transportation, assembly, erection & commissioning, trial run at site and carrying out performance guarantee specified above & final handing over to end customer in flawless condition including supervision of civil works for 15 days by experience/capable engineer for project and package specified above complete with all accessories for the total scope defined as per BHEL NIT & tender technical specification, amendment & agreements till placement of order.		Set	1
2.0	MAJOR BREAK-UP OF PRICES GIVEN IN 1.0 ABOVE.			
2.1	Total lump sum firm price for SUPPLY PART comprising of 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, alongwith spares for erection , startup and commissioning as required, forwarding, proper packing, shipment and delivery at site for project and package specified above complete with all accessories for the total scope defined as per BHEL NIT & tender technical specification, amendment & agreements till placement of order.	84212190	Set	1
2.2	Total lump sum firm price for the SERVICES PART comprising of unloading, handling, transportation & storage at site, in site transportation, assembly, erection & commissioning, final painting at site, trial run at site and carrying out performance guarantee & 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, amendment & agreements till placement of order.	999 433	Set	1
2.3	Total lumpsum firm price for Mandatory spares comprising of manufacture, fabrication, assembly, inspection / testing (as applicable) at vendor's & sub-vendor's works, painting, forwarding, proper packing, shipment, delivery at site & guarantee as per tender technical specification above, amendment & agreements till placement of order.	84212190	Set	1
2.4	Total lumpsum firm price for supervision of civil works for fifteen days.	998732	Set	1

Note: 1) Cost of supervision of civil work shall be paid based on actual days of supervision work on pro rata basis

Particulars of bidder / authorised representative

Name	Designation	Signature		Date	Company Seal

BOQ LIST OF MANDATORY SPARES		Doc No:
		Rev No:
		Date of issue
NAME OF PROJECT:		1X660MW BHUSAWAL TPS-UNIT:6
NAME OF PACKAGE:		EFFLUENT TREATMENT PLANT
TECHNICAL SPECIFICATION:		PE-TS-415-164-A001
Sl. No.	DESCRIPTION	QUANTITY
Mandatory Spare List (Mechanical):		
01:01:00	SPARES FOR HORIZONTAL CENTRIFUGAL PUMPS	
01:01:01	Shaft	(1) One
01:01:02	Shaft Sleeve	(2) Two
01:01:03	Impeller	(1) One
01:01:04	Impeller locking nut and bolt	(4) Four
01:01:05	Impeller wear ring	(4) Four
01:01:06	Casing wear ring	(4) Four
01:01:07	Oil Seal	(4) Four
01:01:08	Oil Deflector	(3) Three
01:01:09	Oil Ring	(3) Three
01:01:10	Gland Packing	400%
01:01:11	Lantern Ring	(3) Three
01:01:12	Mech Seal Assembly	(1) One
01:01:13	Stationary/Carbon Packing and "O" Ring for Mechanical Seal	(3) Sets
01:01:14	Oil Level Gauge	(3) Three
01:01:15	Coupling	(2) Two
01:01:16	Rubber Bush for Coupling	(2) Two
01:01:17	"O" Rings	(2) Sets
01:01:18	Suction Strainers Element	(3) Three
01:01:19	Bearing for Pump Motor	(2) Sets
01:02:00	SPARES FOR VERTICAL TYPE CENTRIFUGAL PUMPS	For each Service & duty
01:02:01	Complete Bowl assembly	(1) Set
01:02:02	Impeller (s)	(1) Set
01:02:03	Shafts	(1) Set
01:02:04	Casing wearing (s)	(1) Set
01:02:05	Impeller wear ring (s)	(1) Set .
01:02:06	Shaft Sleeves	(2) Set
01:02:07	Shaft Sleeves	(1) Set
01:02:08	Shaft nuts & keys	(1) Set
01:02:09	Lantern rings	(1) Set .
01:02:10	Bell mouth liner	(1) Set
01:02:11	Bearings	(1) Set .
01:02:12	Pump motor coupling	(1) Set .
