

# **TENDER SPECIFICATION BHEL PSSR SCT 2015**

**for**

**Civil (balance works), Architectural, Mechanical, Electrical, C&I works of Natural Draught Cooling Tower including supply of materials for civil (excluding Cement, Structural steel & Reinforcement steel for civil works), Mechanical, Electrical & C&I works required for the NDCT-4 at 5x800 MW Yadadri Power Project, Veerlapalem village, Dameracherla Mandal, Nalgonda District., Telangana state**

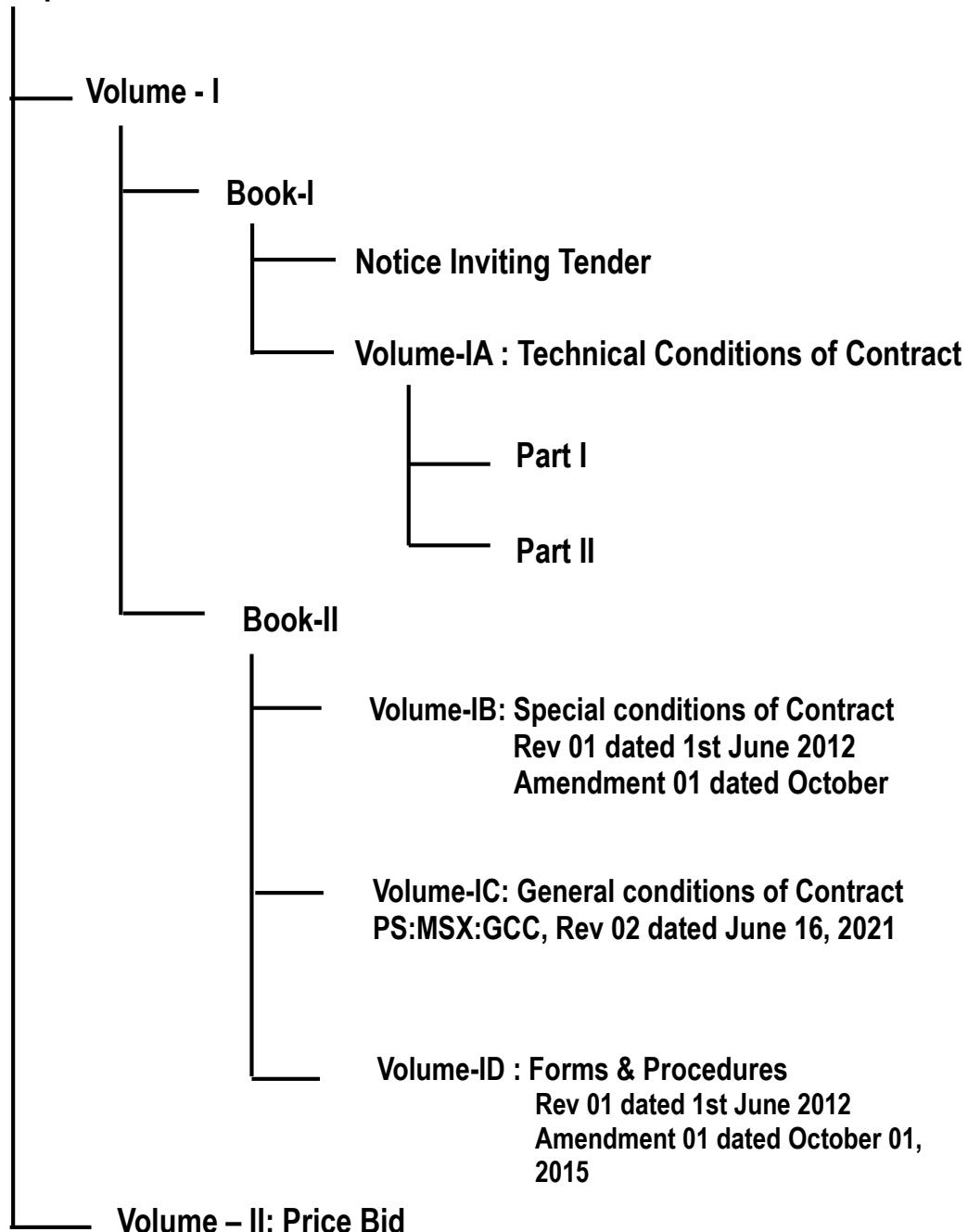
## **VOLUME –II PRICE BID**



**BHARAT HEAVY ELECTRICALS LIMITED**  
(A Government of India Undertaking)  
Power Sector – Southern Region  
Tek Towers, No.11, Old Mahabalipuram Road,  
Okkiyam Thoraipakkam, Chennai - 600097

## **TENDER SPECIFICATION CONSISTS OF**

### **Tender Specification**



## PRICE BID

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## **PART A**

### **Instruction to Bidders:**

1. The quantity indicated in the BOQ in Part C of Price Bid is approximate only and is liable for variation. Payment will be as per actual quantity executed and as certified by BHEL Engineer.
2. Tenderers are requested to affix their company seal and authorized signature in all pages.
3. Bidders shall quote 'Total Amount' in the format enclosed as a separate Excel File in BHEL NIC e-Procurement portal for the subject tender and upload the same under 'Packet details - > Tender covers -> Finance '(Cover Type Description – Price Bid)" and same shall be taken into account for evaluation and awarding and hence, shall be complete in all respect for the full scope of work defined in specification and in accordance with terms & conditions of the tender. Any other entry elsewhere in the price bid shall be treated as Null and Void. Quoting of rates in any other form/formats will not be entertained.
4. The above mentioned 'Total amount' is for the entire Bill of Quantity (BOQ) given in Part -C of the Price Bid.
5. BHEL has pre-fixed the weightages for the amount of individual items of Bill of Quantity with respect to the 'Total Amount' in Part C of Price Bid.
6. Based on the pre-fixed weightages, the amount for the individual items of the Bill of Quantity shall be arrived at. This amount shall be rounded off to the nearest rupee.
7. Based on the quantities of individual item and the amount arrived in Sl. No: 6 above, unit rate of individual items shall be derived. This unit rate shall be rounded off to four decimal places.
8. Bidders to note that this is an item rate contract. Payment shall be made for the actual quantities of work executed as certified by BHEL Engineer at the unit rate arrived at as per Sl No.7 above

**Part C : Bill of Quantities**

**Tender Specification BHEL:PSSR:SCT:2015 for Civil (Balance Works), Architectural, Mechanical, Electrical, C&I works of Natural Draught Cooling Tower NDCT-4 (of Unit 4) of 5X800 MW Yadadri TPS**

**at 5 X 800 MW Yadadri TPS**

<b>Ref.No.</b>	<b>Description</b>	<b>Unit of Measurement</b>	<b>Qty.</b>	<b>Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount</b>
M1	Mobilization and Installation of Tower Crane of required capacity. Note - One time payment shall be made for Mobilization and Installation of Tower Crane for facilitating execution of Cooling Tower.	LS	1	.0088439
M2	Mobilization and Installation of Passenger Hoist/Lift of suitable capacity. Note - One time payment shall be made for Mobilization and Installation of Passenger Hoist/Lift for facilitating execution of Cooling Tower.	LS	1	.001675
M3	Design, supply/ mobilisation, installation and commissioning of jump form (suitable for the NDCT work in context) for shell concreting with all required accessories Note - One time payment shall be made for Mobilization and Installation of jump form with all accessories for facilitating execution of Cooling Tower.	LS	1	.0083983
2600.0	Site clearing and stripping works including all labour, material (unless otherwise specified in BOQ/contract specification), equipment etc. as per specification, drawings and as directed by engineer - in - charge.	--		
A2602	Earth work in stripping of top soil upto a maximum depth of 0.15m below ground level so as to exclude all debris, grass, vegetation, bushes, trees having girth upto 300 mm including roots and organic materials etc for leveling and grading including dressing to specified levels & grades and compacting the graded/stripped surface by manual/mechanical means, disposal of stripped materials within a lead upto 1km etc all complete as per specification, drawing and as directed by the engineer-in-charge.	Sq.M	9,466.8	.0001985
100.0	EARTH WORK: Earth work In excavation, backfilling and disposal including all labour, equipments (unless otherwise specified in BOQ/contract specification) etc complete as per specification, drawing and as directed by engineer- in-charge for the following.	--		
101.0	Earth work in excavation in all types of soil including ash which can be excavated by any means including setting out, levelling, dewatering (but excluding special type of dewatering viz. well point method), shoring & strutting (wherever required), dressing the sides & bottom, all lifts, ramming/compacting the excavated bottom, stacking, disposal of surplus excavated materials within a lead upto 1Km, spreading/levelling of disposed materials etc all complete for following depths below ground level.	--		

