



**2 X 250 MW NSPCL BHILAI TPP-FGD
SCOPE OF WORK**

SPECIFICATION NO. PE-TS-468-600-C001

VOLUME - II B

SECTION - A

REV.NO. 00 DATE 29.07.20

SHEET 1

2 X 250 MW NSPCL BHILAI TPP-FGD

**CUSTOMER'S CONSULTANT-NTPC LIMITED
(A Government of India Enterprises)**

CIVIL, STRUCTURAL & ARCHITECTURAL WORKS

SPECIFICATION NO. PE-TS-468-600-C001



**Bharat Heavy Electricals Limited
Project Engineering Management
PPEI Building, Power Sector,
Plot No. 25, Sector 16A,
Noida (U.P.)-201301**



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SECTION - A

REV.NO. 00 DATE 29.07.20

SHEET 2

PREAMBLE

This volume is sub-divided into following sections:

- Section A : This section outlines the scope of work
- Section B : This section provides 'Project Information'
- Section C : This section indicates the technical requirements specific to the contract
- Section D : This section comprises of technical specification(s)

Note: In case of any conflict between Section-C and Section-D, Section-C of specification prevails.



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VOLUME - II B

SECTION - A

REV.NO. 00 DATE 29.07.20

SHEET 3

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SPECIFICATION NO. PE-TS-468-600-C001

VOLUME - II B

SECTION - A

REV.NO. 00 DATE 29.07.20

SHEET 4

**SECTION - A
*SCOPE OF WORK***



**2 X 250 MW NSPCL BHILAI TPP-FGD
SCOPE OF WORK**

SPECIFICATION NO. PE-TS-468-600-C001

VOLUME - II B

SECTION - A

REV.NO. 00 DATE 29.07.20

SHEET 5

Table of Contents

1.0	SCOPE OF WORK	6
1.1	BRIEF SCOPE OF WORK	6
	TABLE-1	7
1.2	MISCELLANEOUS WORKS	10
1.3	CONSTRUCTION FACILITIES	11
1.4	ADDITIONAL REQUIREMENTS	12
1.5	EXCLUSIONS	14
1.6	TERMINAL POINTS FOR CHIMNEY FLUE DUCT	14
1.7	SIZE OF STRUCTURES/BUILDINGS	15
	TABLE-2A	15
	TABLE-2B	16
	TABLE-2C	18
1.8	LOADING	18
1.9	VARIATION	19
	TABLE-3A	20
	TABLE-3B	21
	TABLE-3C	22
	VOLUME -3 PRICE SCHEDULE	24
	TABLE -4	26
2.0	REFERENCE INPUT DRAWINGS / DOCUMENTS	27



2 X 250 MW NSPCL BHILAI TPP-FGD SCOPE OF WORK

SPECIFICATION NO. PE-TS-468-600-C001

VOLUME - II B

SECTION - A

REV.NO. 00 DATE 29.07.20

SHEET 6

1.0 SCOPE OF WORK

The scope of work covers Engineering, Procurement and Construction (EPC) of Civil, Structural and Architectural works required for completion of 2 X 250 MW NSPCL BHILAI TPP-FGD. The scope of works described herein are in general and shall include those specified in other sections of the tender specification as well.

1.1 BRIEF SCOPE OF WORK

The scope of work includes but not limited to the following. Design and preparation of detailed Engineering/fabrication drawings, getting the design and drawings approved from BHEL & NSPCL /NTPC, supply of all materials, fabrication, erection and construction of the necessary civil, structural and architectural works associated with the Flue Gas Desulphurization (FGD) system package. The work shall have to be carried out both below and above ground level for buildings/structures/facilities and shall be involving excavation, backfilling, disposal, basements(if any), equipment foundations, Grade slab, Floor slabs/Roof, beams, columns, footings, rafts, walls, steel frames, brick walls, cladding, metal deck sheet, stairs, trenches, plinth protection, paving around buildings, garland drains, pits, handrails, monorails, fire doors, cage ladders, gratings ,precast covers, road networks, landscaping, culverts, finishes, complete architectural aspects, drainage system, sanitation, water supply, plumbing, sewage disposal system, effluent disposal system, fire protection system, earthing mats etc. for all civil, structural and architectural works.

Scope includes civil, structural and architectural works on EPC basis of RCC chimney including slip form shuttering, internal platforms, internal staircase, flue can, condensate collection and extraction system as per condensate flow model study report, wind tunnel study, chimney painting, manhole, expansion joints, roof slab, cage ladder, roof access hatch, liner test ports (for continuous pollution monitoring), grade level slab of RCC with metallic hardener floor finish, acid resistant treatment on roof slab, a large electrically operated grill type roll-up door and personnel access metallic door at grade level, roof drain basin, rain water down comer pipe (150 mm diameter galvanized pipe), connection to plant drains, louvers with bird screens for ventilation and all other openings in the wind shield, all finishing works.

Additionally, the scope also includes electricals engineering, design, manufacture, supply, erection, testing and commissioning of the electricals equipment/system complete with all materials and accessories as per electricals specification for wet stack.

Additionally, the scope also includes supply, installation, testing, commissioning etc. of rack & pinion elevator as per specification of the same for chimney. The condensate flow model study shall be carried by the bidder from absorber outlet to the top of flue liner inside the chimney on the basis of input provided by BHEL.

