

Ref: BHE/PW/PUR/NTPRT-BAL-CHIMNEY/2756/Corg 02

Dt: 05-05-2023

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ALL BIDDERS

Sub: Corrigendum-02: Revised EMD amount, PQR amendment, Issuance of Revised BOQ

Job: Execution of balance works of two (02) nos. of single flue RCC chimney of height 275m for Unit-1 and Unit-3 each at 3X800 MW PVUNL Patraru, Jharkhand

Tender Specification Number: BHE/PW/PUR/NTPRT-BAL-CHIMNEY/2756

Bidders to kindly take note of the following:

AA) Salient features of NIT is amended as below

Sl No.	EMD AMOUNT	EMD AMOUNT(Revised)
Vii	₹ 32,40,000.00 (Rupees Thirty Two Lacs Forty Thousand Only) Important Note: Bidders kindly to take note that EMD (Earnest Money Deposit) shall be furnished by MSE bidders as well, as per the amount and procedure indicated in the NIT/GCC.	₹ 30,00,000.00 (Rupees Thirty Lacs Only) Important Note: Bidders kindly to take note that EMD (Earnest Money Deposit) shall be furnished by MSE bidders as well, as per the amount and procedure indicated in the NIT/GCC

BB) PQR B and C-1 are being revised as below:

Sl No	Existing PQR	Amended PQR
B	Bidder shall essentially meet all the Qualifying Requirements (i.e. (B.1 & (B.2.1 or B.2.2) & B.2.3) or (B.1 & B.3) as under, in the last seven years as on latest date of bid submission: B.1: Bidder should have Executed "Piling or Civil or Structure or 'Civil and Structural Works' or RCC Chimney or RCC Cooling Tower or RCC Silo or Mill Bunker or any combination of these works" for any one of the following in the last seven years from latest date of bid submission: B.1.1) Executed One work of value not less than Rs. 1792 Lakhs against single work order. OR B.1.2) Executed Two works each of value not less than Rs. 1120 Lakhs against maximum two work orders. OR B.1.3) Executed Three works each of value not less than Rs. 896 Lakhs against maximum three work orders. And B.2: Bidder should have built at least one "Reinforced Cement Concrete Chimney" of at least 200 Mtr height against a single contract in the last seven years from latest date of bid submission.	Bidder shall essentially meet all the Qualifying Requirements (i.e. B.1 & B.2) as under, in the last seven years as on latest date of bid submission: B.1: Bidder should have Executed "Piling or Civil or Structure or 'Civil and Structural Works' or RCC Chimney or RCC Cooling Tower or RCC Silo or Mill Bunker or any combination of these works" for any one of the following in the last seven years from latest date of bid submission: B.1.1) Executed One work of value not less than Rs. 1600 Lakhs against single work order. OR B.1.2) Executed Two works each of value not less than Rs. 1000 Lakhs against maximum two work orders. OR B.1.3) Executed Three works each of value not less than Rs. 800 Lakhs against maximum three work orders. And B.2: Bidder should have built at least one "Reinforced Cement Concrete Chimney" of at least 100 Mtr height against a single contract in the last seven years from latest date of bid submission.
C-1	Bidders must have achieved an average annual financial turnover (audited) of Rs. 672.00 Lakhs or more over last three Financial Years (FY) i.e 2019-20 , 2020-21 & 2021-2022'	Bidders must have achieved an average annual financial turnover (audited) of Rs. 600.00 Lakhs or more over last three Financial Years (FY) i.e 2019-20 , 2020-21 & 2021-2022'

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Enclosure:

1. Revised-ChapterXIBOQandPercentageWeightages2756 : This Chapter revised in totality.
2. Revised-ExcelSheetforCalculationPurposeOnly2756

CC) BID DUE DATE EXTENSION

Bid submission end date and Bid Opening Date has been amended as mentioned in following table:

Existing Bid Submission End Date	06/05/2023, 13:00 Hrs
Existing Bid Opening Date	06/05/2023, 17:00 Hrs
Revised Bid Submission End Date	09/05/2023, 13:00 Hrs
Revised Bid Opening Date	09/05/2023, 17:00 Hrs

All other Terms and conditions of the Tender Specification shall remain unaltered unless expressly amended by BHEL in writing.

Bidders are requested to submit as a part of Technical Bid, a copy of this corrigendum duly countersigned by the authorized signatory and stamped with the Official seal as a token of Bidder's unqualified acceptance of this corrigendum/ digitally signed.

BIDDERS WHO HAVE ALREADY SUBMITTED THEIR OFFERS PRIOR TO ISSUANCE OF THIS CORRIGENDUM IN E-TENDER PORTAL ARE REQUIRED TO RE-SUBMIT THEIR OFFER AFTER TAKING COGNIZANCE OF THIS CORRIGENDUM.

Thanking you,
Yours Sincerely,

GM (Purchase)

CHAPTER XI – BILL OF QUANTITIES AND % WEIGHTAGE OF INDIVIDUAL ITEMS

JOB Description: Execution of balance works of two (02) nos. of single flue RCC chimney of height 275m for Unit-1 and Unit-3 each at 3X800 MW PVUNL