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**at 5 X 800 MW Yadadri TPS**

<b>Ref.No.</b>	<b>Description</b>	<b>Unit of Measurement</b>	<b>Qty.</b>	<b>Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount</b>
a	Depth from ground level but not exceeding 2 m	Cu.M	100	.0000095
b	Depth exceeding 2 m but not exceeding 4 m	Cu.M	100	.000012
c	Depth exceeding 4 m but not exceeding 6 m	Cu.M	1	.0000001
d	Depth exceeding 6 m but not exceeding 8 m	Cu.M	1	.0000002
103.0	Earth work in excavation in soft rock (rock without any recovery of excavated materials in the form of hard stone/boulder) including weathered rock which can be excavated by means of crow bar, pick axe, pneumatic rock breaker attachment with excavator machine etc but does not require chiselling or blasting including setting out, levelling, dewatering (wherever required), shoring & strutting (wherever required), dressing the sides & bottom, all lifts, ramming/compacting the excavated bottom, stacking, disposal of surplus excavated materials within a lead upto 1 Km, spreading / levelling of disposed materials etc all complete for following depths below ground level.	--		
a	Depth from ground level but not exceeding 2 m	Cu.M	10	.0000014
b	Depth exceeding 2 m but not exceeding 4 m	Cu.M	10	.0000017
c	Depth exceeding 4 m but not exceeding 6 m	Cu.M	10	.0000021
d	Depth exceeding 6 m but not exceeding 8 m	Cu.M	1	.0000002
104.0	Earth work in excavation below ground level in hard rock requiring blasting (but excluding controlled blasting) including wedging, line drilling, pre shearing etc as required for grading, setting out, levelling, dewatering (wherever required), dressing the sides & bottom, all lifts, necessary licenses/statutory clearances for blasting, supply, storage & handling of blasting materials, stacking/disposal of surplus excavated material within a lead upto 1 Km, spreading / levelling of disposed materials etc all complete as per specification, drawing and as directed by the engineer-in-charge.	--		

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a	Depth from ground level but not exceeding 2 m	Cu.M	2,000	.0004731
b	Depth exceeding 2 m but not exceeding 4 m	Cu.M	2,000	.0005686
c	Depth exceeding 4 m but not exceeding 6 m	Cu.M	2,000	.0006828
d	Depth exceeding 6 m but not exceeding 8 m	Cu.M	44.374	.0000182
e	Depth exceeding 8 m but not exceeding 10 m	Cu.M	5,570.399	.0026287
f	Depth exceeding 10 m but not exceeding 12 m	Cu.M	672	.0003492
105.0	Earth work in excavation in hard rock requiring controlled blasting including wedging, line drilling, pre shearing etc as required, setting out, levelling, dewatering (wherever required), shoring & strutting (wherever required), dressing the sides & bottom, all lifts, necessary licenses/statutory clearances for blasting, supply, storage & handling of blasting materials, stacking/disposal of surplus excavated material within a lead upto 1Km, spreading / levelling of disposed materials etc all complete for following depths below ground level.	--		
b	Depth exceeding 2 m but not exceeding 4 m	Cu.M	10	.0000043
c	Depth exceeding 4 m but not exceeding 6 m	Cu.M	10	.0000034
d	Depth exceeding 6 m but not exceeding 8 m	Cu.M	10	.000004
e	Depth exceeding 8 m but not exceeding 10 m	Cu.M	10	.0000047
f	Depth exceeding 10 m but not exceeding 12 m	Cu.M	10	.0000051

**Part C : Bill of Quantities**

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106.0	Earth work in excavation in hard rock requiring chiselling including wedging, line drilling, pre shearing etc as required for grading, setting out, levelling, dewatering (wherever required), dressing the sides & bottom, all lifts, stacking/disposal of surplus excavated material within a lead upto 1Km, spreading / levelling of disposed materials etc all complete for following depths below ground level.	--		
b	Depth exceeding 2 m but not exceeding 4 m	Cu.M	10	.0000212
c	Depth exceeding 4 m but not exceeding 6 m	Cu.M	10	.0000254
d	Depth exceeding 6 m but not exceeding 8 m	Cu.M	10	.0000305
e	Depth exceeding 8 m but not exceeding 10 m	CUM	10	.0000352
f	Depth exceeding 10 m but not exceeding 12 m	Cu.M	10	.0000386
107.0	Earthwork in Back filling upto any depth below ground level around foundations, plinths, trenches, drains etc to proper grade and level in layers not exceeding 250mm thickness using/with selected materials from compulsorily excavated earth (includes soil, soft rock boulder excluding hard rock and mixture of both) available within a lead upto 1 Km and compacted as specified including re-excavation of stacked earth, watering, ramming/compaction by manual/mechanical means, dressing etc all complete for the following.	--		
a	Each layer compacted so as to achieve at least 90% maximum dry density as per IS-2720 (Part-VII)	Cu.M	27,089	.001957
b	Each layer compacted so as to achieve at least 95% maximum dry density as per IS-2720 (Part-VII)	Cu.M	1	.0000001
109.0	Extra over ST No. 101 and 103 to 107 for carriage of material/earth for every 500m or part there of beyond an initial lead of 1km.	--		
a	Carriage for stacking/ backfilling of serviceable material/ earth	Cu.M	43,365	.0004548

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b	Carriage for disposal of serviceable/unserviceable material/ earth	Cu.M	30,000	.0003146
A110	Earth work in backfilling upto any depth below ground level around foundations, plinths, trenches, drains etc to proper grade and level in layers not exceeding 250 mm thickness so as to achieve required compaction with approved borrowed earth (includes soil, rock boulder of specified size and mixture of both ) (borrowed earth to be arranged by the bidder) and compacted as specified including supplying borrowed earth, royalty/seignorage fee (if any), sorting, spreading, breaking clods, watering, ramming/compaction by manual/mechanical means, dressing, finishing to required lines, grades and slopes, testing, all lead and lifts etc all complete as per specification, drawing and as directed by the engineer for the following:	--		
a	Each layer compacted so as to achieve at least 90% maximum dry density as per IS-2720 (Part-VII)	Cu.M	1,000	.0004626
b	Each layer compacted so as to achieve at least 95% maximum dry density as per IS-2720 (Part-VII)	Cu.M	1	.0000004
A111	Supplying and filling sand upto any depth under floors, around foundations, plinths, surrounding pipe and in pipe beds etc. in layers not exceeding 300 mm thickness and compacted so as to achieve at least 75% relative density as per IS-2720 (Part-XIV) including spreading, watering, ramming/compaction by manual / mechanical means, dressing, royalty (if any) etc. all complete.	Cu.M	50	.0001321

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Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
200.0	CONCRETE WORK: Providing and placing concrete work including cost of labour, materials (unless otherwise specified in BOQ/contract specification) and equipment for handling, transportation, batching, mixing, placing, vibrating and curing (excluding cost of centering, shuttering and reinforcement) with mechanised equipments like batching plant, transit mixer, concrete pump, tower cranes of suitable capacity and all accessories, including demobilisation of the same after completion of works etc and passenger lift to be installed at outer shell with all accessories & safety arrangement required for safe movement of labourers. the scope inclusive of transportation of the equipments, mobilization, demobilization, maintenance, operator charges, and necessary foundations etc. all complete as per drawing, specifications and as per direction of engineer in charge . (Cement supply by BHEL)	--		
201.0	Concrete of grade M7.5 (1 part cement, 4 part sand, 8 parts of 40 mm graded aggregate by volume) as mass filling course, lean concrete, levelling course, mud mat under and around foundations/ floors, at any depth below finished floor level etc.	Cu.M	1,000	.0038824
A202	Concrete of grade M10 (1 part cement, 3 part sand, 6 parts of 20 mm graded aggregate by volume) as lean concrete, levelling course, mud mat under and around foundations/floors at any depth below finished floor level etc.	Cu.M	150	.0005824
A203	Concrete of grade M15 (1 part cement, 2 part sand, 4 parts of 20 mm graded aggregate by volume) as lean concrete, levelling course, mud mat under and around foundations/floors at any depth below finished floor level etc.	Cu.M	1,850	.0071826
A212	Screed concrete conforming to IS 456 with coarse sand and graded hard stone aggregate 12.5mm/6 mm nominal size of any thickness over basin floor,drains etc. complete as per following.	--		
a	1:2:4 (1 part cement, 2 part sand, 4 parts of aggregate by volume)	Cu.M	1,190	.0046201