The scope also includes providing all labour, supervision, material, scaffolding, construction equipment's & cranes, batching plant, dewatering pumps, concrete pumps and boom placers, vibrators, consumables, tools and plants, temporary works, supplies, transportation and all incidental items not specified but reasonably implied or necessary for the completion of work in all respects.

The bidder shall do interfacing & co-ordination with Civil/Mechanical/Electrical system engineers in BHEL during detailed engineering and construction stage.

**2 X 250 MW NSPCL BHILAI TPP-FGD
SCOPE OF WORK**

SPECIFICATION NO. PE-TS-468-600-C001

VOLUME - II B

SECTION - A

REV.NO. 00 DATE 29.07.20

SHEET 7

The brief list of buildings/facilities/structures covered under the scope of work is as mentioned below (**Table-1**) and shall include but not to be limited to the following.

TABLE-1

ANNEXURE-A			
S.No.	Buildings/Facility/Structure	Input	Input Received
1	FGD COMPRESSOR HOUSE	Refer Annexure –A1	Y
2	FGD CONTROL ROOM BUILDING	Refer Annexure –A2	Y
3	ACW-DMCW PUMP SHED	Refer Annexure –A3	Y
4	ACW-DMCW PUMP EQUIPMENT FOUNDATION	Refer Annexure –A4	Y
5	GYPSUM DEWATERING BUILDING INCLUDING GYPSUM CONVEYOR TAIL PULLY PLATFORM & GALLERY SUPPORTING STRUCTURES, ASSOCIATED TANK FOUNDATION.	Refer Annexure –A5	Y
6	RCC CHIMNEY	Refer Annexure –A6	Y
7	FOUNDATION FOR LIMESTONE SLURRY STORAGE TANKS (2 NOS)	Refer Annexure –A7	Y
8	FOUNDATION FOR PROCESS WATER TANKS (2 NOS)	Refer Annexure –A7	Y
9	FOUNDATION FOR AUXILLIARY ABSORBENT TANK	Refer Annexure –A7	Y
10	FOUNDATION FOR FILTERATE WATER TANK	Refer Annexure –A7	Y
11	FOUNDATION FOR SECONDARY HYDRO CYCLONE FEED TANK	Refer Annexure –A7	Y
12	FOUNDATION FOR PRIMARY HYDRO CYCLONE FEED TANK	Refer Annexure –A7	Y
13	FOUNDATION FOR WASTE WATER TANK	Refer Annexure –A7	Y
14	FOUNDATION FOR CLARIFIED (CAKE WASH) WATER TANK (2 NOS)	Refer Annexure –A7	Y
15	PAVING, DRAIN, SUMP FOR TANK AREAS	Refer Annexure –A7	Y
16	FOUNDATION FOR BELT FILTER WASH TANK (2 NOS)	Refer Annexure –A7	Y
ANNEXURE-B			
1	BALL MILL BUILDING	Refer Annexure –B1	Y
2	FOUNDATION FOR WET LIMESTONE BALL MILLS	Refer Annexure –B2	Y
3	FIRE FIGHTING SYSTEM & MISC. (FIRE WATER TRENCH, PIPE SLEEVES, HUME PIPE ETC.)	Refer Annexure –B3	Y
4	DELUGE VALVE BRICKS SHED	Refer Annexure –B4	Y
5	LIMESTONE DAY SILOS & BUILDING, ELEVATOR, BUCKET ELEVATOR AND STAIRCASE EXCLUDING SUPPLY OF BUCKET ELEVATORS & ELEVATOR.	Refer Annexure –B5	Y
ANNEXURE-C			
1	GYPSUM STORAGE SHED	Refer Annexure –C1	Y
2	GYPSUM PARKING AREA	Refer Annexure –C2	Y
3	LIMESTONE UNLOADING AREA & PARKING	Refer Annexure –C3	Y
4	SURFACE FEEDERS FROM TRUCK UNLOADING TO LTP-1	Refer Annexure –C4	Y

**2 X 250 MW NSPCL BHILAI TPP-FGD
SCOPE OF WORK**

SPECIFICATION NO. PE-TS-468-600-C001

VOLUME - II B

SECTION - A

REV.NO. 00 DATE 29.07.20

SHEET 8

5	WEIGH BRIDGE FOR LIME STONE	Refer Annexure –C5	Y
6	WEIGH BRIDGE FOR GYPSUM	Refer Annexure –C6	Y
7	LIMESTONE CRUSHER HOUSE EXCLUDING SUPPLY OF ELEVATOR.	Refer Annexure –C7	Y
8	DUST EXTRACTOR SYSTEM STRUCTURE AT CRUSHER HOUSE	Refer Annexure –C8	Y
9	PUMP HOUSE INCLUDING EQUIPMENT FOUNDATION FOR LHP AND GHP	Refer Annexure –C9	Y
10	MCC ROOM FOR LHP AND GHP	Refer Annexure –C10	Y
11	CABLE RACKS	Refer Annexure –C11	Y
12	LTP-1	Refer Annexure –C12	Y
13	DUST EXTRACTOR SYSTEM STRUCTURE AT LTP-1	Refer Annexure –C13	Y
14	LIMESTONE INTERMEDIATE STORAGE SILOS & BUILDING, BUCKET ELEVATORS AND STAIRCASE EXCLUDING SUPPLY OF ELEVATORS	Refer Annexure –C14	Y
15	GYPSUM CONVEYOR GALLERY (GBC 1A/1B)	Refer Annexure –C15	Y
16	LIMESTONE CONVEYOR GALLERY (LBC-1A & 1B)	Refer Annexure –C15	Y
17	CONVEYOR GALLERY LBF 1& 2	Refer Annexure –C15	Y
18	CONVEYOR GALLERY LBF 3 & 4	Refer Annexure –C15	Y
19	UTILITY ROOM CUM OFFICE	Refer Annexure –C16	Y
20	FOUNDATIONS FOR AIR RECIEVER	Refer Annexure –C17	Y
21	CLOSED STORAGE SHED WITH SEATING FACILITY FOR 2 TO 3 PERSONS		
22	CONTROL ROOM INCLUDING EQUIPMENT FDN. FOR TRUCK UNLOADING		
23	OPEN STORAGE YARD 1000 SQ. METERS WITH FENCING, YARD DEVELOPMENT / HARD SURFACING, FENCING, LIGHTING (HIGH MAST /STREET LIGHT TO COVER THE ENTIRE STORAGE AREA), ROADS & DRAINS ETC.		
24	OPEN STORAGE YARD CUM OFFICE SPACE OF 7500 SQ. METERS IN THE LOCATION OF LHP & GHP WITH YARD DEVELOPMENT / HARD SURFACING ALONG WITH APPROACH ROAD FOR VEHICLE MOVEMENT (TRAILER, HYDRA, CRANE, ETC)		