01:03:00	SPARES FOR SCREW PUMPS	For each type & Service
01:03:01	Rotor	(1) One
01:03:02	Shaft	(1) One
01:03:03	Mechanical seal	(1) One
01:03:04	Packing for Stuffing Boxes	(1) Lot (200%)
01:03:05	Bearing	(1)Lot (One (1) for each shaft)
01:04:00	SPARES FOR CLARIFIERS	For each service & rating
01:04:01	Floculator Assembly	(1) Set .
01:04:02	Gear box for Floculator Driver	(1) Lot (One (1) Set of LHS & RHS as applicable)
01:04:03	Gear box for Floculator Driven	(1) One (1) Set of LHS & RHS as applicable
01:04:04	Gear box for Rail drum drive	(1) One (1) Set of LHS & RHS as applicable
01:04:05	Oil seals for all type of gear box	(1) Lot (Five (5) Sets)
01:04:06	Worm wheel	(1) lot (One (1) Set for each type)
01:04:07	Worm wheel worm shaft	(1) lot (One (1) Set for each type)
01:04:08	Coupling complete set	(1) lot (One (1) Set for each type)
01:05:00	SPARES FOR AGITATORS	
01:05:01	Gear Box Unit Complete	(1) Lot (One (1) each type)
01:05:02	Bearing for Gear Box Unit	(1) lot (One (1) Set for each type)
01:05:03	Coupling complete (Motor/Gear box and gear box/agitator)	(1) lot (One (1) Set for each type)
01:05:04	Coupling Bolts	(1) lot (One (1) Set for each type)
01:05:05	Coupling shim pack (if applicable)	(1) Lot (Four (4) Sets each type)
01:05:06	Oil seals	(1) Lot (Four (4) Sets each type)
01:06:00	SPARES FOR VALVES	
01:06:01	(a) Manual Diaphragm valves	(1) Lot (20% of total quantity used for each type and size with minimum two (2) for each type and size.)
	(b) Auto Diaphragm valves	(1) Lot (20% of total quantity used for each type and size with minimum two (2) for each type and size.)
	(c) Spare Diaphragm for above	(1) Lot (20% of total quantity used for each type and size with minimum two (2) for each type and size.)
	(d) Diaphragm	(1) LOT (20% of total quantity used for each type and size with minimum one (1) for each type and size.)
01:06:02	(a) Non return valves (NRV)	(1) Lot (Two (2) of each size & type)
	(b) Flaps for above NRV	(1) Lot (Two (2) of each size)
01:06:03	Gate/ Globe/ Ball valves / plug valve / needle valve	
	(a) Upto 100 NB	(1) Lot (20% of total quantity used for each type and size with minimum two (2) for each type and size.)
	(b) Above 100 NB	(1)Lot (One (1) each type and size.)
01:06:04	Butter fly valve	
	(a) Upto 100 NB	(1) Lot (20% of total quantity used for each type and size with minimum two (2) for each type and size.)
	(b) Above 100 NB	(1)Lot (One (1) each type and size.)

Sl. No.	DESCRIPTION	QUANTITY
01:07:00	SPARES FOR OIL SEPARATOR	
01:07:01	Tube Packs	(1) Lot (10% of total quantity)
01:08:00	SPARES FOR AIR BLOWERS	
01:08:01	Impeller with shaft	(1) Set
01:08:02	Bearings	(1) Set
01:08:03	Oil seals	(5) sets
01:08:04	Filter	(1) Set
01:09:00	MANDATORY SPARE LIST AC and Ventilation System:	
01:09:01	Roof exhauster fans (for each type, rating and capacity)	1 Lot (5 % of total population or one (1) whichever is higher)
01:09:02	Supply air fans (wall mounted) (for each type, rating and capacity)	1 Lot (5 % of total population or one (1) whichever is higher)
01:09:03	exhaust air fans (wall mounted) (for each type, rating and capacity)	1 Lot (5 % of total population or one (1) whichever is higher)
01:09:04	SPLIT AIR CONDITIONERS	
	a) Fan –motor bearing for outdoor unit	Lot (One set for each rating of SAC unit)
	b) Vibration Isolators	Lot (One set each for outdoor unit & Indoor unit for each SAC unit)
	c) Filter	Lot (One set for each SAC unit)
	d) Expansion Valve	Lot (One set for each rating of SAC unit)
	e) Any other spare parts recommended by the Manufacturer	Lot (As recommended by the Manufacturer)
01:10:00	Mechanical spares for Electric Hoist	
01:10:01	Brake linings	Two (2) sets of each type