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A205	Providing and laying Design Mix cement concrete conforming to IS:456 & IS 10262-2009 for reinforced concrete works with coarse sand and graded hard stone aggregate of 20mm nominal size in foundations/substructure, grade slab, paving, drains, under floors etc at all level below (basin wall top level, any shape, position or thickness etc complete including use of plasticizer/ superplasticizer conforming to IS:9103 (latest) to achieve required slump in concrete all complete as per specification & drawing for the following.	--		
Aa	M 20 Grade	CUM	50	.0002024
a	M 25 Grade	CUM	550	.0023441
b	M 30 Grade	CUM	2,460.39	.0105501
c	M 35 Grade	CUM	110	.0004744
A214	Providing and laying Design Mix cement concrete as per IS:456, IS 3370 & IS 10262-2009 for reinforced concrete works using graded aggregate for Concrete in water retaining/conveying structures (such as basin floor slab, basin wall, partition wall, CW outlet, sumps, hot water ducts etc.) including addition of suitable plastisizer cum waterproofing cement additives confirming to IS 9103 latest to achieve a slump more than 125 mm in concrete as per manufacturers recommendation and conforming to limits of permeability as per IS 2545 and specification with 20 mm nominal size graded aggregate for following grades. Watertightness is to be ensured including structural grouting if required.	--		
a	M 25	CUM	1	.0000055
b	M 30	CUM	6,690	.0372692
Cc	M 35	CUM	10,000	.0584938

## Part C : Bill of Quantities

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at 5 X 800 MW Yadadri TPS

Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
A206	Providing and laying Design Mix cement concrete of grade conforming to IS:456 & IS 10262-2009 for reinforced concrete works with coarse sand and graded hard stone aggregate of 20mm nominal size in superstructure at all level above finished floor level (all structures above top of basin wall), any shape, position or thickness etc complete including use of plasticizer/ superplasticizer conforming to IS:9103 (latest) to achieve required slump in concrete all complete as per specification & drawing for the following.	--		
a	M 25 Grade	CUM	50	.0003568
b	M 30 Grade	CUM	50	.000358
c	M 35 Grade	CUM	70	.0005029
Ad	M 40 Grade (except shell,ring beam, corbel, platform,walkway , raker column)	CUM	1	.0000073
Ae	M 40 Grade (For shell, ring beam, corbel, platform, walkway etc.)	CUM	24,300	.1752115
Af	M 45 Grade	CUM	1	.0000073
Ag	M 50 Grade (For Raker column)	CUM	1,970	.0142526
A213	Providing and laying Design Mix cement concrete as per IS:456 & IS 10262-2009 for reinforced concrete works using graded aggregate for Concrete in precast works like roof slabs/trench covers, fins, lintels, chajjas, beams, columns, bracings, wall panels, facias etc.at all levels in all kinds of work including formwork/moulds, curing, rendering the top exposed surface with cement sand mortar (1:3), handling, storing, transporting, all leads, erection without damage, setting in position with cement sand mortar (1:3), filling the gaps between adjacent pre-cast units with M30 grade concrete or cement sand mortar (1:3) and including making of holes for bolts for fixing, welding etc.complete with graded aggregate (20/12.5/10 mm) and as per specification and drawing for following grades.	--		

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a	M 25	CUM	1	.0000095
b	M 30	CUM	550	.0053634
c	M 35	CUM	50	.0004888
215.0	Dismantling concrete work for all types of structures at all levels including stacking of serviceable material to a lead of 500 m and disposal of unserviceable material upto a lead of 2 km, cutting of reinforcement, labour, equipment, safety precautions etc all complete as per drawings, specification and instructions of engineer in charge.	--		
a	Plain cement concrete of all grades	CUM	20	.0000235
b	Reinforced cement concrete of all grades	CUM	20	.0000354
216.0	Chipping of concrete in reinforced concrete work, cutting pockets, making openings at all levels and according to shapes, disposal of waste materials upto a lead of 2 km as directed by engineer including equipment, safety precautions, making good the broken surface etc all complete as per specification, drawing, instructions of engineer in charge but excluding cutting of reinforcement .	CUDM	100	.0000064
217.0	Extra over and above ST No 216 for cutting of reinforcement, all sizes and types including labour, equipment, return of cut reinforcement to store etc all complete as per specification, drawings and instructions of engineer in charge. Measurement shall be on the cross sectional area of reinforcement cut.	SQCM	100	.0000004
218.0	Cutting Reinforced concrete with mechanised tools like Core drilling machine etc. for cutting pockets, holes, cores in slab, beam, column or foundation as per direction of engineer in charge.	CUDM	50	.000011
219.0	Providing and applying curing compound (water based) of approved make wherever required as per manufacturer's specification.	SQM	1	.0000001

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300.0	FORMWORK: Providing, fixing and removing formwork at all elevations for all structures, as per specifications and including all labour, material, scaffoldings and centering etc. complete as per drawing, specifications and as per direction of engineer in charge for the following:	--		
301.0	Fairface form work with good quality water proof ply wood of minimum 12mm thickness and smooth surface below basin wall top level for foundations, footings, base of columns, walls, columns, pilasters, beams, mass concrete, trenches etc.including chamfering of edges as per drawing, specification and instruction of engineer in charge..	SQM	4,636.67	.0028365
302.0	Fairface form work with good quality water proof ply wood of minimum 12mm thickness and smooth surface above (top of basin wall for columns, beams, suspended floors, roofs, lintels, cantilevers, staircases, landings, balconies, etc. including chamfering of edges as per drawing for all heights as per specification, drawing and instruction of engineer in charge.	SQM	46,510	.0339255
A302	Fairface Formwork for smooth surface for Raker columns including preparation of scheme, designing, submission and approval of staging drawing with sufficient props, braces and ties for all heights complete including chamfering of edges, deshuttering as per drawing,specification, and instruction of engineer in charge.	SQM	5,310	.0157033
B302	Fairface formwork for smooth surface of shell by providing and using jump form shutting of approved quality with plastic coated plywood shutting and minimum three working platforms internally and minimum two working platforms externally, with continuous spray curing arrangement with automatic system including lifting arrangement, adjustment as per shell profile , access system, hoisting, strutting, propping, adequate illumination and safety arrangements etc. and other temporary supports/structures as required including dismantling and removal of formwork for tower shell, peripheral top platform, peripheral inner walkway etc. as per specifications and as directed by engineer-in-charge including all plant and machinery, accessories etc. Tie rod holes & holes due to jumpform arrangement are to be plugged/filled up with mortar and shutting impression are to be made good.	SQM	125,050	.1033085

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304.0	Providing, fixing and removing formwork in block-outs/pockets and openings (below 0.1 sqm plan area) at all elevations including cutting, formation of all shapes and all other operations required for making the required shape and size all complete as per specification, drawing and instruction of engineer in charge.	--		
a	Upto 150 mm depth	EACH	700	.0001713
b	Pockets of depths more than 150mm and upto 300 mm depth	EACH	6,800	.0028207
c	Pockets of depths more than 300mm and upto 600 mm depth	EACH	1,400	.0010456
d	Pockets of depths more than 600mm and upto 1000 mm depth	EACH	10	.0000118
e	Pockets of depths more than 1000mm and upto 1500 mm depth	EACH	10	.000017
f	Pockets of depths more than 1500mm and upto 2000 mm depth	EACH	1	.0000023
305.0	Extra over item no. 301 and 302 for curved form work for foundations, footings, beams, basin walls, trenches, domes, arches etc as per specification.( Not for shell & Raker column)	--		
a	Extra for Curve Shuttering for Item No. 301	SQM	1	.0000001
b	Extra for Curve Shuttering for Item No. 302	SQM	1	.0000001
400.0	REINFORCEMENT WORK: Reinforcement work including all labour, material (unless otherwise specified in BOQ/contract specification), equipment, transportation, handling including cleaning, derusting, straightening, cutting, bending, binding in position with soft drawn annealed binding wire or tack welding, providing concrete cover blocks, pins, separators, chairs, supports for reinforcement etc. at all level as per specification, drawings and as directed by engineer - in - charge including all plant and machinery, accessories etc.	--		

