

	TITLE:		SPECIFICATION NO. PE-TS-412-155A-	
	2X660 MW ENNORE SEZ STPP		A001	
			SECTION : I	
			SUB-SECTION:IA	
		TECHNICAL SPECIFICATION FOR CONDENSATE POLISHING UNIT		
		REV. NO. 00		DATE :

ANNEXURE VI

MANDATORY SPARE LIST

	TITLE: 2X660 MW ENNORE SEZ STPP		SPECIFICATION NO. PE-TS-412-155A-A001	
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MANDATORY SPARES LIST FOR CONDENSATE POLISHING UNIT

Sr. no.	Description of Item	Unit	Quantity
	MECHANICAL		
1.0	SERVICE & REGENERATION VESSELS (FOR EACH TYPE & SIZE)		
i)	Diffuser, Distributors & Nozzle	%	10
ii)	Perforated Laterals & Under Drain Collectors	%	10
iii)	Gaskets	Set	2
iv)	Nut & Bolts	Set	1
2.0	Valves	%	20 % of each type & size
3.0	Pumps & Blowers along with Drive Motors		1 no. each type & size
4.0	Ejector & Dosing Pump		1 no. each type & size
5.0	Resin Trap		1 no. each type & size
6.0	HORIZONTAL CENTRIFUGAL PUMP FOR EACH TYPE		
i)	Bearings	i)	Bearings
ii)	Thrust Pads	ii)	Thrust Pads
iii)	Shaft sleeves	iii)	Shaft sleeves
iv)	Fasteners	iv)	Fasteners
	ELECTRICAL		
7.0	415 V Motors		
i)	Terminal plates	Nos.	10 Nos. each for small motors upto 30 KW & 4 Nos. each for more than 30 KW
ii)	Heaters	Set	2 sets
iii)	Greasing arrangements	Set	4 sets each type of motor
iv)	Motor of each type and rating	%	10% of the installed quantity or minimum 1 number whichever be higher.
v)	Bearings (DE and NDE) for each type and rating of motor	Set	4 sets

MANDATORY SPARES: List of Mandatory Spares for Electric hoists are as follows & no Mandatory Spares are applicable for Chain Pulley Blocks.

Electric Hoists		
SL NO	ITEM DESCRIPTION	QTY
1	Brake linings	2 set of each type
2	Rope guide & rope tightener	1 no. of each type
3	Limit switch	2 set of each type & size
4	Gear box / gear set	2set of each type
5	Drum Bearing	1set of each type & rating

Note: Bidder to please refer the notes of Sub-section IA of this technical specification regarding spares.

MANDATORY SPARES
CONTROL & INSTRUMENTATION
CONDENSATE POLISHING UNIT

2x660 MW ENNORE SEZ PROJECT OF TANGEDCO

MANDATORY SPARES

III. CONTROL & INSTRUMENTATION			
Sl no	Name of spares	Unit	Qty
1.0.0		INSTRUMENTATION	
(i)	Each type of lamps, PBs, ILPBs, fuse, MCB, MCCB used in the equipment/system.	Nos.	20 % of Installed of each type.
1.00.01	Measuring Instruments		
1.00.01.01	Indicators, Recorders, Electrical Metering and Skid Mounted Instruments		
(i)	Indicators, recorders and meters offered from each model for the project. These instruments shall be supplied with three sets of blank scales.	Nos.	10 % of Installed of each type/Model or a minimum of one number for each model and type, whichever is more
(ii)	For skid mounted instruments As applicable	Nos.	10% of total number of instruments for each Type and model or a minimum of one number for each model and type, whichever is more
1.00.01.02	Temperature Elements and Thermowells		

C&I Mandatory Spares are indicative in above list. These spares shall be considered as per the applicable items in main supply of respective packages. The spares shall be considered as unit wise except for any item/equipment supplied as common for both units.

Sl no	Name of spares	Unit	Qty
(i)	Thermocouple/RTD elements	Nos.	10% spare for each type and length of element furnished with thermocouple/RTD assemblies, or a minimum of one number of each type & length, whichever is more.
(ii)	Thermowells	Nos.	10% for each type of temperature sensors or a minimum of one for each type, whichever is more
1.00.01.03	Temperature, Transmitters and Electronic Transmitters (For Pressure, DP, Temp, Flow, Level), Temperature, Pressure, Flow & Level Switch, safety switches, Gauges, meters, Transducer or any other instrument etc.	Nos.	10% of total number of Instruments/transducers offered for each model and type for the project or a minimum of one number, whichever is more.