ANNEXURE-D

1	ABSORBER TOWER & TANK FOUNDATION (2 NOS)	Refer Annexure –D1	Y
2	FOUNDATION FOR ELEVATOR AND STAIRCASE OF ABSORBER TOWER & TANK (2 NOS)	Refer Annexure –D2	Y
3	FOUNDATION FOR RC PUMP & OXIDATION BLOWER SHED (2 NOS)	Refer Annexure –D3	Y
4	SO2 ANALYSER ROOM (2 NOS)	Refer Annexure –D4	Y
5	FOUNDATIONS FOR RC PUMP AND OXIDATION BLOWER (2 NOS)	Refer Annexure –D5	
6	FOUNDATIONS FOR BOOSTER FAN (4 NOS), SA FAN & LUBE OIL SYSTEM	Refer Annexure –D6	Y
7	FOUNDATION FOR FLUE GAS DUCTS SUPPORT STRUCTURE UNIT-1	Refer Annexure –D7	Y
8	FOUNDATION FOR FLUE GAS DUCTS SUPPORT STRUCTURE UNIT-2	Refer Annexure –D7	Y



**2 X 250 MW NSPCL BHILAI TPP-FGD
SCOPE OF WORK**

SPECIFICATION NO. PE-TS-468-600-C001

VOLUME - II B

SECTION - A

REV.NO. 00 DATE 29.07.20

SHEET 9

9	FOUNDATION FOR MISC PUMPS	Refer Annexure –D8	Y
10	FOUNDATIONS FOR PIPE & CABLE RACK	Refer Annexure –D9	Y
ANNEXURE-E			
1	ROADS	Refer Annexure-E (Plot Plan)	Y
2	CULVERT		
3	STORM WATER DRAINS		
4	PIPE TRENCH, CABLE TRENCH, EARTHING MAT, EARTH PITS (15 nos.)		
5	PAVING		
6	STP AND ETP NETWORK AND SUMPS		
7	RAIN WATER HARVESTING SCHEME		

NOTE: Any other building/facility/structure that would be required as per system design requirements but not covered in TABLE-1 above is also in the scope of the bidder.



**2 X 250 MW NSPCL BHILAI TPP-FGD
SCOPE OF WORK**

SPECIFICATION NO. PE-TS-468-600-C001

VOLUME - II B

SECTION - A

REV.NO. 00 DATE 29.07.20

SHEET 10

1.2 MISCELLANEOUS WORKS

The following miscellaneous civil works are part of the above-mentioned buildings/structures/facilities as applicable. The quoted price of building/structure/facility shall include the cost of such miscellaneous works in the respective areas and there will be no separate/extra payment on account of the same.

1. Miscellaneous foundations, pedestals, anchors, pockets, cut outs, trenches, precast covers etc.
2. Supply and fixing of embedment's, rails, rail fixing accessories inserts, bolts, pipe sleeves etc.
3. Quality testing of all materials and works, preparation of bar bending schedules, preparation of fabrication drawings and bill of materials etc.
4. Dewatering, sheet piling/slope protection works, temporary drainage system during execution etc. all complete as per work requirement.
5. Breaking the existing facilities for enabling the civil work under this package if required and making good after completion.
6. Providing openings in walls/floor/slab etc. as requirements.
7. Removal of all debris, underground obstacles (if any) and disposal of surplus materials to approved locations.
8. Dismantling of existing facilities/structures, wherever so required as per system requirement and their relocation at new area as indicated by the BHEL & NSPCL /NTPC, associated repair work above/below ground level, rerouting of over ground and underground pipes, cables, ducts, etc. as necessary. Further any rework required due to change in mechanical/electrical inputs /design or any other reason during engineering/construction.
9. Any mismatch during fixing of tank/equipment with pedestal/foundation during erection stage shall be taken care by grouting, rebaring, chipping etc. as required.
10. Micro grading
11. Any other civil works as required for completion of the system but not mentioned.

1.3 CONSTRUCTION FACILITIES

The following facilities shall be taken care by the bidder at their own end.