01:10:02	Rope guide and rope tighter	One (1) of each type
01:10:03	Limit switch	Two (2) of each type and size
01:10:04	Bearings for long travel wheels	Two (2) sets
01:10:05	Bearings for gear boxes for each type of hoist	Two (2) sets
01:10:06	Break liners for all the brakes	100% of total population of each type & size
01:10:07	Oil seals	100% of total population of each type, size rating
01:10:08	Brake springs for all brakes	100% of total population of each type, size rating
01:10:09	Wire ropes for hooks	100% installed on each crane and hoist
01:10:10	Solenoid coils for brakes	Two (2) sets
01:10:11	Overload relay for motors	Two (2)
01:10:12	Limit switches for hoists and travel mechanisms	Two (2) sets
01:10:13	Spare motors for hoists	Two (2)
01:10:14	Long travel machinery	
	a) Gear wheel	One (1) set
	b) Internal clip	Two (2)
	c) Pinion	One (1)
01:11:00	Mechanical spares for Manual hoist	
01:11:01	Load chain wheel	One (1)
01:11:02	Load chain stripping fork	Five (5)
01:11:03	Hand chain wheel	Two (2)
01:11:04	Ratchet pawl	One (1)
01:11:05	Locking ratchet wheel	Two (2)
01:11:06	Guide roller	Two (2)
01:11:07	Brake disc	Two (2)
	Note for Sl. No. 10 &11:- One (1) Set" is defined as 100% requirement for one hoist for the entire hoists of similar size & capacity.	

SI. No.	DESCRIPTION	QUANTITY
C&I Mandatory Spare List:		
02:01:00	ELECTRONIC TRANSMITTERS	
02:01:01	Transmitters of all types, ranges and model no. (for the measurement of Pressure, differential pressure flow, level etc.)	(1)Lot (10% or 2 no. of each type and model, whichever is more)
02:01:02	Electronic cards / PCB's for each type and model and model of transmitters	(1) Lot (10% or 5 nos. of each type, whichever is more)
02:02:00	TEMPERATURE ELEMENTS	
02:02:01	RTDs of each type & length	(1)Lot (10% or 2 nos. whichever is more)
02:02:02	Thermocouples of each type like K-type, R-type, metal etc and length	(1)Lot (10% or 2 nos. whichever is more)
02:02:03	Thermowell for T/C & RTDs	(1)Lot (10% or 1 no. of each type, rating, length used in the system whichever is more)
02:02:04	Process actuated switch devices Including all types of pressure, differential pressure, flow, temperature, differential temperature, level switch devices	(1)Lot (10% or 1 no. of each type and model whichever is more)
02:03:00	INDICATORS/RECORDERS	
02:03:01	Digital Indicators of each model, type & range (including relevant digital indicators of electrical system)	(1) Lot (10% or 2 nos. min. whichever is more)
02:03:02	Vertical Indicators of each type & model	(1) Lot (5% or 1 no. of each model whichever is more)
02:03:03	Recorders for each type and model	(1) Lot (5% or 1 no. whichever is more.)
02:03:04	Consumables for continuous recorders Charts Ink capsules	(1) Lot (25 rolls per recorder/ 25 nos per recorder/ 20 nos. per recorder / Ink Pads /Pens.)
02:03:05	Consumables for multi point recorders	
	a) Charts	(1) Lot (5 nos. per recorder)
	b) Ink pads	(1)Lot (5 nos. per recorder)
	c) Print mechanism/ print head assembly	(1) Lot (10% or 5 nos. of each type whichever is more)
02:03:06	Level transmitters (displacer type)	
	a) Electronic cards / PCB's of level transmitters	(1) Lot (10% of total quantity used or 1 for each type/rating whichever is more)
	b) Level transmitters	(1) Lot (10% of total quantity used or 1 for each type/rating whichever is more)
02:03:07	PD type flow transmitters	(1) Lot (10% of total quantity used or 1 for each type/rating whichever is more)
02:04:00	PROCESS CONNECTION PIPING (for impulse piping /tubing, sampling piping/ tubing and air supply piping as applicable)	
02:04:01	Valves of all types and models	(1) Lot (10% or 2 no. of each type, class, size and model whichever is more.)