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Sl no	Name of spares	Unit	Qty
e.	Digital output module	Nos.	10% of qty Installed of each category/model or at least 2 No. of each type/model (Whichever is more)
1.00.02.02	All types of electronic modules, controllers, function modules, cards, terminal boards, relay boards, power supply cards etc for above mentioned system and other Control System/Sub- systems and any other type of PCB not covered above	Nos.	10% of qty Installed of each category/model or at least 2 No. of each type/model (Whichever is more)
1.00.02.03	Electronic Cards/modules	Nos.	10% of number for each type or minimum of 2 number for each type whichever is high.
1.00.02.04	Auto/Manual stations, set-point/bias stations etc	Nos.	10% of the number of stations offered for the project from each type or a minimum of 2 number from each model, whichever is more.
1.00.02.05	Control logic power supply fuses, MCB,MCCB, at each current rating required for the project.	Nos.	20% spare for each type/Model
1.00.02.06	Electronic cards of each type used for each type of Servers supplied with any control system	Nos.	Ten (10) percent or 2 no. (Whichever is more)
1.00.02.07	Electric to pneumatic converters of each type utilized with automatic control system using pneumatic drives	Nos.	Ten (10) percent of each type or a minimum of one of each type, whichever is more.
1.00.02.08	Plug-in type keyboard	Nos.	10 nos. of each type/model.
1.00.02.09	Control QWS	Nos.	Two No. of each type with complete accessories & monitors.
1.00.02.10	Utility/Engineering OWS	Nos.	Two No. of each type with complete accessories & monitors.
1.00.02.11	DVD/CD	Nos.	10 boxes
1.00.02.12	Data highway cable with adequate	set.	200 mts. each

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Sl.no	Name of spares	Unit	Qty
	connectors of each type		
1.00.02.13	Hard disc drive unit	Nos.	Five nos of each type
1.00.02.14	Prefab cable connectors	Nos.	10% or 5 nos (whichever is more) of each type of Installed
1.00.02.15	Cubicle power supply power supply modules	Nos.	Ten (10) percent or 5 nos (whichever is more) of Installed of each type and rating
1.00.02.16	Interposing/coupling relays.	Nos.	Ten (10) percent Installed of each type and rating
1.00.02.17	Ethernet Switches, Routers & other communication hardware	Nos.	10% of qty Installed of each type or a minimum of 2 numbers from each model, whichever is more.
1.00.02.18	Sensors with special cables, Power supply modules, Relay, Interface Module, and electronic modules used for vibration monitoring system.	Nos.	10% of qty installed or Five no. (Whichever is more) of each type)

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SI no	Name of spares	Unit	Qty	*Remarks	Unit
1.00.02.25	RJ 45 connector with box of each type	Nos.	Twenty (20) percent or 2 no. (Whichever is more)	For CAS included in clause Compressor Air System of Mech. List of mandatory spares AND For Electrochlorination , price included under clause HORIZONTAL CENTRIFUGAL PUMP FOR EACH TYPE of Mech. List of mandatory spares AND For Air Conditioning system, price included under clause Air Conditioning system of Mech. List of mandatory spares	PEM+EDN
1.00.02.26	Hooters, Buzzers, Cooling fans of each type.	Nos.	Ten (10) percent or 2 no. (Whichever is more)		PEM+EDN
1.00.02.27	Interface cables	Set	2 sets of each type/model		PEM
1.00.02.28	Power supply modules (AC to DC converters)	Nos.	10% or Five no. (Whichever is more) of each type/model		PEM
1.00.02.29	DVD/CD drive unit of each type	Nos.	5 nos.		PEM+EDN
1.00.02.30	Mouse	Nos.	20 nos. of each type/model.		PEM+EDN
1.00.03	Steam and Water Analysis System (SWAS)			Lot price has been given for items under SI no. 10.00.03	EDN
1.00.03.01	High pressure reducing elements for sample flow.	Nos.	10% spare of qty installed.		EDN
1.00.03.02	Ion exchange columns with resin as utilized with cation conductivity analysers	Nos.	Four No		EDN
1.00.03.03	Conductivity cells as utilised with conductivity monitors	Nos.	Two nos of each type		EDN
1.00.03.04	pH flow-through type cells used with pH monitors	Nos.	Two nos. of each type		EDN
1.00.03.05	Chemical reagents for all analysers	Set	12 months continuous operation of all analysers from date of taking over.		EDN
1.00.03.06	Chemical reagents for colorimetric silica analyzers	Set	12 months continuous operation of all analysers from date of taking over.		EDN
1.00.03.07	Electronic Modules	Nos.	One (1) no. for each type of Analyser.		EDN