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403.0	Transportation from BHEL stores, straightening, cutting, bending, placing in position at all level, binding in position of HCRM steel reinforcements of grade Fe-500 confirming to IS:1786 including cost of binding wire, labour, scaffolding, transportation to & from stores etc complete all as per specifications, drawings and as directed by Engineer.(BHEL to supply HCRM steel free of cost)	--		
a)	For all works except shell	MT	2,169.69	.0336826
b)	For all works in shell	MT	3,545	.0665453
c)	Mild steel reinforcement bars (including supply of mild steel bars by bidder)	MT	50	.0031632
500.0	Roof Treatment works: Roof treatment works including all labour, material (unless otherwise specified in BOQ/contract specification), equipment, transportation, handling, curing, sampling, testing etc at all level as per specification, drawings and as directed by engineer - in - charge.	--		
511.0	Providing and applying two coats of bitumen grade 85/25 as per IS 702 ( @ 1.7kg/sqm)with 1% antistripping compound conforming to IS 6241 in foundation, wall, column etc on concrete surfaces exposed to soil / ash including surface preparation etc. all complete.	SQM	-1,346.681	-.0001836
600.0	JOINTS AND FILLERS: Joints & fillers including all labour, material, equipment, transportation, handling etc at all level as per specification, drawings and as directed by engineer - in - charge.	--		
601.0	Supplying & installation of bitumen impregnated fibre board confirming to IS 1838 as joint filler at joints in concrete including nailing, coating of both faces with coal tar pitch/bitumen etc. all complete.	--		
a	12 mm wide joints.	SQM	1	.0000005
b	20 mm wide joints.	SQM	1	.0000008
c	25 mm wide joints	SQM	220	.0002056

**Part C : Bill of Quantities**

**Tender Specification BHEL:PSSR:SCT:2015 for Civil (Balance Works), Architectural, Mechanical, Electrical, C&I works of Natural Draught Cooling Tower NDCT-4 (of Unit 4) of 5X800 MW Yadadri TPS**

**at 5 X 800 MW Yadadri TPS**

<b>Ref.No.</b>	<b>Description</b>	<b>Unit of Measurement</b>	<b>Qty.</b>	<b>Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount</b>
d	50 mm wide joints	SQM	1	.0000017
602.0	Supplying and installation of Dura board HD100 or its equivalent as approved by the Engineer, as filler material in joints including nailing, installation as per manufacturer's recommendation etc. all complete.	--		
a	12 mm wide joints.	SQM	1	.0000006
b	20 mm wide joints.	SQM	1	.000001
c	25 mm wide joints	SQM	1	.0000012
d	50 mm wide joints	SQM	1	.0000022
603.0	Providing and applying polysulphide based sealant conforming to IS:12118 in joints in concrete including cleaning of joints, raking out groove, application of primer, scaffolding etc. all complete for following size grooves:	--		
a	25mmX25mm	RM	2,000	.0012561
b	50mmX25mm	RM	510	.0006085
--	--	--		
604.0	Supplying and filling in position hot applied bitumen sealing compound (Grade A) confirming to IS 1834 including cleaning, mixing, heating, pouring/injecting sealing compound in gaps in joints including application of primer etc. all complete.	--		
a	10mm X 40mm	RM	1	.0000001
b	12mm X 25mm	RM	1	
c	20mm X 25mm	RM	1	.0000001

**Part C : Bill of Quantities**

**Tender Specification BHEL:PSSR:SCT:2015 for Civil (Balance Works), Architectural, Mechanical, Electrical, C&I works of Natural Draught Cooling Tower NDCT-4 (of Unit 4) of 5X800 MW Yadadri TPS**

**at 5 X 800 MW Yadadri TPS**

<b>Ref.No.</b>	<b>Description</b>	<b>Unit of Measurement</b>	<b>Qty.</b>	<b>Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount</b>
608.0	Supplying and filling in position hot applied bitumin sealing compound (Grade B) confirming to IS 1834 including cleaning, mixing, heating, pouring/injecting sealing compound in gaps in joints including application of primer etc. all complete.	--		
a	10mm X 40mm	RM	1	.0000001
b	12mm X 25mm	RM	1	.0000001
c	20mmX25mm	RM	1	.0000001
A610	Providing and fixing PVC water stops in joints conforming to IS 12200 & IS 15058 all complete for the following: (Bulb type)	--		
Ab	230 mm wide and 6 mm thick	RM	377.5	.000084
Ac	230 mm wide and 8 mm thick	RM	1,000	.000247
Ad	230 mm wide and 10 mm thick	RM	510	.0001385
700.0	MS EMBEDMENTS: Embedments including all labour, material (unless otherwise specified in BOQ/contract specification), equipment, transportation, handling etc. at all level as per specification, drawings and as directed by engineer - in - charge.	--		
701.0	Supply, fabricating and fixing of mild steel embedments, inserts, pipe sleeves, angle pieces, rungs of various diameters, plates of dimensions as required etc. including welding, bolting, cutting, drilling, scaffolding, setting etc. all complete.	MT	5	.0004333
702.0	Supply, Fabrication, transportation, delivery at site and erection, installation and alignment of mild steel foundation bolt assembly conforming to IS:2062 and grade 1 of IS:432 in concrete along with nuts, lock nuts (as per IS:1363, 1364 and IS:3138), washers, anchor plates, stiffener plates, protective tape, pipe sleeves, templates etc. including welding, cutting, grinding, threading, drilling etc. all complete.	MT	1	.0001067
703.0	Same as above items 701 with BHEL supplied material (scrap) free of cost including Fabrication,loading, transportation, unloading and Erection etc. all complete from BHEL store to plant site.	--		

**Part C : Bill of Quantities**

**Tender Specification BHEL:PSSR:SCT:2015 for Civil (Balance Works), Architectural, Mechanical, Electrical, C&I works of Natural Draught Cooling Tower NDCT-4 (of Unit 4) of 5X800 MW Yadadri TPS**

**at 5 X 800 MW Yadadri TPS**

<b>Ref.No.</b>	<b>Description</b>	<b>Unit of Measurement</b>	<b>Qty.</b>	<b>Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount</b>
a	Mild steel embedments, inserts, pipe sleeves, angle pieces, rungs of various diameters, plates of dimensions as required etc.	MT	1	.0000255
A703	Fixing of embedments, inserts, pipe sleeves, angle pieces, anchor bolts of various diameters, plates of dimensions as required etc. including scaffolding, setting in position, transportation from BHEL site stores to work spot etc. all complete.	MT	1	.0000232
704.0	Supplying, fabricating, erecting and installing following items in concrete/brickwall for all kind of works, including setting material in concrete, layout, scaffolding, cutting, forming, grinding, drilling, bolting, welding, jointing, testing etc. all complete.	--		
a	MS pipes of all diameters	Kg	1	.0000001
b	PVC pipes / conduits of all diameters	Kg	1	.0000003
c	UPVC pipes / conduits of all diameters	Kg	1	.0000004
Ae	Mechanical expansion fasteners, cold formed stud type having 3 way expansion sleeve of SS 316 grade approved for use in cracked concrete and seismic design with ETA C1/C2 approval or equivalent of safe tensile capacity as specified below for concrete work.	--		
i	(SS.316) Candorr M6*100 M.A.F. (Mechanical Anchor Fastener with nut & washer, HSN: 73181900)	EACH	200	.0000263
ii	(SS.316) Candorr M8*100 M.A.F. (Mechanical Anchor Fastener with nut & washer, HSN: 73181900)	EACH	200	.0000291
iii	(SS.316) Candorr M10*100 M.A.F. (Mechanical Anchor Fastener with nut & washer, HSN: 73181900)	EACH	200	.0000419
iv	(SS.316) Candorr M12*125 M.A.F. (Mechanical Anchor Fastener with nut & washer, HSN: 73181900)	EACH	100	.0000337