02:04:02	2 way, 3way, 5way valve manifolds	(1) Lot (10% or 2 no. of each type, class, size and model whichever is more.)
02:04:03	Fittings	(1) Lot (10 nos. of each type)
02:04:04	Purge meters	(1) Lot (10 % of each model or 2 Nos. whichever is more)
02:04:05	Filter regulators	(1) Lot (10% of each model or 2 Nos. whichever is more)
02:04:06	Impulse pipe & tubing of all type	(1) Lot (20 mtrs each type & size)
02:04:07	Impulse line root valve	(1)Lot (10% of total quantity used or 4 no. whichever is more for each type and rating of each size)
02:04:08	SS tube	(1) Lot (40 mtrs of each type/size)
02:04:09	Fitting for SS tube	(1) Lot (40 nos. of each type/size)
02:05:00	INSTRUMENTATION CABLE, INTERNAL WIRING AND ELECTRICAL FIELD	
02:05:01	Pre fabricated cable of each type	(1) Lot (10% of installed quantity)
02:05:02	Pre fabricated cable connector	(1) Lot (10% or 1no. of each type and model, whichever is more.)
02:05:03	Other cables	(1) Lot (10% of each type, pair and size of actual installed quantity)
02:06:00	ELECTRICAL ACTUATORS	
02:06:01	Actuators	(1) Lot (10% or 1 no. of each type, model and rating, whichever is more.)
02:06:02	Power unit for modulating actuator	(1) Lot (10% or 2 nos. of each type, whichever is more.)
02:06:03	DC-DC unit/power pack units	(1) Lot (10% or 2 nos. of each type, whichever is more.)
02:06:04	Electronic cards	(1) Lot (10% or 2 nos. of each type, whichever is more.)
02:06:05	Brake assembly	(1) Lot (10% or 2 nos. of each type, whichever is more.)
02:06:06	Brake coils	(1) Lot (10% or 2 nos. of each type, whichever is more.)
02:06:07	Position feed back transmitters	(1) Lot (10% or 2 nos. of each type, whichever is more.)
02:06:08	Control unit	(1) Lot (10% or 2 nos. of each type, whichever is more.)
02:06:09	Torque and limit switch assembly of each unit	(1) Lot (10% or 2 nos. of each type, whichever is more.)
02:06:10	O-ring	(1) Lot (1 set of each size)
02:06:11	Motor	(1) Lot (1 no. of each type & rating)
02:06:12	Auxiliary contact	(1) Lot (10% of total quantity used or 2 nos. whichever is more for each type and rating of each size)
02:06:13	Seal kit	(1) Lot (1 set of each type & size)
02:07:00	CONDUCTIVITY	
02:07:01	Conductivity Sensor/cell for each type of Cell Constant	(1) Lot (20% of the total no. used in the system or minimum 2(two) nos. whichever is higher.)
02:07:02	Conductivity Transmitter Complete Set	(1) Lot (20% of the total no. used in the system or minimum 2(two) nos. whichever is higher.)
02:08:00	pH	
02:08:01	pH Sensor	(1) Lot (20% of the total no. used in the system or minimum 2(two) nos. whichever is higher.)
02:08:02	pH Transmitter Complete Set	(1) Lot (20% of the total no. used in the system or minimum 2(two) nos. whichever is higher.)
02:08:03	Sensor recharger	(1) Lot (20% of the total no. used in the system or minimum 2(two) nos. whichever is higher.)
02:09:00	OTHER HARDWARE	
02:09:01	Stainer each type	(2) 2(two) nos.

SI. No.	DESCRIPTION	QUANTITY
02:09:02	Sample Cooler	(2) 2(two) nos.
02:09:03	High Pressure Reducing Valve	(5) 5(five) nos.
02:09:04	Cation column	(5) 5(five) nos.