Sl. No.	Description of Item	Unit	Total Qty.	Rate	Amount	Weightage
1	Earth work in excavation in all types of soil including moorum, 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 1 km, spreading/levelling of disposed materials etc all complete for following depths below ground level including necessary men/women, materials, equipment, loading, transportation, unloading etc as per specification, drawing and as directed by engineer- in-charge.					
a	Depth from ground level but not exceeding 2 m	cum	600			0.028904033
b	Depth exceeding 2 m but not exceeding 4 m	cum	600			0.036062534
c	Depth exceeding 4 m but not exceeding 6 m	cum				
d	Depth exceeding 6 m but not exceeding 8 m	cum				
e	Depth exceeding 8 m but not exceeding 10 m	cum				
f	Depth exceeding 10 m but not exceeding 15 m	cum				
2	Extra over Item No. 1 for dewatering of ground water by well point method as per IS 9759.	cum				
3	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 including necessary men/women, materials, equipment, loading, transportation, unloading etc as per specification, drawing and as directed by engineer- in-charge.					
a	Depth from ground level but not exceeding 2 m	cum				
b	Depth exceeding 2 m but not exceeding 4 m	cum				
c	Depth exceeding 4 m but not exceeding 6 m	cum				
d	Depth exceeding 6 m but not exceeding 8 m	cum				
e	Depth exceeding 8 m but not exceeding 10 m	cum				
f	Depth exceeding 10 m but not exceeding 15 m	cum				
5	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 1 km, spreading / levelling of disposed materials etc all complete for following depths below ground level including necessary men/women, materials, equipment, loading, transportation, unloading etc as per specification, drawing and as directed by engineer- in-charge.					
a	Depth from ground level but not exceeding 2 m	cum				
b	Depth exceeding 2 m but not exceeding 4 m	cum				
c	Depth exceeding 4 m but not exceeding 6 m	cum				
d	Depth exceeding 6 m but not exceeding 8 m	cum				
e	Depth exceeding 8 m but not exceeding 10 m	cum				
f	Depth exceeding 10 m but not exceeding 15 m	cum				
6	Earth work in excavation in hard rock requiring chiselling including wedging, line drilling, pre shearing etc as required, setting out, levelling, deawtering (wherever required), dressing the sides & bottom, all lifts, stacking/disposal of surplus excavated material within a lead upto 1 km, spreading / levelling of disposed materials etc all complete for following depths below ground level including necessary men/women, materials, equipment, loading, transportation, unloading etc as per specification, drawing and as directed by engineer- in-charge.					
a	Depth from ground level but not exceeding 2 m	cum				
b	Depth exceeding 2 m but not exceeding 4 m	cum				
c	Depth exceeding 4 m but not exceeding 6 m	cum				

CHAPTER XI – BILL OF QUANTITIES AND % WEIGHTAGE OF INDIVIDUAL ITEMS

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Sl. No.	Description of Item	Unit	Total Qty.	Rate	Amount	Weightage
d	Depth exceeding 6 m but not exceeding 8 m	cum				
e	Depth exceeding 8 m but not exceeding 10 m	cum				
f	Depth exceeding 10 m but not exceeding 15 m	cum				
7	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 250 mm thickness using/with selected materials from compulsorily excavated earth 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 including necessary men/women, materials, equipment, loading, transportation, unloading etc as per specification, drawing and as directed by engineer- in-charge.					
b	Each layer compacted so as to achieve at least 90% maximum dry density as per IS-2720 (Part-VII)	cum	4200			0.181724927
8	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 250 mm thickness using/with selected earth directly from excavation within a lead upto 1Km and compacted as specified including re-excavation of stacked earth, watering, ramming/compaction by manual/mechanical means, dressing etc all complete.for the following including necessary men/women, materials, equipment, loading, transportation, unloading etc as per specification, drawing and as directed by engineer- in-charge.					
b	Each layer compacted so as to achieve at least 90% maximum dry density as per IS-2720 (Part-VII)	cum	500			0.016397584
9	Extra over item No. 1 and 3 to 7 for carriage of excavated earth/selected materials for every 500 m or part thereof beyond an initial lead of 1 Km.	cum	4000			0.053591995
11	Supplying and filling sand upto any depth below grade slab, around foundations, etc. in layers not exceeding 250 mm thickness and compacted so as to achieve at least 80% relative density as per IS-2720 (Part-XIV) including spreading, watering, ramming/compaction by manual / mechanical means, dressing, royalty (if any) etc. all complete including necessary men/women, materials, equipment, loading, transportation, unloading etc as per specification, drawing and as directed by engineer- in-charge.	cum	400			0.245138821
12	Supplying and laying (inside chimney in the space below the grade level slab) crushed rock range 63 mm to 45 mm in layers not exceeding 200 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	1000			0.650853803
13	Providing and laying Nominal Mix plain cement concrete (1:3:6) with graded aggregate (with maximum size of coarse aggregate not exceeding 40 mm) at all levels for all kinds of work like mass concrete, lean concrete, mudmat, filling etc. including labour, materials, equipment, handling, transporting, batching, curing, testing etc. all complete as per specifications, drawings and instructions of the Engineer. (CEMENT SHALL BE SUPPLIED BY BHEL FREE OF COST AS PER TCC)	cum	200			0.324208165
14	Providing and laying design mix cement concrete with graded aggregate (maximum size of coarse aggregate not exceeding 20 mm) for reinforced concrete work at all levels for all kinds of work, including labour, materials, equipment, handling, transporting, batching, mixing, placing, levelling, compacting, curing, testing etc. and rendering or cleaning and finishing the exposed surface with cement mortar (1:3) to give smooth and even surface, all complete as per specifications, drawings and instructions of the Engineer, but excluding all formwork and reinforcing steel:					
i	For all works below ground level (except chimney shell)					