1. All civil and structural works associated with drinking and service water facilities for bidder's labour and other personnel at the work site/staff colony.
2. Development of temporary staff colony and labour colony as required along with fencing etc.
3. Making all arrangements for distribution of construction power at various locations as per requirements.
4. Making all arrangements for the supply of construction water.
5. Construction of bidder's site office, stores (open/covered as applicable), workshops, material/field testing laboratory and any other temporary facilities as required.
6. Providing all necessary firefighting devices/equipment/fire tender etc. as required during construction stage.
7. Providing all tools and plans (T & P) required for completion of the work.
8. Providing skilled/semiskilled/unskilled labours and supervisory staff for quality control and execution.
9. The connection of sewer pipe line for the associated buildings of FGD and Lime and gypsum handling area.
10. Development of fabrication yard for structural steel as required and specified elsewhere in the specification.
11. Meeting occupational health and safety requirements.
12. Temporary illumination and lighting as required for execution of work.
13. Development of temporary approach roads, temporary drains as required for the execution.
14. Any other civil, mechanical, electrical works as required by the bidder enabling smooth execution of work.



**2 X 250 MW NSPCL BHILAI TPP-FGD
SCOPE OF WORK**

SPECIFICATION NO. PE-TS-468-600-C001

VOLUME - II B

SECTION - A

REV.NO. 00 DATE 29.07.20

SHEET 12

1.4 ADDITIONAL REQUIREMENTS

1. All work including material shall be as per technical specification and approved drawings. The approval shall be obtained from BHEL & NSPCL/NTPC.
2. Bidder has to obtain approval of BHEL & NSPCL/NTPC for all works including design, drawing, construction methodology, construction materials, schedule etc.
3. All necessary statutory clearances shall be obtained by the bidder.
4. All the quality standards, tolerances, bolting and welding standards and other technical requirements shall be strictly adhered to.
5. Works shall be carried out as per approved design/drawings, specifications and field quality plans (FQP). The FQP shall be prepared by bidder and approved by BHEL & NSPCL/NTPC.
6. The bidder should visit the site and fully apprise himself of the prevailing conditions at the site.
7. The existing structures/buildings/facilities shall not be damaged /disturbed during execution. In case for construction of existing works any breaking/modification of the existing facilities is required, the same shall be made good after completion. It is also to be noted that in case any other works are in progress or under execution nearby the FGD area, the work shall be planned and executed in such a way that the same shall not affect others work. No claim will be entertained by BHEL & NSPCL/NTPC on ground of lack of knowledge on this account.
8. Necessary precaution and arrangements including sprinkling of water as required during work as acceptable to BHEL & NSPCL/NTPC for safety, security and dust suppression etc. have to be made by the bidder.
9. Any other measures as required for safety of the adjacent existing structures/buildings/facilities during execution shall also be taken care by the bidder.
10. Bidder shall note that the analysis, and drawings will be reviewed by BHEL; after incorporating BHEL comments/observations the same shall be further forwarded to NSPCL/NTPC for their review and approval. It is the responsibility of the bidder to get things approved by BHEL & NSPCL/NTPC.
11. The analysis/design and drawings shall be submitted in soft copy for review/approval by BHEL & NSPCL/NTPC. All files on analysis, design and drawing in editable as well as non-editable form shall be submitted to BHEL & NSPCL/NTPC.



**2 X 250 MW NSPCL BHILAI TPP-FGD
SCOPE OF WORK**

SPECIFICATION NO. PE-TS-468-600-C001

VOLUME - II B

SECTION - A

REV.NO. 00 DATE 29.07.20

SHEET 13

12. Bidder shall submit "as built drawings" after completion of construction of respective structure/building/facility in soft as well as in hard copies (2 nos.).

13. Fabrication drawings shall be prepared by the bidder and shall be vetted by engaging a third-party independent consultant by the bidder. The third-party consultant shall be approved by BHEL.

14. It is the essence of contract that all documents and drawings shall be submitted and get approved for scheduled completion of project. The project schedule shall be discussed with the successful bidder during detailed engineering stage and the bidder shall adhere to the project L2 schedule.

15. Foundation system and Geotechnical investigation:

15.1	Owner (NSPCL) had carried out geotechnical investigation in the vicinity of the proposed FGD area. The geotechnical data is attached as Annexure-F is solely for the purpose of guidance to the bidder. BHEL/Owner does not take any responsibility about the accuracy and applicability of the geo-technical data furnished herewith. The onus of correct assessment/interpretation and understanding of the existing sub-strata conditions is on the bidder. Any variation in the data between the one furnished and to that found during execution of the work at site shall not constitute a valid reason in affecting the terms & conditions of this bid and the bidder shall note that nothing extra will be payable on this account. The bidder shall fully satisfy himself about the nature of sub-strata expected to be encountered including the type of foundation, ground water table and construction methodology to be adopted etc. prior to the submission of the bid.
15.2	BHEL is carrying out detailed geo-technical investigation in the proposed project site. Detailed geo-technical Investigation report shall be made available to the successful bidder. Any variation in the data between the one furnished and to that found during execution of the work at site shall not constitute a valid reason in affecting the terms & conditions of this bid and the bidder shall note that nothing extra will be payable on this account. The bidder shall ensure that the safe foundation system is adopted. If the bidder desires to carry out additional geo-technical investigation, he/she may do so with prior information/permission of BHEL/Owner at no extra cost to BHEL/Owner. No extension in time schedule shall be permitted on this account. The bidder shall obtain approval on the agency for conducting geo-technical investigation work if it desires to do so. Field and laboratory testing schedule proposed by the bidder shall be got approved by BHEL /Owner before undertaking the geo-technical investigation work. Design of foundation system shall be as specified in Annexure-F . Bidder shall note that the net safe bearing capacity and foundation depth/ safe load carrying capacity of pile to be adopted for design during detailed engineering stage shall be got approved by BHEL/Owner.