## Part C : Bill of Quantities

### Tender Specification BHEL:PSSR:SCT:2015 for Civil (Balance Works), Architectural, Mechanical, Electrical, C&I works of Natural Draught Cooling Tower NDCT-4 (of Unit 4) of 5X800 MW Yadadri TPS

at 5 X 800 MW Yadadri TPS

Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
Af	Adhesive type Chemical anchor fastener consisting of slow curing epoxy chemical adhesive and threaded rod of carbon steel (minimum grade of 5.8) including nut and washer usable in diamond core drilled holes and in wet/ water submerged holes dispensed through mechanical dispenser Candorr SR500 or equivalent of safe tensile capacity as specified below for concrete work.	--		
i	Candorr M8*110 C.A.B (Chemical Anchor Bolt with nut & washer, HSN:73181900)	EACH	1	.0000003
ii	Candorr M10*130 C.A.B (Chemical Anchor Bolt with nut & washer, HSN:73181900)	EACH	1	.0000004
iii	Candorr M12*160 C.A.B (Chemical Anchor Bolt with nut & washer, HSN:73181900)	EACH	1	.0000005
800.0	GROUTING: Grouting including all labour, material (unless otherwise specified in BOQ/contract specification), equipment, roughening surface, cleaning, ramming, curing etc. at all level , drawings and as directed by engineer - in - charge.	--		
804.0	Providing & grouting of pocket holes, pipe sleeves and under base plates of structural steel work/ machinery/ pipe supporting structures including roughening of surface, cleaning, ramming, curing etc. all complete with Combextra GP-1 or equivalent as per specification, drawing and direction of engineer-in-charge. (Cost of all material and cleaning of the pockets by compressed air shall be in the scope of the contractor).	CUM	7	.0003498
1300.0	FINISHES TO CONCRETE / PLASTERED SURFACES: Finishes, painting to concrete, plastered surfaces including all labour, material (unless otherwise specified in BOQ/contract specification), equipment, surface preparation, scaffolding etc. at all level as per specification, drawings and as directed by engineer - in - charge.	--		
A1310	Providing and applying one coat of primer and two coats of waterproof bitumenous paint of approved make as per IS: 3384 & IS: 9862 on all surfaces in contact with water/moisture, including required scaffolding, cleaning and preparing the surface, etc complete as per specifications and as directed by the engineer	--		
a)	For all works except shell	Sq.M	89,420	.0291741
b)	For all works in shell	Sq.M	62,000	.022251

**Part C : Bill of Quantities**

**Tender Specification BHEL:PSSR:SCT:2015 for Civil (Balance Works), Architectural, Mechanical, Electrical, C&I works of Natural Draught Cooling Tower NDCT-4 (of Unit 4) of 5X800 MW Yadadri TPS**

**at 5 X 800 MW Yadadri TPS**

<b>Ref.No.</b>	<b>Description</b>	<b>Unit of Measurement</b>	<b>Qty.</b>	<b>Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount</b>
A1312	Providing and applying 2 coats of water proof cement paint of approved make and color on complete exterior surface of shell at all heights including cleaning and preparing the surface, material, labour, scaffolding, curing etc including primer coat complete as per specification and as directed by engineer-in-charge to give an even shade.	SQM	63,050	.0205707
1800.0	MISCELLANEOUS: Miscellaneous works including all labour, material (unless otherwise specified in BOQ/contract specification), equipment etc. at all level unless otherwise specified as per specification, drawings and as directed by engineer - in - charge.	--		
1801.0	Providing and Filling in trenches, plinths, area paving and other underground structures with graded stone aggregate of size range 63 mm to 45 mm in layers not exceeding 230 mm in thickness including breaking of stone boulders to required sizes, filling the interstices with selected sand and compacting to 85 % of original volume of stone stack for all lifts etc. all complete. Payment shall be made for the measurement of the volume of the compacted fill.	CUM	350	.0007018
1815.0	Providing and fixing GI rungs in concrete/brick walls having zinc coating of minimum 900 g/sqm etc. all complete.	Kg	500	.0000367
A1850	Providing and installing heavy duty mild steel access door, in shell with clear opening size of 1.2m x 2.1m, complete with all fittings and fixtures, locking arrangements, frames, fasteners, auto door closure, including the cost all labour, material and equipment, setting in place, grouting primer and finish painting of 3 coats of epoxy paint etc. complete as per drawing and specifications.	Each	2	.0000777
1821.0	Sprinkling of water by water tanker fitted with perforated GI pipe (portable tanker minimum 3000 litre capacity) for roads and miscellaneous area within plant boundary, for dust suppression and reduction of suspended material at site for day to day work, as directed by BHEL site engineer (water for this purpose shall be provided by BHEL free of cost and utilisation of machine will be in terms of Tank-hour put in actual use for water sprinkling).	TANK-HR	2,000	.0009136

**Part C : Bill of Quantities**

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**at 5 X 800 MW Yadadri TPS**

<b>Ref.No.</b>	<b>Description</b>	<b>Unit of Measurement</b>	<b>Qty.</b>	<b>Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount</b>
A1872	Lettering with approved colour synthetic enamel paint including preparation of surface and painting work of base area for lettering on external face of NDCT at any height. Item includes for all tools & plants, staging, supporting, hanging platforms, safety arrangements, labours, materials etc. to complete the work in all respect.	--		
a	Lettering	L.S.	1	.0001233
2300.0	STRUCTURAL WORKS: Structural steel works including all labour, material (unless otherwise specified in BOQ/contract specification), equipments unless otherwise specified, transportation, handling etc. at all level as per specification, drawings and as directed by engineer - in - charge.	--		

**Part C : Bill of Quantities**

**Tender Specification BHEL:PSSR:SCT:2015 for Civil (Balance Works), Architectural, Mechanical, Electrical, C&I works of Natural Draught Cooling Tower NDCT-4 (of Unit 4) of 5X800 MW Yadadri TPS**

**at 5 X 800 MW Yadadri TPS**

<b>Ref.No.</b>	<b>Description</b>	<b>Unit of Measurement</b>	<b>Qty.</b>	<b>Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount</b>
A2301	<p>Fabrication,erection and alignment of structural steel with mild steel rolled section / built up section / combination of both conforming to IS:2062, pipes conforming to IS:1161/ IS:1239, chequered plate conforming to IS: 3052, mild steel rounds, monorails, stays, safety chains, ladders, MS grating etc. in columns, beams, portals,hangers, struts, monorails, stiffeners, brackets, stub columns, bracings, cleats,base plates, splice plates, chequered plate flooring, walkway platforms, ladders, stairs, stringers, treads, landings, hand-rails etc, connection design &amp; preparation of fabrication drgs, collection of steel from stores, fabrication, straightening, cutting, bending, rolling, grinding, machining, drilling, welding, electrodes and other consumables, alignment, erection bolts &amp; nuts (weight of erection bolts, nuts and welds not payable), assembly, edge preparation, preheating (min preheat and interpass temperature of 20degree C for welding over 20 mm and upto 40 mm &amp; 66degree C for welding over 40 mm and upto 63 mm &amp; 110degree C for thickness over 63 mm &amp; use of low hydrogen/ radiogenic electrodes), post heating, testing of welders, inspection of welds, visual inspection, non destructive and special testing, rectification and correction of defective welding works, production test plate, inspection and testing, erection scheme, protection against damage in transit, stability of structures, installation of temporary structures, setting column bases, rectification, dismantling and removal of all temporary structures (weight of temporary structures not payable), return of surplus / waste steel materials to store etc all complete. Including appointment of a separate agency, approved by BHEL, for review and approval of fabrication drgs, in consultation with BHEL.</p> <p>(Structural steel for the above shall be supplied by BHEL free of cost as per the terms and conditions specified elsewhere in the contract)</p>	MT	2	.0000563
A2302	Extra over ST No. A2301 for surface preparation by blast cleaning of steel structures to near white metal surface (Sa 2 1/2) and applying epoxy resin based zinc rich primer of grade 2 as per IS:14589 in 2 coats, one at shop and second coat after erection, including touch-up painting etc all complete.	MT	2	.0000119