CHAPTER XI – BILL OF QUANTITIES AND % WEIGHTAGE OF INDIVIDUAL ITEMS

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Sl. No.	Description of Item	Unit	Total Qty.	Rate	Amount	Weightage
a	Grade M-25 (foundations, etc) (CEMENT SHALL BE SUPPLIED BY BHEL FREE OF COST AS PER TCC)	cum	200			0.343191289
ia	Extra over St. No. 14(i) for controlling of temperature of fresh concrete for raft/pilecap to less than 23 degree centigrade using ice, including all related arrangements for providing, storing and mixing of ice with water, cooling of aggregates etc. All complete as per specification, drawing and instruction of engineer in charge.	cum	1138.34			0.151720521
ii	For all other works					
a	Grade M-25 grade level slab, pit, trenches, drain etc. (CEMENT SHALL BE SUPPLIED BY BHEL FREE OF COST AS PER TCC)	cum	1000			1.715956443
c	Grade M-35 for chimney shell, corbels and external platforms and other shell attachments. (CEMENT SHALL BE SUPPLIED BY BHEL FREE OF COST AS PER TCC)	cum	7989.84			17.14117897
A14	Providing and laying Concrete of Grade M25 or equivalent nominal mix of 1:1:2 mix(1 part cement,1 parts sand, 2 parts of 20mm nominal size graded aggregate) for reinforced concrete concrete works using graded aggregate for concrete in Pre cast concrete sleepers Including cost of Labour, materials, and equipment for handling transportation, batching, mixing placing, vibrating, shuttering/mould and curing complete as per drawing specifications and as per direction of engineer in charge. Fixing of reinforcement shall be paid separately under item 16.i(a). (TMT & Cement will be provided free of cost as per TCC)	CUM				
15	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, shell, pedestal etc on concrete surfaces exposed to soil / ash including surface preparation etc. all complete.	Sqm	100			0.007145899
15 (a)	Providing brick work in cement mortar 1:6 (1 part cement 6 parts coarse sand) in walls, chambers etc. in thickness varying from 230mm to 460mm at all depths, places and positions below plinth including raking out joints, curing, scaffolding etc. complete excluding plastering and painting.					
	Using fly ash lime bricks confirming to IS 12894 with crushing strength of 75 kg/cm2(including cost of cement for brick making). (CEMENT FOR MORTAR FOR BRICKWORK SHALL BE SUPPLIED BY BHEL FREE OF COST AS PER TCC)	CUM				
16	Providing and placing steel reinforcements of TMT steel of grade Fe-500 /Fe 500D confirming to IS:1786 and having minimum elongation 14.5% , for reinforced concrete work, at all levels, for all kinds of work, including transportation, cleaning, derusting, straightening, cutting, bending, binding in position with annealed wire and/or welding, providing concrete cover blocks, pins, separators, chairs, supports for reinforcement, etc. with all materials, labour, equipment, handling, testing, transportation to & from stores etc., preparation of bar bending schedules, all complete as per specifications, drawings and instructions of the Engineer.					
i	For all works below ground level (except chimney shell)					
a	High strength deformed bars (REINFORCEMENT STEEL SHALL BE SUPPLIED BY BHEL FREE OF COST AS PER TCC)	MT	100			0.378270012
ii	For all other works					
a	Mild steel reinforcement bars (SUPPLY OF REINFORCEMENT STEEL IS IN BIDDER'S SCOPE)	MT	20			0.588542983
b	High strength deformed bars (REINFORCEMENT STEEL SHALL BE SUPPLIED BY BHEL FREE OF COST AS PER TCC)	MT	885.12			3.993814688

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Sl. No.	Description of Item	Unit	Total Qty.	Rate	Amount	Weightage
17	Providing and fixing formwork of approved quality for cast-in-situ, plain or reinforced concrete works of any type and section (including curved surfaces and chimney shell) for all elevations, including labour, materials, equipment, waste of forms, shoring, strutting, scaffolding, staging, tying, nailing, caulking, bolting etc. and removal of form work and staging etc. all complete as per specifications, drawings and instructions of the Engineer.					
i	For all works below ground level (except chimney shell)	Sqm	200			0.03808596
ii	For all other works					
a	Inner and outer faces of wind shield with slip form shuttering (New shuttering plates to be used for slip form shall be new and grade of steel shall conform to the specification)	Sqm	26445.01			15.57631928
b	All other components of the superstructure including slabs, beams, columns, walls, enclosures, mini shells, external platforms, corbels, other shell attachments, chases/recesses in shell etc.	Sqm	967			0.681869472
18	Providing and fixing formwork in shell openings and pockets (above 0.1 sq.m surface area) including cutting, formation of shapes and all other operations required for making the required shape and size, removal of formwork, all complete as per specifications, drawings and instructions of the Engineer.	Sqm	28.81			0.020315272
19	Providing and placing in position at all levels, building paper (kraft paper), as per IS:1397, between concrete surfaces including the cost of labour, material, etc. complete as per drawings and instruction of the Engineer.	Sqm	149.67			0.004098609
20	Providing and installing, at all levels, bitumen impregnated fibre boards, 12 mm thick, conforming to IS:1838, as joint filler at joints in concrete, including nailing, coating of both faces with coal tar pitch/bitumen, including the cost of all labour, material and equipments etc., complete as per drawings, specifications and instructions of the Engineer.	Sqm	82.33			0.045016285
21	Providing and filling, at all levels, bitumen sealing compound (hot applied type) conforming to IS:1834, for sealing gaps and joints in concrete, including cleaning, mixing, heating, pouring or injecting, application of primer, cost of all labour, material and equipments etc., complete as per drawings, specifications and instructions of the Engineer.	Kg	1246.33			0.130995253
22	Preparing detailed fabrication drawings and after approval by the Engineer, supplying, fabricating, erecting and installing miscellaneous steel parts to be embedded/cast in concrete (like staircase embedments, corbel face plates, edge protection angles, opening face plates embedments etc.) at all positions and levels including the cost of all labour, materials and equipments for setting materials in concrete, grouting, welding, bolts & bolting, expansion anchors, drilling, cutting, etc. complete as per drawings and specification.	Mt	6.3			0.20454608
C23	Erection of structural steel of mild steel/High strength steel rolled section / built up section / combination of both conforming to IS:2062, pipe sections] true to line, level, plumb & dimension, lifting to all heights, rectification if any, including collection of factory fabricated parts from BHEL store and assembly, installation of erection/connection bolts and application of finish paint coat (Payment for finish coat shall be made separately as per Item No. H23), welding to cast in fixing place, cutting, etc. complete as per approved drawing, specification and approval of engineer in charge. Erection bolts shall be arranged by the bidder and is not payable. The prefabricated structure shall be supplied in variable length to the maximum length of 10 meters -12 meters and all erection work on ground or at any elevation is included in this item. Payment shall be made for weight of structure & splice plate but not for erection bolts & nuts, temporary structures, etc. (Payment for high strength structural bolts shall be made separately as per Item No. 25)	Mt				
C23 (i)	Erection:-65%		1219.66			5.362796719
C23 (ii)	Alignment :-35%		1028.17			2.434288543