**2 X 250 MW NSPCL BHILAI TPP-FGD
SCOPE OF WORK**

SPECIFICATION NO. PE-TS-468-600-C001

VOLUME - II B

SECTION - A

REV.NO. 00 DATE 29.07.20

SHEET 14

1.5 EXCLUSIONS

The following shall be excluded from the scope of work under this package.

1. Mechanical, Electrical and Control & Instrumentation supplies and works unless noted otherwise.
2. Second stage concreting by grouting the pockets for fixing of equipment's.

1.6 TERMINAL POINTS FOR CHIMNEY FLUE DUCT

The terminal points for the chimney flue duct under this package shall be as per Annexure-G.

**2 X 250 MW NSPCL BHILAI TPP-FGD
SCOPE OF WORK**

SPECIFICATION NO. PE-TS-468-600-C001

VOLUME - II B

SECTION - A

REV.NO. 00 DATE 29.07.20

SHEET 15

1.7 SIZE OF STRUCTURES/BUILDINGS

Tentative size of structures / buildings are given in **Table-2 i.e. (Table 2A to 2C)**.
Details are furnished in **Annexures-A, B, C, D & E**.

TABLE-2A

S.No.	Building/Facility/Structure	Qty./Lot (N)	Length,L (m)	Width,W (m)	Height,H (m)	Volume (V*=N.L.W.H)	Remarks
1	FGD compressor house	1	12	12	5.7		
2	FGD control room building	1	51.8	15	8.5		
3	ACW-DMCW pump shed	1	14	13	5		
4	Gypsum dewatering building including gypsum conveyor tail pully platform & gallery supporting structures.	1	30	16	15		
5	Ball mill building	1					Refer Annexure-B1
6	Deluge valve bricks shed	1					Refer Annexure-B4
7	Limestone day silos & building, elevator, bucket elevator and staircase excluding supply of bucket elevators & elevator.	1					
a	Limestone day silos & building, elevator & staircase	1					Refer Annexure-B5
b	bucket elevator 3 & 4	1	10.5	4	43		
8	Gypsum storage shed						
a	Civil Works	1	52	27	7.7	16689.40	
b	Structural Shed Portion	1	52	11.9	9.5		
9	Limestone crusher house excluding supply of elevator.	1	19.6	15	28.10	8,261.4	
10	Dust Extractor system structure at crusher house	1	12	7	3.8	319.2	
11	Pump house including equipment foundation for LHP and GHP	1	12	8.6	5	516	
12	MCC Room for LHP and GHP	1	48	23	5.5	6072	
13	LTP-1	1	16.5	7	10.5	1212.75	
14	Dust Extractor system structure at LTP-1	1	12	8	7	672	



**2 X 250 MW NSPCL BHILAI TPP-FGD
SCOPE OF WORK**

SPECIFICATION NO. PE-TS-468-600-C001

VOLUME - II B

SECTION - A

REV.NO. 00 DATE 29.07.20

SHEET 16

15	Limestone intermediate storage silos & building, bucket elevators and staircase excluding supply of elevators						
a	Limestone intermediate storage silo & building	1	23	10.5	31.75	10,051.125	
b	bucket elevator 1 & 2	1	10.5	5	45.4		
16	Utility room cum office	2	8	3.5	3.5	196	
17	So2 analyzer room	2					Refer Annexure-D4
18	Closed Storage Shed with seating facility for 2 to 3 persons	1	30	10	5.5	1650	
19	Control Room including equipment Fdn. For Truck Unloading	2	4.5	3	4	108	

TABLE-2B

S.No.	Building/Facility/Structure	Qty./Lot (N)	Length,L (m)	Width/Diameter,W (m)	Area (A*=N.L.W)	Remarks
1	ACW-DMCW pump equipment foundation	1				Refer Annexure -A4
2	Foundation for limestone slurry storage tanks	2		9		
3	Foundation for process water tanks	2		4.5		
4	Foundation for auxiliary absorbent tank	1		10		
5	Foundation for filtrate water tank	1		4		
6	Foundation for secondary hydro cyclone feed tank	1		4		
7	Foundation for primary hydro cyclone feed tank	1		5		
8	Foundation for waste water tank	1		5.5		
9	Foundation for clarified (cake wash) water tank	2		3.5		
10	Foundation for belt filter wash tank	2		3.5		
11	Paving, drain, sump for tank areas	1		4X4 (5 nos. Sump)		Refer Annexure -E
12	Foundation for wet limestone ball mills	2				Refer Annexure