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Sl no	Name of spares	Unit	Qty	*Remarks	Unit
1.00.03.08	Pressure gauge, solenoid valves, temperature gauge, Back Pressure regulating valves, 3 way grab valves, needle valves, isolation valves, PRV, flow switch, flow indicator and temperature switch, erection hardware's, valves in SWAS.	Nos.	Two (2) no. of each type		EDN
1.00.03.09	Primary coolers/secondary coolers.	Nos.	Three (3) No of each type		EDN
1.00.04	Relay based Control Panels			PEM-For Air Conditioning system, price included under clause Air Conditioning system of Mech. List of mandatory spares EDN-Lot Price has been given	PEM+EDN
1.00.04.01	LEDs for indicating lights	Nos.	10% of qty installed.		PEM+EDN
1.00.04.02	Control circuit fuses/MCB/MCCB/Semiconductor Fuses	Nos.	300% of installed of each type, current rating.		PEM+EDN
1.00.04.03	Relays modules & contactors.	Nos.	20% spare of qty Installed of each type & rating.		PEM+EDN
1.00.05	Alarm Annunciation System			PEM-For Electrochlorination , price included under clause HORIZONTAL CENTRIFUGAL PUMP FOR EACH TYPE of Mech. List of mandatory spares AND For Air Conditioning system, price included under clause Air Conditioning system of Mech. List of mandatory spares EDN-Lot Price has been given	PEM+EDN PEM+EDN
1.00.05.01	logic modules, group card modules, power supply modules, Hooters and any other electronic module.	Nos.	20% spares of each type installed		PEM+EDN
1.00.05.02	un-engraved window boxes complete with LED etc.	Nos.	5% spares of each size installed		PEM+EDN
1.00.05.03	LEDs for annunciation facia windows and LEDs box assemblies offered for the project	Nos.	20% of qty installed		PEM+EDN
1.00.05.04	Annunciator hooter	Nos.	One (1) No. of each type		PEM+EDN

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Sl.no	Name of spares	Unit	Qty
1.00.06.11	Electronic modules of each type & rating for UPS and DC control power supply system.	Set	One set of with each set consisting of at least one number of each type of electronic module for inverters, chargers, static switch, stabiliser etc. as per approved BOM.
1.00.06.12	MCCB for UPS & 24 V DC charger panels, ACDB, DCDB.	Nos.	20 % of installed or 5 Nos of each type (which ever is more)
1.00.07	Erection hardware		
1.00.07.01	Instrument valves	Nos.	Ten (10) percent of each type & Size installed
1.00.07.02	Condensate pots of each type & Size installed	Nos.	Ten (10) percent of total number of Installed or four numbers whichever is higher .
1.00.07.03	Manifold	Nos.	Ten (10) percent of each type & Size installed
1.00.07.04	Fittings	Nos.	Ten (10) percent of each type & Size installed
1.00.08	LVS		
1.00.08.01	LEDs	Nos.	20% (Installed) spares of each type & size.
1.00.08.02	LVS Filters	Nos.	50% spare or min 6 nos.
1.00.08.03	Electronic cards of each type for LVS	Nos.	3 nos. or 20% whichever is more
1.00.08.04	Interfacing cables	Set	Two Set of each type & size.

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Sl no	Name of spares	Unit	Qty
1.00.11.01	As per Manufacturer's Recommendation for Three Years Continuous Operation or minimum quantities indicated as below (whichever is more)		
1.00.11.02	Electronic cards/Module/Mother Board /Signal Processing Unit for each type of Analyzer	Nos.	One no. of each type
1.00.11.03	Power supply module	Nos.	One no. of each type for each analyser
1.00.11.04	UV Lamp with adopter with SO2 analyser.	Nos.	One no. of each type
1.00.11.05	Light source and detector unit for SPM and NOX/SOX analyser.	Nos.	One no. of each type for each analyser
1.00.11.06	Pump for SPM Analyser	Nos.	One no. of each type
1.00.11.07	Conference hall mic.	Nos.	Two no. of each type
1.00.11.08	Conference hall speakers.	Nos.	Two no. of each type
1.00.12	HMS		
1.00.12.01	As per Manufacturer's Recommendation for Three Years Continuous Operation	Set	
1.00.12.02	Electronic cards	Nos.	One no. of each type
1.00.13	Mandatory Spares for Control valves, Power Cylinder, Control Dampers, Actuators and Accessories		
(A)	Following spares shall be furnished for control valves, Power Cylinder, Control Dampers as applicable.		
	One set of spare control valve stem packing for each control valve.		