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Sl. No.	Description of Item	Unit	Total Qty.	Rate	Amount	Weightage
D23	Providing welded splices for joining pre-fabricated structural parts (Beams, columns, ties, bracings etc.) supplied by BHEL including welding of main structural members as per drawing, cutting if required, grinding, machining, preparing smooth surface for splicing, welding splice over welded structural member etc complete as per fabrication drawing , electrodes and other consumables for welding, alignment, manual/blast cleaning, providing and application of primer, paint etc. all complete. Weight of splice plates along with weight of structural members on either side of joint to maximum extent of 3 meters length or actual length (if lesser than 3 m) shall be payable. Manual/blast cleaning of steel surface , application of primer and paint including supply shall be paid separately as per Item No.E23/F23, G23 & H23.	Mt	25			0.169113617
E23	Extra over ST NO. D23 for Manual cleaning of steel structures and applying providing & applying coat of self curing inorganic zinc ethyle Silicate primer (having 80% of metallic zinc content in dry film, solid by volume Minimum 60+/-2%). Zinc dust pigment shall be as per specifications. Primer of minimum 70 micron DFT shall be applied over shot blast cleaned surface including touch-up painting etc all complete as per specification and drawing.	MT (of steel)	5			0.006089631
F23	Extra over ST NO. D23 for blast cleaning of steel structures to near white metal surface conforming to Sa 2 ½ finish of ISO 8501-1 with surface profile 40-60 Micron and providing and applying two component moisture curing zinc (ethyl) silicate primer coat (having minimum 80% of metallic Zinc content in dry film, solid by volume minimum 60% ±2%) of minimum 70 micron DFT including the cost of all labour, material, equipments, protection of surface and cleaning, scaffolding, touch-up painting etc., complete as per drawings, specifications and instructions of the Engineer. Zinc dust composition and properties shall be Type-II as perASTM D520-00. Primer coat shall be applied in Shop immediately after blast cleaning by airless spray technique.	Mt (of steel)	20			0.030448156
G23	Extra over ST NO. D23 for providing and applying (by airless spray technique) intermediate coat of two component polyamide cured epoxy with MIO Content (containing lamellar MIO minimum 30% on pigment, solid by volume minimum 80% ±2%) of minimum 100 micron DFT after an interval of minimum 24 hours (from the application of primer coat) and of approved make including the cost of all labour, material, equipments, protection and cleaning, scaffolding, touch-up painting etc. all complete as per drawing and specifications.	Mt (of steel)	25			0.016311625
H23	Extra over ST NO. C23, D23 & E23 for providing and applying Finish coat of two-pack aliphatic Isocyanate cured acrylic finish paint (solid by volume minimum 55% ±2%) with Gloss retention (SSPC Paint Spec No 36, ASTM D 4587, D 2244, D 523) of Level 2 (after minimum 1000 hours exposure, Gloss loss less than 30 and colour change less than 2.0 ΔE) and minimum 70 micron DFT over steel sections already having intermediate coats, including the cost of all labour, material, equipments, protection and cleaning, scaffolding etc. all complete as per drawing and specifications. This coat shall be applied after an interval of minimum 24 hours (from the application of sealer coat) and within six (6) months (from the completion of Intermediate coat). Colour and shade of the coat shall be as approved by the Employer.	Mt (of steel)	30			0.026685735
24	Supplying, fabrication, erection and alignment of factory made galvanised welded grating units with mild steel conforming to IS:2062 in platforms, staircases with edge binding strips and anti-skid nosing in treads etc. including 2 coats of redoxide zinc-chromate primer (one coat at shop and one coat after erection), fixing clamps, fittings, fixtures, all taxes, duties, packing, grinding, drilling, welding, edge preparation, etc. all complete.	Mt	2			0.120379465
25	Providing and fixing in positing of high strength structural bolts (of property class 8.8 and product grade `C` as per IS: 1367) and conforming to IS: 3757 and high strength structural hardened and tempered nuts (of property class `8` as per IS:1367) conforming to IS:6623 with hardened and tempered washers as per IS:6649 etc. up to and inclusive of 39 mm diameter and upto 400 mm long for structural steel work etc all complete.	Quintal	204			2.332949358