02:09:05	Pressure Gauge, Pressure Switch, Temperature Gauge, Temperature Switch, Isolating Valve, Solenoid Valve, Rota Meter etc.	(1) Lot(10% of total quantity of each item and type/rating used in the system or minimum 1(one) no. whichever is higher.)
02:09:06	Annunciation System	
	a) Each type of PCB	(1) Lot (1(one) No. each)
	b) Lamp Box with Facia & Lamps (LED type)	(5) 5(five)Nos.
	c) Hooter	(1) 1(one) No.
02:09:07	Auxiliary/Power Contactor, Push Button, Indicating Lamp, Fuse etc. for Chiller Unit	(1) Lot (10% of total quantity of each type of items used in the system or minimum 2(two) nos. whichever is more.)
02:10:00	RADAR TYPE LEVEL TRANSMITTER	
02:10:01	Transmitter/Receiver	(1) Lot (10% or 1 no. of each type transmitter/ receiver)
02:10:02	Electronic card	(1) Lot (10% or 1 no. of each type electronic card)
02:11:00	CONTROL PANEL AND LOCAL/ REMOTE CONTROL DESK (AS APPLICABLE)	
02:11:01	Recorder	(1) Lot (1(one) No. each type and model)
02:11:02	Bar graph indicator	(1) Lot (10% of total quantity used in the system or minimum 1(one) no. whichever is more for each type and model.)
02:11:03	Digital indicator	(1)Lot (10% of total quantity used in the system or minimum 1(one) no. whichever is more for each type and model.)
02:11:04	Mosaic/Conventional Type Push button Station	(1) Lot (10% of total quantity used in the system or minimum 2(two) nos. whichever is more for each type and model.)
02:11:05	Mosaic Type Push button Station with LED Indication	(1) Lot (10% of total quantity used in the system or minimum 2(two) nos. whichever is more for each type and model.)
02:11:06	Mosaic Type LED Indication Station	(1)Lot (10% of total quantity used in the system or minimum 2(two) nos. whichever is more for each type and model.)
02:11:07	Simaphore Indicator	(1) Lot (2(two)Nos. each type)
02:11:08	ANNUNCIATION SYSTEM (For offsite / Auxiliary Plants)	
	a) Each type of PCB (for non-PLC driven system)	(1) Lot (1(one) No. each)
	b) Lamp Box with Facia & Lamps (LED type)	(1) Lot (10% with minimum 2 nos.)
	c) Hooter	(1) 1(one) No.
02:12:00	MANDATORY SPARES NOT COVERED ABOVE	Bidder to supply 10% electronic modules/ cards or any other electronic components required for system such as annunciation system for offsite/auxiliary plant, online condensate tube cleaning system, ambient air monitoring system, plant simulator.

Sl. No.	DESCRIPTION	QUANTITY
Electrical Mandatory Spare List:		
03:01:00	415V MOTORS	
03:01:01	Terminal plates for motors upto 30kw for each rating	(1) Lot (1 no. For each type & rating of Motor)
03:01:02	Terminal plates for motors above 30kw for each rating	(1) Lot (1 no. For each type & rating of Motor)
03:01:03	Heaters	(1) Lot (1 set For each type & rating of Motor)
03:01:04	Greasing arrangements	(1) Lot (1 set For each type & rating of Motor)
03:01:05	Motor of each type and rating	(1) Lot (10% of the installed quantity or minimum 1 number whichever is higher)
03:01:06	Bearings (DE and NDE)	(1) Lot (1 set For each type & rating of Motor)
03:01:07	End shield cover driving of non driving end	(1) Lot (1 set For each type & rating of Motor)
03:01:08	Cooling fan	(1) Lot (1 set For each type & rating of Motor)
03:01:09	Motor terminal block	(1) Lot (1 set For each type & rating of Motor)
03:01:10	Complete set of coupling	(1) Lot (1 set For each type & rating of Motor)
Note:		
A)	If any item as listed above under mandatory spare list is not applicable, then bidder to supply its equivalent spares.	
B)	If any item which is considered as not applicable by bidder and if the same is found to be applicable during detailed engineering, bidder to supply the same without any cost implication.	