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**at 5 X 800 MW Yadadri TPS**

<b>Ref.No.</b>	<b>Description</b>	<b>Unit of Measurement</b>	<b>Qty.</b>	<b>Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount</b>
A2305	Providing and applying two coats of epoxy paint with minimum 25 micron total dry film thickness (DFT) per coat of approved make and shade to achieve an even shade over steel sections already having primer coats and keeping overall DFT with primer not less than 115 microns including protection and cleaning, scaffolding etc. all complete.	MT	2	.0000104
2307.0	Supplying, fabrication, erection and alignment of factory made electroforged galvanised grating units with mild steel having minimum galvanisation conforming to IS:2062 in flooring, platforms, drain and trench covers, walk-ways, passages, staircases with edge binding strips and anti-skid nosing in treads etc. including fixing clamps, fittings, fixtures, all taxes, duties, packing, grinding, drilling, welding, edge preparation, etc. all complete.	--		
a	Minimum galvanisation of 610 g/sqm	MT	0.25	.0000224
A2322	Supply, fabrication and fixing of GI pipe hand railing (1000 mm high) of 32/40 mm dia (Medium/Heavy Grade) including transportation, loading/unloading, painting etc. all complete..	MT	28	.0029856
A2309	Extra over above ST NO. A2301 for finishing the structural steels, chequered plate, bolts, inserts etc. with hot double dipped galvanisation @ 610 gm/sqm all complete.	MT	1	.0000263
A2323	Supply, fabrication and fixing of GI Cage Ladders conforming to IS: 3696 with Width - 600mm, ladder side flats - 60mm x 10 thk., Rungs - 20mm dia @ 300mm c/c., ladder stays @ 2.25m c/c, Circumferential cage rings @ 800c/c - 50mm x 6thk, Cage vertical flat - 50mm x 6 thk x 5 nos. The cage ladders shall be complete with all the necessary accessories, embedded parts, hardware, etc. as directed engineer and as per drawings including transportation, loading/unloading, painting etc. all complete..	MT	44	.0039464
21.0	MECHANICAL	--		

## Part C : Bill of Quantities

### Tender Specification BHEL:PSSR:SCT:2015 for Civil (Balance Works), Architectural, Mechanical, Electrical, C&I works of Natural Draught Cooling Tower NDCT-4 (of Unit 4) of 5X800 MW Yadadri TPS

#### at 5 X 800 MW Yadadri TPS

Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
A2329	<p>Design, supply, fabrication, erection of stoplog gates, Sluice gates etc. with embedments required, lifting beams, special tools &amp; plants, spare parts for three years, machining, casting, all materials such as structural steel, cast steel, stainless steel, brass used for seals, rubber seals, gears, ball and roller bearing, branch bushings, greasing, bolts, nuts, lugs, threaded fastners etc., cleaning, sand blasting, hot double dip galvanised with minimum coating of zinc 750 gms/sqm., following by an application of etching primer and dipping in black bitumen as per B.S. 3416, erection along with a second stage concreting to true plumb and levels, submission of drawings / fabrication drawings for engineers approval etc all complete. The leakage through rubber seal shall not be more than 5 lit/min/metre length of seal under maximum head.</p> <p>(Stoplog gate shall be designed as per IS:5620 and shall be of clear size 4m wide x 4m deep approx., minimum 8 thk skin plate, SS316L seal plate, SS316L guide frame, EPDM side seal and SS316 hardware with mechanical jacking arrangement)</p> <p>(supply of structural steel is in the scope of bidder only) Payment:</p> <p>Supply - 70%</p> <p>Fixing - 30%</p>	Sets	2	.0010487
A2332	<p>Design, Supplying, fabricating, erecting in position and testing / examining bolted and / or welded structural steel work for stationary screens made out of rolled sections and / or plates including cutting, straightening if required, edge preparation, bolting / welding of joints, cleaning, sand blasting, hot double dip galvanised with minimum coating of zinc as 750 gms./sqm. followed by application of an etching primer and dipping in black bitumen as per BS 3416, etc all complete.</p> <p>(SS316L screen of 4m x 4m approximate clear opening size fabricated out of minimum 6mm thick wire mesh of 25mm x 25mm apertures including SS316L guide frame and SS316L hardware)</p> <p>(supply of structural steel is in the scope of bidder only) Payment:</p> <p>Supply - 70%</p> <p>Fixing - 30%</p>	Sets	4	.0012817
c	Chain pulley block with trolley conforming to IS:3832 with load chain conforming to IS: 3109 complete with necessary accessories such as hooks, slings etc with hardware as per specifications and as directed or as per drawings	--		SIGNATURE OF BIDDER WITH SEAL

**Part C : Bill of Quantities**

**Tender Specification BHEL:PSSR:SCT:2015 for Civil (Balance Works), Architectural, Mechanical, Electrical, C&I works of Natural Draught Cooling Tower NDCT-4 (of Unit 4) of 5X800 MW Yadadri TPS**

**at 5 X 800 MW Yadadri TPS**

<b>Ref.No.</b>	<b>Description</b>	<b>Unit of Measurement</b>	<b>Qty.</b>	<b>Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount</b>
i)	3 Ton capacity with 15 m chain for Stop Log Gates as per specifications, drawings and as directed by engineer	Sets	1	.000021
ii)	2 Ton capacity with 15 m chain for Screens as per specifications, drawings and as directed by engineer	Sets	1	.0000152
21.7	Providing & fixing handling Facilities on top of cooling tower including fabrication, erection complete with all the necessary accessories, hardware, etc. as per specifications, as directed by engineer and as per drawings	--		
a	Swivelling type lifting arm complete with swivelling brackets, pins, etc. along with 250 mm diameter CS pulleys, and all the necessary hardware, etc. as per specifications, drawings and as directed by engineer	Sets	2	.000035
b	75 NB pipe inserts for top platform slab as per specifications, drawings and as directed by engineer	Sets	10	.0000582
22.0	PIPING AND VALVES	--		
22.1	Providing & fixing 300 NB flanged CI pipe of Class 'A' type confirming IS: 1536 or MS Corrosion protected pipe in Sludge Pit as per specifications, drawings and as directed by engineer	RM	20	.0001167
22.2	Providing & fixing 300 NB double flanged Knife Edged Gate Valve in Sludge Pit as per specifications, drawings and as directed by engineer	Sets	2	.0001118
22.3	Providing & fixing Fabricated MS piping (20 thk of dia 3.8 m and 3.4 m for hot water supply) conforming to IS: 3589 and MS plates as per IS: 2062 including bends, Ts, elbows, reducers, etc. complete with all the necessary HDGS hardware, gaskets, etc. including fabrication, cutting, aligning, welding, lowering, laying, hydro-testing, etc. as per specifications, drawings and as directed by engineer Payment: Supply - 70% Fixing - 30%	MT	257	.034438

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**at 5 X 800 MW Yadadri TPS**

<b>Ref.No.</b>	<b>Description</b>	<b>Unit of Measurement</b>	<b>Qty.</b>	<b>Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount</b>
22.4	Providing & fixing 3400 NB Double Flanged Moto Actuated Butterfly valves of approved make conforming to AWWA C-504 / BS: 5155 with mating flanges, and complete accessories and hardware as per specifications and data sheets including aligning, erecting, testing etc complete as per specifications, drawings and as directed by engineer Payment: Supply - 70% Fixing - 30%	Sets	2	.0116521
22.5	Providing & fixing Fabricated MS piping (12 thk of dia 1.2 m for by-pass line during commissioning) conforming to IS: 3589 and MS plates as per IS: 2062 including bends, Ts, elbows, reducers, etc. complete with all the necessary HDGS hardware, gaskets, etc. including fabrication, cutting, aligning, welding, lowering, laying, hydro- testing, etc. as per specifications, drawings and as directed by engineer Payment: Supply - 70% Fixing - 30%	MT	25	.00335
22.6	Providing & fixing 150 NB MS HDG drain nipple with suitable drain plug for flushing of HW ducts and complete with accessories and hardware as per specifications and data sheets including aligning, erecting, testing etc.	Sets	4	.0000233
22.7	Fixtures on Piping	--		
a)	Providing & fixing 100 NB x 200 long MS heavy duty Stub connections as per IS: 1289 with isolating ball valves as per IS:9890 of threaded type for flow measurement in HW pipe and complete with accessories & hardware as per specifications and data sheets including aligning, erecting etc.	Sets	3	.0000174
b)	Providing & fixing Dial type pressure guage of 150 mm dial size as per IS:3624 including stub connection with isolation ball valve as per IS:9890 and complete accessories, hardware as per specifications and data sheets including erecting, testing etc necessary for installing & operating the system	Sets	2	.0000218
23.0	PAINTING / PROTECTIVE COATING ON PIPING	--		

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**Tender Specification BHEL:PSSR:SCT:2015 for Civil (Balance Works), Architectural, Mechanical, Electrical, C&I works of Natural Draught Cooling Tower NDCT-4 (of Unit 4) of 5X800 MW Yadadri TPS**

**at 5 X 800 MW Yadadri TPS**

<b>Ref.No.</b>	<b>Description</b>	<b>Unit of Measurement</b>	<b>Qty.</b>	<b>Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount</b>
a	Surface preparation, providing & applying coating and wrapping of underground HW pipe with epoxy and fibre glass 'RP' tissue (4 thk anti-corrosive tape as per AWWA C 203-93) as per specifications and as directed by engineer	Sq.M	510	.0011404
b	Surface preparation, providing & applying painting on outside surface of above-ground HW pipe as per specifications (50 micron DFT Red Lead Primer followed by adequate no. of coats of Synthetic Enamel Paint to achieve a total DFT of 200 microns) and as directed with approved make and type of paints	Sq.M	1,160	.0014057
c	Surface preparation, providing & applying painting on inside surface of HW pipe as per specifications (One coat of Epoxy Resin based Red Oxide Primer to 50 microns and adequate no. of coats of Coal Tar Epoxy Paint to achieve a total DFT of 200 microns) and as directed with approved make and type of paints	Sq.M	1,160	.0014057
d	Surface preparation, providing & applying painting of steel surfaces as per specification with approved make and type of paints	Sq.M	250	.000303
24.0	FILLS Payment on prorata basis: Supply - 70% Fixing - 30%	LS	1	.1408952
25.0	DISTRIBUTION SYSTEM Payment on prorata basis: Supply - 70% Fixing - 30%	LS	1	.0689665
26.0	PUMP	--		
26.1	Providing & fixing Submersible Sludge Pumps of minimum 200 Cu.M/hr capacity @10MWC head, complete with associated 250m long discharge piping, valves and accessories up to nearest plant drain, including control panel as per specification & as directed	Sets	2	.0002528
26.2	Providing and fixing tripod for handling sludge pump including 2T capacity chain pulley block with minimum 8m chain length along with pipe inserts as per sludge pit drawing for mounting the system	Sets	1	.000021

## Part C : Bill of Quantities

### Tender Specification BHEL:PSSR:SCT:2015 for Civil (Balance Works), Architectural, Mechanical, Electrical, C&I works of Natural Draught Cooling Tower NDCT-4 (of Unit 4) of 5X800 MW Yadadri TPS

#### at 5 X 800 MW Yadadri TPS

Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
27.0	Tests	--		
27.1	Thermal Performance Guarantee Test as per ATC-105 (Class B Test with data collection system and logger)	LS	1	.0008739
III	ELECTRICAL & INSTRUMENTATION	--		
1.0	AVIATION WARNING LIGHT SYSTEM	--		
a	<p>Providing &amp; fixing Hi Intensity LED twin-type (double fixtures) white flashing Aviation Obstruction Lights as per ICAO, FAA and DGCA, India specifications. The fixtures shall be in corrosion resistant aluminum casting finished in stove enameled control gear suitable for 200/240V, 50Hz supply, complete as per specifications with all the necessary fixing accessories. Expected life is required to be more than 10 years.</p> <p>Payment term: Supply - 70% Fixing - 30%</p>	Sets	8	.0052188
b	Providing & fixing 1.5 m long MS HDG ISMC 100 with brackets/clamps, nuts and bolts for mounting the light fixtures as per drawings and/or manufacturer recommendations and as directed by engineer.	Sets	8	.0000467
c	Providing & fixing JBs with necessary brackets, bolts & nuts for cabling to the fixtures	Sets	12	.0000699
d	<p>Providing &amp; fixing Aviation Lighting Panel cum Controller with Photoelectric light detectors to monitor north sky to control the aviation warning lights. The lights should be switched on when the ambient light goes below 35 candelas and should be switched off when the intensity is more than 58 candelas. The AOLs should not switch off due to short time increase in sky light due to lightning flashes or any other short bursts of light. The detectors should be complete with all the accessories, hardware, etc. necessary for installation. The provision for Auto manual operation shall also be provided.</p>	Sets	2	.0001864
e	Providing & fixing 250W HPSV well glass fixture with built in capacitor/ballast and controller with IP:55 protection along with 3 m pole for staircase lighting as per specification and/or as directed by engineer.	Sets	154	.0114483

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**Tender Specification BHEL:PSSR:SCT:2015 for Civil (Balance Works), Architectural, Mechanical, Electrical, C&I works of Natural Draught Cooling Tower NDCT-4 (of Unit 4) of 5X800 MW Yadadri TPS**

**at 5 X 800 MW Yadadri TPS**

<b>Ref.No.</b>	<b>Description</b>	<b>Unit of Measurement</b>	<b>Qty.</b>	<b>Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount</b>
f	Cables	--		
--	All cables shall be 1.1 KV grade, PVC inner heathed, FRLS-HRPVC insulated, armoured PVC outer sheathed copper cable conforming to IS:1554 part-I and including lugs etc. and subject to BHEL approval. The cables shall be clamped to Cage Ladders at every 750 c/c along its run and will include all the hard ware required for its fixing and terminations, etc. The Junction/Terminal boxes should be provided as and where required during erection and/or as directed by engineer	--		
i	Providing & fixing power Cable for Receptacless: 4Cx10sq.mm AL	RMT	668	.0006227
ii	Providing & fixing 4C x 6 sq.mm Copper cable for power supply from AOLP to AOL JBs & Staircase Lighting	RMT	668	.0009582
iii	Providing & fixing 3C x 2.5 Sq.mm copper cable for local connection from local Junction box to aviation warning lights	RMT	56	.0000414
iv.	40 dia PVC Conduits for cables	RMT	600	.0000532
g	Providing & fixing 240V x 63A single phase 3-pin outdoor, weather proof, industrial type switch-socket outlets with inter-lock switches and fitted with metal cap as per specifications, drawings and as directed by engineer	Sets	4	.0000233
h	Providing & fixing weather & dust proof (IP-55) 200 mm x 150mm x 100mm deep junction box (2/3/4 way) made out of 2mm thk G.S. with ELMEX type terminals, glands etc. complete as per specifications, drawings and as directed by engineer	Sets	12	.0000222

## Part C : Bill of Quantities

### Tender Specification BHEL:PSSR:SCT:2015 for Civil (Balance Works), Architectural, Mechanical, Electrical, C&I works of Natural Draught Cooling Tower NDCT-4 (of Unit 4) of 5X800 MW Yadadri TPS

#### at 5 X 800 MW Yadadri TPS

Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
i	Providing & fixing 415 V Lighting Distribution Board fabricated from 2 thk sheet steel, dust and vermin proof and removable gland plates at top and bottom with ELMEX type connectors and with suitable earthing including 2 nos. 63A TPN incomers, HRC fuses and 2 nos. 63A, 4 nos. 16 A outgoing connections with HRC fuses. Two incomers from CWP will have to be connected to this LDB by the contractor. Automatic change over with suitable delay timers with Auto/Manual operation will have to be provided The DB shall be designed for 50 KVA Fault Level and must also include a transformer of 100 KVA rating Payment: Supply: 70% Fixing - 30%	Sets	2	.0002913
j	Providing & fixing Temporary aviation warning lights as per specifications, during construction, once the construction reaches beyond 50m level from general ground level as per specifications, drawings and as directed by engineer	LS	1	.0001165
--	LIGHTNING PROTECTION SYSTEM conforming to IS: 2309	--	--	--
a	Providing & fixing Air terminator / Lightning arrestor made of 20mm dia. x 2.0m ht Cu rod with pointed end and welded to base plate for fixing on top platform complete as per specifications and as directed by Engineer	Sets	32	.0002982
b	Providing & fixing of 75 x 10 thk GI flat Coronal band connecting all air terminator on one side and to the down conductor on the lower side as per specification complete with all the necessary fixtures, hardware, etc. required for installation. The clamps used shall be GI and heavy duty and shall be fixed approx 1m below the top of the cooling tower and clamped at the spacing not more than 750 mm C/C	RMT	274	.0001635

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at 5 X 800 MW Yadadri TPS

Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
c	Providing & fixing of 75 x 10 thk GI flat Down conductor complete with all the necessary fixtures, hardware, etc. required for installation. The down conductors on the top shall be connected to the coronal band and on the lower side they shall be connected to the test links. The clamping shall be at 750 mm C/C with heavy duty GI clamps. The down conductors shall be in one piece as far as possible. The necessary joints shall be of fully welded type and not bolted type except at the test link. These conductors shall be laid over the concrete surface so that visual inspection and repair, if necessary during maintenance is possible	RMT	3,200	.0019091
d	Providing & fixing 75x10 thk GS flat Test links (complete assembly) with enclosure anchored to Raker column as directed by engineer	Sets	16	.0000932
e	Providing & fixing 4.5 m long, Dia. 40mm MS rod buried down conductor as per specifications and as directed by engineer	Sets	4	.0000134
f	Providing & fixing 100 dia. x 1.5m Class-1 grade PVC pipe to be filled with PCC after enclosing down conductor below test link (approx. 10m length) as per specifications, drawings and as directed by engineer	Sets	16	.0001118
--	EARTHING conforming to IS :3043	--	--	--
a	Providing & fixing of Earth conductor made out of 40 mm Dia. MS round bar complete with all the necessary fixtures, hardware, etc. required for installation shall be supplied and installed between test link on one side and to the earth mat on the other side as per specifications, drawings and as directed by engineer	RMT	100	.0000736
b	Providing & fixing 70x10 thk GS flat coronal band on top platform cleated at 750mm c/c complete with all the necessary fixtures, hardware, etc. required for installation as per specifications, drawings and as directed by engineer	RMT	274	.0001635
c	Providing & fixing 70x10 thk GS flat down conductors from top platform to earth mat, cleated at 750mm c/c complete with all the necessary fixtures, hardware, etc. required for installation as per specifications, drawings and as directed by engineer	Sets	400	.0002386

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### Tender Specification BHEL:PSSR:SCT:2015 for Civil (Balance Works), Architectural, Mechanical, Electrical, C&I works of Natural Draught Cooling Tower NDCT-4 (of Unit 4) of 5X800 MW Yadadri TPS

#### at 5 X 800 MW Yadadri TPS

Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
d	Laying of Earthing Mat (Main Grounding Conductor @ 1m below FGL approx. at about 6 m outside the NDCT periphery), transportation from yard stores, loading, unloading, cutting to length, welding, protective painting of joints etc. all complete. (Excavation & Back filling shall be paid separately under respective item of earth work. Earthing mats/rods shall be supplied by BHEL free of cost)	RMT	487	.0003586
e	Construction of Treated Earthing pit as per drawing with charcoal & salt, GI pipes (40 dia, 3 m long) as per IS- 3043, earth electrodes, GI wire, GI strips, brick chamber with covers including associated earthwork etc. all complete. (Material for GI pipes, earth electrodes, GI wire, GI strips shall be supplied by BHEL free of cost).	Sets	4	.0000699
f	Providing & fixing Dia. 40mm MS rod buried grounding inter connector between cooling towers and to nearest main plant grounding mat as per specifications, drawings and as directed by engineer	RMT	200	.0001473
g	Providing & fixing 25x6mm thk GS flat for cage ladders, hand rails and all non-current carrying metal parts as per specifications, drawings and as directed by engineer	RMT	80	.0000086
h	Providing & fixing 50x6 thk GS flat for non-metal parts such as basin, CWC, drain box etc. and cable trays as per specifications, drawings and as directed by engineer	RMT	100	.0000214
i	Providing & fixing 25x3mm thk GS flat for control panels (AWL) as per specifications, drawings and as directed by engineer	RMT	10	.0000005
j	Providing & fixing 8 SWG GI wire for Junction boxes / pull boxes, receptacles, conduits etc. as per specifications, drawings and as directed by engineer	RMT	25	.0000001
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a	Providing & fixing of Temporary lightning protection system during construction as per specifications, complete with all the necessary fixtures, hardware, etc. required for installation as per specifications, drawings and as directed by engineer	LS	1	.0000582
b	Conducting tests on circuit as per specifications, drawings and as directed by engineer	LS	1	.0000291
--	INSTRUMENTATION	--	--	--

## Part C : Bill of Quantities

### Tender Specification BHEL:PSSR:SCT:2015 for Civil (Balance Works), Architectural, Mechanical, Electrical, C&I works of Natural Draught Cooling Tower NDCT-4 (of Unit 4) of 5X800 MW Yadadri TPS

at 5 X 800 MW Yadadri TPS

Ref.No.	Description	Unit of Measurement	Qty.	Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount
a	Providing & fixing Thermowells complete with all the necessary fixtures, hardware, etc. required for installation as per specifications, drawings and as directed by engineer	Sets	4	.0000233
b	Providing & fixing Temperature Guages complete with all the necessary fixtures, hardware, etc. required for installation as per specifications, drawings and as directed by engineer	Sets	2	.0000317
c	Providing & fixing Pressure Gauges complete with all the necessary fixtures, hardware, etc. required for installation as per specifications, drawings and as directed by engineer	Sets	2	.0000242
d	Providing & fixing of 3-hole type Pitot Tube procured from IIT Delhi, complete with all the necessary fixtures, hardware, etc. required for installation as per specifications, drawings and as directed by engineer. Please note that the above item is optional for BHEL to operate at its own discretion. Hence, bidder shall obtain written clearance from BHEL/Site, before initiating any kind of procurement activities for the item during the course of execution.	Sets	1	.0004078
e	Providing & fixing Level Switches in Sludge Pit complete with all the necessary fixtures, hardware, etc. required for installation as per specifications, drawings and as directed by engineer	Sets	1	.000021
f	Providing & fixing rotating type Anemometer for wind speed measurement as per specifications, drawings and as directed by engineer. Please note that the above item is optional for BHEL to operate at its own discretion. Hence, bidder shall obtain written clearance from BHEL/Site, before initiating any kind of procurement activities for the item during the course of execution.	Sets	1	.000014
g	Providing & fixing Mechanically Aspirated Psychrometer for wetbulb temperature measurement as per specifications, drawings and as directed by engineer	Sets	1	.0003351

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**Tender Specification BHEL:PSSR:SCT:2015 for Civil (Balance Works), Architectural, Mechanical, Electrical, C&I works of Natural Draught Cooling Tower NDCT-4 (of Unit 4) of 5X800 MW Yadadri TPS**

**at 5 X 800 MW Yadadri TPS**

<b>Ref.No.</b>	<b>Description</b>	<b>Unit of Measurement</b>	<b>Qty.</b>	<b>Weightage for amount of each item (Nearest to the 7 decimal points) w.r.t the total amount</b>
4.0	<p>Mandatory spares to be supplied for the project is as per Annexure 5 of Technical Specifications.</p> <p>1. Totally 5 cooling towers are to be supplied for 5x800 MW Yadadri TPS for which 2 set of mandatory spares are to be supplied to TSGENCO. (Quantity in Annexure 5 of Technical Specifications is for 2 sets)</p> <p>2. Bidder to quote for supply of one complete set of mandatory spares as per list in Annexure 5 of Technical Specifications.</p> <p>Please note that the above item is optional for BHEL to operate at its own discretion. Hence, bidder shall obtain written clearance from BHEL/Site, before initiating any kind of procurement activities for the mandatory spare items during the course of execution.</p>	Sets	1	.0116521
<b>TOTAL Weightage</b>				1.0