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Sl. No.	Description of Item	Unit	Total Qty.	Rate	Amount	Weightage
27	Providing, fabricating and installing at various locations and elevations of the chimney system the following miscellaneous mild steel items complete with the cost of all labour, material and equipment, transporting, lifting, setting in place, cutting, grinding, drilling, welding, bolts and bolting, anchor fasteners and anchoring, priming, painting, grouting etc. complete as per drawings and specifications:					
a	Mild steel ladders with cage, hood access hatch, louvers, bird screens, hood drain basin covers and other miscellaneous mild steel items not specifically mentioned. Payment Terms: On receipt of material - 60% On execution as per item details - 40%	Mt	34			1.562546883
b	32/40 mm nominal bore medium class tubular hand railing conforming to IS 1161 for stair case and internal and external platforms. Payment Terms: On receipt of material - 60% On execution as per item details - 40%	Mt	46			2.201586864
c	Providing minimum 610 gsm Hot dipped galvanisation as per IS 4736 on mild steel parts, , gratings, hand rails etc. as per specification.	Mt	76			1.347108684
28	Preparing detailed fabrication drawings after approval by the Engineer, providing, fabricating and erecting, at all levels, mild steel strakes complete with all stiffeners, attachments, fasteners, pipe sleeves, etc. including the cost of all labour, material and equipment, transporting, lifting to all heights, setting in place, embedding components in concrete, fixing to cast-in embedments, cutting, grinding, drilling, bolts and bolting, welding, preheating and post heating for welding , testing, grouting, primer and finish painting of exposed components(Epoxy phenolic coating system having total 240 microns DFT), galvanisation of embedded parts (as per IS 4736 with minimum weight for galvanizing shall be 610 gm/sq.m and shall comply with relevant IS Codes.) etc. complete as per drawing and specifications.	Mt	0.5			0.017783289
31	Preparing detailed fabrication drawings and after approval by the Engineer, providing, fabricating and installing at all levels, stainless plates (including stainless steel screws and fasteners) of grade AISI 316Land lead sheets beams and over the mild steel in the platform beam bearing, flue supports bearings, flue restraints brackets/ buffers etc. including the cost of all labour material & equipment, transporting, lifting to all heights, setting in place, cutting, grinding, drilling, welding of stainless steel using compatible & approved stainless steel electrodes, testing & machining flat and polishing the contact surfaces of stainless steel, coating the polished surfaces with silicone grease, etc., complete as per drawings and specifications.					
a	Stainless steel components.	Mt	2			0.040077883
b	Lead Sheets.	Kg	142			0.028230308
34	Supplying and laying in position shaped acid resisting bricks conforming to class - I of IS:4860 at all elevations for liner, baffle wall construction (with sloped A/R mortar toppings over brick work) complete including the cost,of all labour, material and equipment, raking joints, flush pointing, cleaning, curing, etc. complete as per drawings and specifications.	Cum	10			0.219222222
37	Supplying, and placing in position (at the beam supports bearings) Neoperne pads between concrete surface and mild steel including the cost of all labour materials, cutting to shape, grinding, drilling etc., complete as per drawings and specifications.	Cum	2			0.687869543
42	Supplying and installing ready mix castable refractory concrete at opening of chimney shell baffle wall and at other locations including all necessary arrangement for keeping them in position as per drawings and approval of Engineer.	Cum	4			0.046553657
43	Providing, laying and packing, at all levels, asbestos ropes at expansion joints including the cost of all labour material, etc. complete as per drawing and specifications.					
a	25 mm (diameter) at expansion joints between steel linig segments.	Rm	100			0.023414769

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Sl. No.	Description of Item	Unit	Total Qty.	Rate	Amount	Weightage
b	12 mm (diameter) at expansion joints between steel lining segments.	Rm	1300			0.139169517
50	Providing and painting, at all levels, inside surface of chimney shell, inside and outside surfaces of minishells, underside of roof slab and other concrete components/surfaces of the chimney as indicated in the drawings and wherever as directed by the Engineer, with acid and heat resisting black bituminous paint (conforming to type I(i) of IS:158) in as many number of coats (not less than four coats in any case) as required to give a paint DFT of not less than 150 microns including the cost of all labour, materials, equipment, surface preparation, primer and finish painting, protecting, cleaning etc. complete as per drawings and specifications.	Sqm	1100			0.109060699
51	Providing and painting, at all levels, inside surface of chimney shell, inside and outside surfaces of minishells, underside of roof slab and other concrete components/surfaces of the chimney as indicated in the drawings and wherever as directed by the Engineer, with epoxy phenolic coating system having total 220 microns DFT including the cost of all labour, materials, equipment, surface preparation, primer, intermediate and finish painting, protecting, cleaning etc. complete as per drawings and specifications.	Sqm	1010			0.275748545
55	Providing and painting, at all levels, the external surfaces of chimney shell and wherever as directed by the Engineer, with aliphatic acrylate system having total 170 microns DFT including the cost of all labours, material and & equipment, surface preparation, primer and finish painting, and consisting of : i) Two component transparent polyamide cured epoxy sealer coating (having solid by volume minimum 40% ±2%) of minimum 100 micron DFT to be applied over cleaned surface in multiple coats. Surface to be coated shall be absolutely dry, clean and dust free. ii) finish coat of two-pack aliphatic Isocyanate cured acrylic finish paint (solid by volume minimum 55% ±2%) with Gloss retention (SSPC Paint Spec No 36, ASTM D 4587, D 2244, D 523) of Level 2 (after minimum 1000 hours exposure, Gloss loss less than 30 and colour change less than 2.0 ΔE) and minimum 70 micron DFT. This coat shall be applied after an interval of minimum 24 hours and within six (6) months (from the completion of Intermediate coat), Colour and shade of the coat shall be as approved by the Employer, protecting, cleaning etc. complete as per drawings and specification.	Sqm	36006			8.482738308
56	Providing and painting, at all levels, the external surfaces of chimney shell and wherever as directed by the Engineer, with acid and heat resistant polyurethane paint in alternate bands of colours 'signal red' and 'pure/bright white including the cost of all labours, material and & equipment surface preparation, primer and finish painting, protecting, cleaning etc. complete as per drawings and specification.	Sqm	20			0.003540546

CHAPTER XI – BILL OF QUANTITIES AND % WEIGHTAGE OF INDIVIDUAL ITEMS

JOB Description: Execution of balance works of two (02) nos. of single flue RCC chimney of height 275m for Unit-1 and Unit-3 each at 3X800 MW PVUNL

Sl. No.	Description of Item	Unit	Total Qty.	Rate	Amount	Weightage
57	Providing and painting, at all levels, the external surfaces of chimney shell and wherever as directed by the Engineer, with epoxy phenolic coating having total 220 microns DFT in alternate bands of 'signal red' and 'bright white' colours including the cost of all labours, material and & equipment surface preparation, primer and finish painting, protecting, cleaning etc. complete as per drawings and specification. Concrete surfaces shall be provided with two component transparent polyamide cured epoxy sealer coating (having solid by volume minimum 40% ±2%) of minimum 50 micron DFT to be applied over cleaned surface in multiple coats. Surface to be coated shall be absolutely dry, clean and dust free. Sealer coat shall be followed with the application of Intermediate coat of epoxy phenolic coating (solid by volume minimum 63%) of minimum 100 micron DFT. This coat shall be applied after an interval of minimum 24 hours (from the application of primer coat) by airless spray technique. Intermediate coat shall be followed with the application of finish coat of two-pack aliphatic Isocyanate cured acrylic finish paint (solid by volume minimum 55% ±2%) with Gloss retention (SSPC Paint Spec No 36, ASTM D 4587, D 2244, D 523) of Level 2 (after minimum 1000 hours exposure, Gloss loss less than 30 and colour change less than 2.0 ΔE) and minimum 70 micron DFT. This coat shall be applied after an interval of minimum 10 hours and within six (6) months (from the completion of Intermediate coat), Colour and shade of the coat shall be as approved by the Employer.	Sqm	6394			1.773823466
58	Providing and painting, at all levels, the inside surface of chimney shell above roof, horizontal surface of shell at top, underside of concrete roof slab, external surface of minishell above roof and wherever as directed by the Engineer, with epoxy phenolic coating having total 220 microns DFT including the cost of all labours, material and & equipment surface preparation, primer and finish painting, protecting, cleaning etc. complete as per drawings and specification. All concrete surfaces shall be provided with two component transparent polyamide cured epoxy sealer coating (having solid by volume minimum 40% ±2%) of minimum 50 micron DFT to be applied over cleaned surface in multiple coats. Surface to be coated shall be absolutely dry, clean and dust free. Sealer coat shall be followed with the application of Intermediate coat of epoxy phenolic coating (solid by volume minimum 63%) of minimum 100 micron DFT. This coat shall be applied after an interval of minimum 24 hours (from the application of primer coat) by airless spray technique. Intermediate coat shall be followed with the application of finish coat of two-pack aliphatic Isocyanate cured acrylic finish paint (solid by volume minimum 55% ±2%) with Gloss retention (SSPC Paint Spec No 36, ASTM D 4587, D 2244, D 523) of Level 2 (after minimum 1000 hours exposure, Gloss loss less than 30 and colour change less than 2.0 ΔE) and minimum 70 micron DFT. This coat shall be applied after an interval of minimum 10 hours and within six (6) months (from the completion of Intermediate coat), Colour and shade of the coat shall be as approved by the Employer.	Sqm	800			0.21786757
59	Proving and laying over the chimney roof, a comosite acid and heat protection treatment including providing of slopes for roof drainage including the cost of all labour, material and equipment, etc., complete as required for preparing the roof concrete, laying under bed of plain cement concrete screed to slopes, preparation of screed surface for painting, painting the screed surface with black bituminous paint, applying bitumenmastic in layers, laying acid resisting(A/R) mortar bed and laying 75 mm thick acid resisting(A/R) bricks with A/R mortar, curing, pointing(with phenolic based A/R cement), protection and cleaning, finishing, etc., complete as per drawing and specifications.	Sqm	436			0.688568472
60	Providing, fitting& fixing, outlet and overflow, cast iron roof drain heads (with gratings) in chimney roof including sockets, adapters, brackets, hangers, supports, etc., casting-in and jointing to 150 mm nominal bore rainwater pipes, grouting, etc. including the cost of all labour material and equipment, transporting, lifting, setting in place, painting, etc. complete as per drawing and specifications.	Each	16			0.105035449

CHAPTER XI – BILL OF QUANTITIES AND % WEIGHTAGE OF INDIVIDUAL ITEMS

JOB Description: Execution of balance works of two (02) nos. of single flue RCC chimney of height 275m for Unit-1 and Unit-3 each at 3X800 MW PVUNL

Sl. No.	Description of Item	Unit	Total Qty.	Rate	Amount	Weightage
61	Providing, fitting and fixing rainwater pipes at all levels internally from the chimney roof to ground level upto the hood drain basin including shoes, bends, junctions, flanges, hoppers, sockets, adaptors, brackets, hangers, supports, anchor fasteners, spacers, pipe sleeve through shell, silicon or vulcanised butyl sealnt, foam backing material, jointing, socketing, grouting, caulking, primer and finish painting etc. complete including the cost of all labour, material and equipment, complete as per drawing and specifications:					
a	150 mm nominal bore cast iron pipes.	Rm	64			0.078448725
b	150 mm nominal bore medium class galvanised mild steel pipes.	Rm	1100			1.682148661
62	Providing and laying 50 mm thick cement concrete flooring (comprising of 12 mm thick mettalic concrete hardener topping over 38 mm thick under bed of concrete) over the grade level slab inside the chimney, including the cost of all labour, material and equipment, etc. complete as required for preparation of base, laying underbed and topping, finishing, rounding of edges, corners and junctions, curing, testing, etc. complete as per drawing and specifications.	Sqm	1676			0.349708918
63	Providing and installing an electrically operated grill type steel roll-up door (with the bottom 0.5 metres of the curtain in solid type) at chimney base, in opening area of 90 sq m (approx), with all hardware and mechanisms, fittings and fixtures, locking arrangements, frames, fasteners, gear handle arrangement for standby manual operation, all electrical accessories such as motors, control systems, cables, etc. including the cost of all labour, material and equipment, fixing in position, grouting primer and finish painting, testing, etc., complete as per drawing and specifications.	Each	2			0.273605405
64	Providing and installing at any level and location, mild steel, double plate, personnel access doors, in shell openings of size 1.1m by 2.15m, complete with all fittings and fixtures, locking arrangements, frames, fasteners, rubber gasket including the cost all labour, material and equipment, lifting to all heights, setting in place, grouting primer and finish painting, etc., complete as per drawing and specifications.	Each	14			0.218422032
65	Supply, fabricating and fixing of cleanout door of size 650X825 mm. The door should be solid steel construction with inner plate 8mm and outer plate 6mm with suitable infill of stiffners, & filled with insulation mateterial and all other fittings, fixtures, fasteners including the cost of painting etc complete as per drawings and specification. The door should be hinged type and providing with locking device in addition to swivel studs with wing nuts on remaining 3 edges. The should be openable both from inside & outside and removable insulation to be provided around door opening. The door shall be provided with a minimum two coats of acid & alkali resistant paint confirming to IS158 type-I to give a DFT of 75microns. The outside surface shall be provided with minimum 2 coats of Zinc redoxide primer and two coats of synthetic enamil paint.	Each	6			0.031304152
67	Supplying, fabricating and installing mild steel hatches at various locations in the chimney system complete with locking arrangements, frames, insulation, fittings and fixtures and all mechanisms and accessories reqd. for proper operation including all labour, painting etc. complete as per drawings and specifications.					
a	Hood Access Hatch	Each	2			0.020223462
b	Equipment Hatch	Each	2			0.02064831
c	Liner Access Hatch /man hole	Each	28			0.289077686
68	Conducting load testing on girders for 1.25 times the full load, on ground , including provision of test bed and jacks, dial gauges and other supplies complete as per specification and drawings and approval of engineer in-charge.	Pair	2			0.218911237

CHAPTER XI – BILL OF QUANTITIES AND % WEIGHTAGE OF INDIVIDUAL ITEMS

JOB Description: Execution of balance works of two (02) nos. of single flue RCC chimney of height 275m for Unit-1 and Unit-3 each at 3X800 MW PVUNL

Sl. No.	Description of Item	Unit	Total Qty.	Rate	Amount	Weightage
69	Designing, supplying, fabricating and installing after approval by the Engineer, non-metallic expansion joints to seal gaps between chimney components and to meet the service requirements as given in the specifications alongwith the cost of all components of the expansion joint, insulation, galvanised bolts, nuts, washers, anchor fasteners and retaining bars, packing materials and reinforcements at the connecting ends and flanges, lapping etc. including preparation of brick surface (to be connected to the expansion joint) with potassium silicate resisting mortar for proper leak tight bearing surface, with the cost of all labour and equipment, user hand books (giving details of installation, dismantling and maintenance procedures for the expansion joints) etc. complete as per drawings and specifications for:					
a	Expansion joint between ducts and liners.(2 Nos.)	Sqm	122			0.9784765
b	Expansion joint between duct and chimney shell.(2 Nos.)	Sqm	122			0.97847335
70	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 Conbextra GP-1 or equivalent. (Cost of all material and cleaning of the pockets by compressed air shall be in the scope of the contractor).	Cum	2			0.076101263
71	Providing & grouting of pocket holes, pipe sleeves and under base plate of structural steel work/ machinery/ pipe supporting structures including roughening of surface, cleaning, ramming, curing etc. all complete with mix 1:1:2 (1 cement : 1 coarse sand : 2 aggregate of 6 mm down graded stonechips) using non shrink admixture. (Cost of all material and cleaning the pocket by compressed air shall be in the scope of the contractor).	CUM	2			0.007610351
72	Providing (supplying) and installation of FRP pipes, bends & its fittings, etc complete as per approved drawing for drainage of collected condensate . Measurement for payment shall be done for net weight of FRP pipes, bends and fittings in the pipe assembly.	Kg	400			0.045662108
E0	Supplying and erecting after approval by Engineer an Elevator from ground upto top of chimney with landing at various platform level complete as per spec. and drawings. Payment Terms: a) On receipt of elevator at site - 60% b) On completion of erection, testing & Commissioning - 40%	Lumpsum	2			5.177505143
	ELECTRICAL WORKS (Design, Engineering, Supply, Installation, testing & commissioning of following items as per specification) PAYMENT TERMS OF ELECTRICAL ITEMS:- A) ON RECEIPT OF MATERIALS AT SITE: 60% B) ON ERECTION, TESTING & COMMISSIONING: 40%					
E1	415V, 200A, 50 KA for 1 sec, 4 wire AC Distribution Board with 1No. incomer (SFU) , 12 nos. of 100A (TPN) outgoing alongwith 100KVA lighting transformer (415/433) V in Incomer, Dyn11, Z=4%, ±2x2.5% off ckt. Tap) complete in all respects	no.	2			0.499377659
E2	415V, 200A, 4 wire AC Emergency Lighting distribution board alongwith 50KVA lighting transformer (415/433 V, Dyn11, Z=4%, ±2x2.5% off ckt. Tap) with 2 nos. of SFU (TPN) incomers with auto changeover facility using contactors and 8 nos. 100A SFU (TPN) outgoing complete in all respects. In case load requirement of chimney can not be met by 50 kVA lighting transformer after considering loading, 100 kVA lighting transformer shall be provided alongwith suitably rated components without any commercial implications to the purchaser..	no.	2			0.847100955
E3	Normal AC lighting panel outdoor type with degree of protection IP 55 with one no. 100A SFU (TPN) Incomer , 20 outgoing (16A SP MCBs)	no.	8			0.688876756
E4	Emergency lighting panel outdoor type with degree of protection IP 55 with One no. of 100A TPN/SFU incomer and 12 outgoing (16A, SP MCBs)	no.	6			0.42822155
E5	Aviation lighting panel outdoor type with degree of protection IP 55 with one no. 100A SFU (TPN) Incomer , 8 outgoing 32A SFU (TPN), photodetector and timer circuit along with 100A contactor to control aviation lighting system.	no.	2			0.183867617
E6	Aviation obstruction lights :					

CHAPTER XI – BILL OF QUANTITIES AND % WEIGHTAGE OF INDIVIDUAL ITEMS

JOB Description: Execution of balance works of two (02) nos. of single flue RCC chimney of height 275m for Unit-1 and Unit-3 each at 3X800 MW PVUNL

Sl. No.	Description of Item	Unit	Total Qty.	Rate	Amount	Weightage
	a. High intensity flashing RED light as per ICAO standard having intensity of 4000 to 2,00,000 candles depending upon background illuminance & flashing frequency 40-60/min with all accessories, photocell, timer etc.	no.	24			3.598897314
	b. Temporary obstruction light located at diametrically opposite points at the top of chimney during period of construction with four fixture each .	no.	8			0.382186801
E7	Aviation Distribution Board (ADB) with one 32A SFU (TPN) incomer and 8 nos. SP 20A MCB. Construction is same as Lighting Panel.	no.	8			0.720959495
E8	Flood light with 250W HPSV lamps with all control gears & accessories	no.	16			0.103675397
E9	Well glass type luminaries with 70W HPSV lamp with all control gears & accessories	no.	140			0.357886782
E10	Well glass type luminaries with 150W HPSV lamp with all control gears & accessories	no.	300			1.886913015
E11	63Amp welding switch socket with plug & other Mounting accessories	no.	16			0.133444427
E12	3 pin, 1 ph, 240V, 20Amp. Industrial Power sockets complete with plug Switches etc.	no.	16			0.044480276
E13	Al conductor, HR PVC insulated, Armoured, PVC outer sheath, FRLS type 1100V grade conforming to IS-1554 Part I.					
a	3½ C x95mm ² Al for connection between ACDB/ELDB/ welding sockets	Mtrs.	3000			1.368675097
b	3½ Cx35mm ² Al for Lighting panel incoming supply	Mtrs.	3000			0.694058636
c	4C x16mm ² Al for connection between ALP/ADB/Aviation Lights	Mtrs.	2000			0.386143193
d	4C x 2.5mm ² Cu Control cable for Aviation lighting system	Mtrs.	1000			0.173044356
E14	Cu conductor, HR-PVC insulated, PVC outer sheathed and FRLS type 1100V grade conforming to IS-1554 Part I.					
a	2.5 mm ²	Mtrs.	6000			0.242703148
b	4.0 mm ²	Mtrs.	34000			2.200539147
E15	GI pipe conduit with minimum 25 mm dia with GI junction boxes, GI pull boxes (Size 200x200x100mm of 16 SWG sheet steel for junction & pull boxes) & accessories etc. complete in all respects.	Mtrs.	8000			0.905249259
E16	PVC coated Flexible steel conduit 25mm dia with accessories	Mtrs.	200			0.006472624
E17	Lightning protection Air terminal : Lead coated copper material of 20 mm dia & 3 metre long.	no.	12			0.096437687
E18	50x6 Lead Coated GI Strip for coronal band on flue and top platform	Mtrs.	600			0.047951964
	Electrical equipment earthing materials including down conductors 50x6 GI Strip	Mtrs.	4000			1.108708017
	Electrical equipment earthing materials including down conductors 25x3 GI Strip	Mtrs.	600			0.09315772
E19	14 SWG GI wire for equipment earthing	Mtrs.	8000			0.189129156
E20	Test links for 50x6 down conductors enclosed in 200mm X 200mm X 100mm GI box of 16SWG sheet steel.	no.	12			0.000321336
E21	40mm dia MS rod for earthing of down conductor	Mtrs.	400			0.012019945
E22	Earthpit with earthing electrode including brick chamber with cover, accessories etc. complete in all respect.	no.	12			0.120158491
E23	Telephone socket with junction box etc. complete	no.	16			0.046412792
E24	Telephone handsets complete	no.	16			0.011153598
E25	Telephone cable of minimum 0.6 mm dia annealed high conductivity electro copper conductor, PVC insulated, twisted, PVC tape wrapped, screened, tip corded, PVC sheathed, confirming to relevant ITD (Indian Telephones department) specification					
	a) 24 pairs	Mtrs.	800			0.298358174
	b) 2 pairs	Mtrs.	200			0.004373589
E26	GS cable trays. Cable trays shall be of ladder type constructed of minimum 2 mm thick mild steel hot dip galvanise including cover, cabling material, accessories etc.					
a	600 mm wide	Mtrs.	600			0.484682615
b	300 mm wide	Mtrs.	200			0.087496087
c	150 mm wide	Mtrs.	200			0.07357963
	Grand Total					100