2 X 250 MW NSPCL BHILAI TPP-FGD SCOPE OF WORK

SPECIFICATION NO. PE-TS-468-600-C001

VOLUME - II B

SECTION - A

REV.NO. 00 DATE 29.07.20

SHEET 17

						-B2
13	Gypsum parking area	1	47	16	752	
14	Limestone unloading area & parking					
a	Truck Unloading Platform	1			1413	
b	Platform	1	24	20		
c	ramp	1	89	8		
15	Weigh bridge for lime stone	1	21.22	3.76	79.787	
16	Weigh bridge for gypsum	1	21.22	3.76	79.787	
17	Foundations for air receiver	2				Refer Annexure -C17
18	Foundation for Absorber tower & tank	2				Refer Annexure -D1
19	Foundation for elevator and staircase of absorber tower	2				Refer Annexure -D2
20	Foundation for RC pump & oxidation blower shed	2				Refer Annexure D3
21	Foundation for RC pump and oxidation blower	2				Refer Annexure -D5
22	Foundation for booster fan, sa fan & lube oil system	4				Refer Annexure -D6
23	Foundation for miscellaneous pumps	1				Refer Annexure -D8
24	Paving	1				Refer Annexure -E
25	Open storage yard 1000 Sq. Meters with fencing, Yard development / Hard surfacing, Fencing, lighting (High Mast /Street light to cover the entire storage area), roads & drains etc.	1	50	20	1000	
26	Open storage yard cum office space of 7500 Sq. Meters in the location of LHP & GHP with yard development / Hard surfacing along with approach road for vehicle movement (Trailer, Hydra, Crane, etc)	1	150	50	7500	
27	STP and ETP network and sumps					Refer Annexure -E (Plot Plan)
28	Rain water harvesting scheme					



**2 X 250 MW NSPCL BHILAI TPP-FGD
SCOPE OF WORK**

SPECIFICATION NO. PE-TS-468-600-C001

VOLUME - II B

SECTION - A

REV.NO. 00 DATE 29.07.20

SHEET 18

TABLE-2C

S.No.	Building/Facility/Structure	Qty.(N)	Length/Height, L(m)	Total Length (Le*=N. L)	Remarks
1	RCC Chimney	2	150	300	
2	Firefighting system & misc. (fire water trench, pipe sleeves, hume pipe etc.)	1			Refer Annexure-B3
3	Surface feeders from truck unloading to LTP-1	1	16.4		
4	Cable racks	1	170		
5	Gypsum Conveyor gallery (GBC 1A/1B)	1	15		
6	Limestone Conveyor gallery (LBC-1A & 1B)	1	119		
7	Conveyor Gallery LBF 1& 2	1	7.2		
8	Conveyor Gallery LBF 3 & 4	1	8.5		
9	Foundation for flue gas ducts support structure (Unit-1)	1			Refer Annexure-D7
10	Foundation for flue gas ducts support structure (Unit-2)	1			
11	Foundations for Pipe & cable rack	1			Refer Annexure-D9
12	Roads	1			Refer Annexure- E
13	Culverts	1			
14	Storm water drains	1			
15	Pipe trench,cable trench, Earthing Mat, Earth pits (15 Nos.)	1			

1.8 LOADING

The details of loading on building/structure/facility to be considered for design shall be as specified elsewhere in the specification, Annexures and considering relevant Indian Standards. In case any other/additional loads over and above the one specified is required, the same shall also be considered during detailed engineering.



**2 X 250 MW NSPCL BHILAI TPP-FGD
SCOPE OF WORK**

SPECIFICATION NO. PE-TS-468-600-C001

VOLUME - II B

SECTION - A

REV.NO. 00 DATE 29.07.20

SHEET 19

1.9 VARIATION

The contract is on EPC basis and the prices quoted are on lumpsum basis. The size of buildings/facilities/structures are given in Table-2. The details of loading to be considered for design are specified elsewhere. Bidder shall prepare and submit the offer based on the tender requirements. The specified sizes may vary during contract stage considering mechanical/electrical system requirements. The prices quoted shall remain firm for a variation in size of buildings/facilities/structures up to $(\pm)10\%$ in volume/area/length over the specified as applicable; however, in case of variation beyond $(\pm)10\%$ over the specified, compensation/rebate as applicable shall be charged as per Table-3 (Table 3A to 3C). The variation clause shall be admissible only for the buildings/facilities/structures as listed in Table-2 (Table 2A to 2C). Compensation/rebate shall not be applicable at contract stage for change in loading up to any extent over the specified. No other compensation/rebate shall be admissible. No time compensation shall be admissible for variation in input as per table 2, even beyond $(\pm)10\%$.

Any other building/facility/structure required additionally that would be required as per system design requirements but not covered in TABLE-1 above is also in the scope of the bidder and shall be compensated for the same on pro-rata basis of similar structure. Similar structure shall be decided by BHEL Engineer-in-charge.

Notation:

For estimation of size of buildings/structure/facility, dimensions are to be measured from grid to grid spacing for plan dimensions.

Parapet height shall be excluded in height measurement.

V-Quantity mentioned in Table-2A stands for volume

A-Quantity mentioned in Table-2B stands for area

Le-Quantity mentioned in Table-2C stands for total length

Y-Quantity executed as per Civil Drawing in contract stage. The unit of measurement will be same that of 'V', 'A', 'Le' as applicable.

p-Weightage percentage of an item (**Building/Facility/Structure**) in VOLUME- 3.