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Sl no	Name of spares	Unit	Qty
	Two moulded rubber diaphragms for each control valve.		
	One sets of each of O-rings and rubber gaskets for each control valve.		
d)	100 percent qty. of lubricants for gaskets for each control valve on one year consumption basis.		
	2 sets of limit switches and 1 set of valve positioner for each control valve.		
f)	20 percent of position transmitter (4-20mA) for total qty. of control valve.		
g)	One (1) set of valve trims (such as plug, stem, seat ring /cage, guide bushing, stem lock pin, packing retaining ring, etc) for each control valve.		
h)	One completes actuator of each type or min 10% for each type and size whichever is more.		
i)	20 percent of Solenoid valves or min 2 no. of each type for total qty. of control valves.		

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Sl no	Name of spares	Unit	Qty
j)	20% of I to P converters, Pressure regulators.		
B)	Mandatory spares for each critical applications special control valves as specified in NIT		
C)			
a.	Soft Goods Kit Valve	1 set	
b.	Metal seat	1 set	
c.	Seat Ring	1 set	
d.	Spindle	1 set	
e.	Actuator Soft Goods kit	1 set	
i.	Feed back transmitter unit	2 Nos.	
ii.	Electronic Position Transmitter	2 Nos.	
iii.	Solenoid valves	2 Nos.	
iv.	Air filter regulators	2 Nos.	
v.	Air Lock Relay	2 Nos.	
vi.	Complete Actuator for each type and model	1 set	

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Sl no	Name of spares	Unit	Qty
1)	2nos. acoustic transducer with rear connector sealed to IP-65		
2)	2 nos. flexible high temperatures lead, 3metre long for acoustic transducer.		
3)	2 nos. acoustic s field amplifier / processor mounted in a die cast aluminum or polycarbonate box sealed to IP-65 with mounting brackets, pairs.		
4)	1 no. A/D Converter cards/field signal interface module for 32 or more channels.		
5)	1 no. Alarm relay output card.		
6)	Consumables like batteries, fuses etc. for two years operation of boiler tube leak detection system.		
1.00.15	Mandatory spares not covered above		
	Bidder to supply 10% or 1 no. (whichever is more) of each type of sensor/instrument/Analyser/instrumentation/mechanical fittings, Nucleonic & non nucleonic density transmitter etc.& for any other system of CPU package.		
1.00.16	OTHER RELATED CONTROL AND INSTRUMENTATION SYSTEMS/EQUIPMENTS		
1.00.16.01	Other SG related sub-systems		
1	Flame Monitoring System		

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NOTES:

- i) Unless stated otherwise, a "set" or "Lot" means items required for complete replacement in one equipment of each type / size/ range.
- ii) Whenever the quantity is mentioned in "sets" the bidder has to give the item details and prices of each item.
- iii) Wherever quantity has been specified as percentage (%), it shall mean percentage (%) of the population of the item required for one unit of 660 MW in the station (project), unless specified otherwise.
- iv) All the Mandatory 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.
- v) 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.
- vi) Wherever quantity is specified both as a percentage and a value, the Bidder has to supply the higher quantity until and unless specified otherwise.
- vii) Inspection of mandatory spares shall be in line with the approved quality plans for the respective Items/equipments. The inspection categorisation of mandatory spares shall also be in line with the approved categorisation plan for the respective items/equipment.
- viii) In case, mandatory spares are not applicable as per equipment / item selected, bidder has to provide equivalent mandatory spare as per for selected equipment / item in line with list of mandatory spares.
- ix) In case mandatory spares indicated in the list are not applicable to the particular design offered by the bidder, the bidder should offer spares applicable to offered design with quantities in line with list of mandatory spares.

THE VENDOR WARRANTS:

1. 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:
2. 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.
3. 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



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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.

4. 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.
5. 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.