Q=Total bid price quoted by successful bidder.

q-Quoted price derived from weighted percentage of an item (**Building/Facility/Structure**) in VOLUME- 3, **q= Q*p/100**

Table-3 i.e. (Table 3A to 3C)

TABLE-3A

S.No.	Building/Facility/Structure	Compensation for variation above 10% {q/(V)} * {Y-1.1V}	Rebate for variation below 10% {q/V} * {0.9V-Y}
1	FGD compressor house		
2	FGD control room building		
3	ACW-DMCW pump shed		
4	Gypsum dewatering building including gypsum conveyor tail pully platform & gallery supporting structures.		
5	Ball mill building		
6	Deluge valve bricks shed		
7	Limestone day silos & building, elevator, bucket elevator and staircase excluding supply of bucket elevators & elevator.		
a	Limestone day silos & building, elevator & staircase		
b	bucket elevator 3 & 4		
8	Gypsum storage shed		
a	Civil Works		
b	Structural Shed Portion		
9	Limestone crusher house excluding supply of elevator.		
10	Dust Extractor system structure at crusher house		
11	Pump house including equipment foundation for LHP and GHP		
12	MCC Room for LHP and GHP		
13	LTP-1		
14	Dust Extractor system structure at LTP-1		
15	Limestone intermediate storage silos & building, bucket elevators and staircase excluding supply of elevators		
a	Limestone intermediate storage silo & building		



**2 X 250 MW NSPCL BHILAI TPP-FGD
SCOPE OF WORK**

SPECIFICATION NO. PE-TS-468-600-C001

VOLUME - II B

SECTION - A

REV.NO. 00 DATE 29.07.20

SHEET 21

b	bucket elevator 1 & 2		
16	Utility room cum office		
17	So2 analyzer room		
18	Closed Storage Shed with seating facility for 2 to 3 persons		
19	Control Room including equipment Fdn. For Truck Unloading		

TABLE-3B

S.No.	Building/Facility/Structure	Compensation for variation above 10% $\{q/(A)\} * \{Y-1.1A\}$	Rebate for variation below 10% $\{q/A\} * \{0.9A-Y\}$
1	ACW-DMCW pump equipment foundation		
2	Foundation for limestone slurry storage tanks		
3	Foundation for process water tanks		
4	Foundation for auxiliary absorbent tank		
5	Foundation for filtrate water tank		
6	Foundation for secondary hydro cyclone feed tank		
7	Foundation for primary hydro cyclone feed tank		
8	Foundation for waste water tank		
9	Foundation for clarified (cake wash) water tank		
10	Foundation for belt filter wash tank		
11	Paving, drain, sump for tank areas		
12	Foundation for wet limestone ball mills		
13	Gypsum parking area		
14	Limestone unloading area & parking		
a	Truck Unloading Platform		
b	Platform		
c	ramp		
15	Weigh bridge for lime stone		
16	Weigh bridge for gypsum		
17	Foundations for air receiver		



**2 X 250 MW NSPCL BHILAI TPP-FGD
SCOPE OF WORK**

SPECIFICATION NO. PE-TS-468-600-C001

VOLUME - II B

SECTION - A

REV.NO. 00 DATE 29.07.20

SHEET 22

18	Foundation for Absorber tower & tank		
19	Foundation for elevator and staircase of absorber tower		
20	Foundation for RC pump & oxidation blower shed		
21	Foundation for RC pump and oxidation blower		
22	Foundation for booster fan, sa fan & lube oil system		
23	Foundation for miscellaneous pumps		
24	Paving		
25	Open storage yard 1000 Sq. Meters with fencing, Yard development / Hard surfacing, Fencing, lighting (High Mast /Street light to cover the entire storage area), roads & drains etc.		
26	Open storage yard cum office space of 7500 Sq. Meters in the location of LHP & GHP with yard development / Hard surfacing along with approach road for vehicle movement (Trailer, Hydra, Crane, etc)		

TABLE-3C

S.No.	Building/Facility/Structure	Compensation for variation above 10% {q/(Le)} *{Y-1.1 Le }	Rebate for variation below 10% {q/ Le } *{0.9 Le -Y}
1	RCC Chimney		
2	Firefighting system & misc. (fire water trench, pipe sleeves, hume pipe etc.)		
3	Surface feeders from truck unloading to LTP-1		
4	Cable racks		
5	Gypsum Conveyor gallery (GBC 1A/1B)		
6	Limestone Conveyor gallery (LBC-1A & 1B)		
7	Conveyor Gallery LBF 1& 2		
8	Conveyor Gallery LBF 3 & 4		
9	Foundation for flue gas ducts support structure (Unit-1)		
10	Foundation for flue gas ducts support structure (Unit-2)		
11	Foundations for Pipe & cable		



**2 X 250 MW NSPCL BHILAI TPP-FGD
SCOPE OF WORK**

SPECIFICATION NO. PE-TS-468-600-C001

VOLUME - II B

SECTION - A

REV.NO. 00 DATE 29.07.20

SHEET 23

	rack		
12	Roads		
13	Culverts		
14	Storm water drains		
15	Pipe trench, cable trench, Earthing Mat, Earth Pits (15 nos.)		
16	STP and ETP network and sumps		
17	Rain water harvesting scheme		



**2 X 250 MW NSPCL BHILAI TPP-FGD
SCOPE OF WORK**

SPECIFICATION NO. PE-TS-468-600-C001

VOLUME - II B

SECTION - A

REV.NO. 00 DATE 29.07.20

SHEET 24

**VOLUME -3
PRICE SCHEDULE**

Item No.	Description	Quantity	Unit	Rate (INR)	Amount (INR)
1	Engineering, Procurement and Construction (EPC) of Civil, Structural and Architectural works for 2 X 250 MW NSPCL BHILAI TPP-FGD Project in line with the scope of work and specification all complete.	1	Lump Sum		
			TOTAL:		
	Amount in Words:				
NOTE:					
1	The total lump Sum amount quoted in the price schedule shall be apportioned to workout the engineering, procurement and construction price of individual building/facility/structure as listed in Table -4.				
2	The price of individual building/facility/structure thus arrived shall be further apportioned in the following heads.				
			Percentage (%) weightage		
	Engineering		1.43		
	Procurement & Construction		98.57		
			Signature of bidder with seal		

**2 X 250 MW NSPCL BHILAI TPP-FGD
SCOPE OF WORK**

SPECIFICATION NO. PE-TS-468-600-C001

VOLUME - II B

SECTION - A

REV.NO. 00 DATE 29.07.20

SHEET 25

TABLE-4

S.No.	Building/Facility/Structure	Percentage (%) (p) weightage of Total Price in the price schedule
1	FGD compressor house	0.66
2	FGD control room building	4.78
3	ACW-DMCW pump shed	0.51
4	Gypsum dewatering building including gypsum conveyor tail pully platform & gallery supporting structures.	3.44
5	Ball mill building	2.6
6	Deluge valve bricks shed	0.14
7	Limestone day silos & building, elevator, bucket elevator and staircase excluding supply of bucket elevators & elevator.	
a	Limestone day silos & building, elevator & staircase	2.87
b	bucket elevator 3 & 4	0.63
8	Gypsum storage shed	
a	Civil Works	1.44
b	Structural Shed Portion	2.09
9	Limestone crusher house excluding supply of elevator.	10.45
10	Dust Extractor system structure at crusher house	0.01
11	Pump house including equipment foundation for LHP and GHP	0.56
12	MCC Room for LHP and GHP	0.76
13	LTP-1	1.01
14	Dust Extractor system structure at LTP-1	0.19
15	Limestone intermediate storage silos & building, bucket elevators and staircase excluding supply of elevators	
a	Limestone intermediate storage silo & building	6.67
b	bucket elevator 1 & 2	0.62
16	Utility room cum office	0.24
17	So2 analyzer room	0.09
18	Closed Storage Shed with seating facility for 2 to 3 persons	0.17
19	Control Room including equipment Fdn. For Truck Unloading	0.67
20	ACW-DMCW pump equipment foundation	0.13
21	Foundation for limestone slurry storage tanks	0.3
22	Foundation for process water tanks	0.08
23	Foundation for auxiliary absorbent tank	0.19
24	Foundation for filtrate water tank	0.03
25	Foundation for secondary hydro cyclone feed tank	0.03
26	Foundation for primary hydro cyclone feed tank	0.05
27	Foundation for waste water tank	0.06
28	Foundation for clarified (cake wash) water tank	0.05
29	Foundation for belt filter wash tank	0.05



**2 X 250 MW NSPCL BHILAI TPP-FGD
SCOPE OF WORK**

SPECIFICATION NO. PE-TS-468-600-C001

VOLUME - II B

SECTION - A

REV.NO. 00 DATE 29.07.20

SHEET 26

30	Paving, drain, sump for tank areas	0.25
31	Foundation for wet limestone ball mills	0.87
32	Gypsum parking area	0.1
33	Limestone unloading area & parking	
a	Truck Unloading Platform	0.31
b	Platform	0.56
c	ramp	0.48
34	Weigh bridge for lime stone	0.11
35	Weigh bridge for gypsum	0.11
36	Foundations for air receiver	0.02
37	Foundation for Absorber tower & tank	1.14
38	Foundation for elevator and staircase of absorber tower	0.29
39	Foundation for RC pump & oxidation blower shed	0.66
40	Foundation for RC pump and oxidation blower	0.29
41	Foundation for booster fan, sa fan & lube oil system	1.66
42	Foundation for miscellaneous pumps	0.11
43	Paving	2.56
44	Open storage yard 1000 Sq. Meters with fencing , Yard development / Hard surfacing, Fencing, lighting (High Mast /Street light to cover the entire storage area), roads & drains etc.	0.06
45	Open storage yard cum office space of 7500 Sq. Meters in the location of LHP & GHP with yard development / Hard surfacing along with approach road for vehicle movement (Trailer, Hydra, Crane, etc)	0.28
46	RCC Chimney	35.63
47	Firefighting system & misc. (fire water trench, pipe sleeves, hume pipe etc.)	1.85
48	Surface feeders from truck unloading to LTP-1	0.01
49	Cable racks	0.71
50	Gypsum Conveyor gallery (GBC 1A/1B)	0.73
51	Limestone Conveyor gallery (LBC-1A & 1B)	4.02
52	Conveyor Gallery LBF 1& 2	0.36
53	Conveyor Gallery LBF 3 & 4	0.37
54	Foundation for flue gas ducts support structure (Unit-1)	0.78
55	Foundation for flue gas ducts support structure (Unit-2)	0.78
56	Foundations for Pipe & cable rack	1.95
57	Roads	0.38
58	Culverts	0.05
59	Storm water drains	0.26
60	Pipe trench, cable trench, Earth mat, Earth pits (15 nos.)	0.14
61	STP and ETP network and sumps	0.42
62	Rain water harvesting scheme	0.13
	Total percentage of quoted price of all building/facility/structure a listed in table-2A to table-2C.	100.00

Note: Amount in Rupees arrived as above shall be limited to two decimal place.
Sum total arrived at distribution shall be adjusted during the closure of the contract.



**2 X 250 MW NSPCL BHILAI TPP-FGD
SCOPE OF WORK**

SPECIFICATION NO. PE-TS-468-600-C001

VOLUME - II B

SECTION - A

REV.NO. 00 DATE 29.07.20

SHEET 27

2.0 REFERENCE INPUT DRAWINGS / DOCUMENTS

Reference input drawings are attached in Annexures (Annexures A to G) below: