



**TENUGHAT VIDYUT NIGAM LIMITED**  
**2x210 MW Tenughat Thermal Power Station**  
**Jharkhand**  
**Dry Fly Ash Collection & Disposal System**



**SECTION - D**

**SPECIFICATION OF CIVIL WORKS**

**LIST OF CONTENTS**

1. Technical Specifications (Civil Works)
2. Technical Rule (Civil Works)
3. Specification for civil engineering works  
11-CIVIL-GS-07



**TENUGHAT VIDYUT NIGAM LIMITED**  
**2x210 MW Tenughat Thermal Power Station**  
**Jharkhand**  
**Dry Fly Ash Collection & Disposal System**



**SECTION 1 : SPECIFICATION OF CIVIL WORKS**

Preamble:-This specification shall be read in conjunction with the general conditions of contract and other project requirement provided in the other volumes containing special conditions of contract, if any; instruction to bidders, if any; special instructions to bidders, if any etc.

Specification for civil works comprises, besides this section, one volume of general specification for civil engineering works titled 11-CIVIL-GS-07.This volume shall also form part of this section and therefore shall be read in conjunction with this section.



**TENUGHAT VIDYUT NIGAM LIMITED**  
**2x210 MW Tenughat Thermal Power Station**  
**Jharkhand**  
**Dry Fly Ash Collection & Disposal System**



**TECHNICAL SPECIFICATIONS (CIVIL WORK)**

**LIST OF CONTENTS**

- 1.0 Scope
- 2.0 Civil Works-Material and Workmanship
- 3.0 Principal Features of Structure and Other Facilities
- 4.0 Design Calculations, Drawings and Documents
- 5.0 General Sub-soil Conditions
- 6.0 Site Conditions
- 7.0 Estimated Quantities for Civil Works
- 8.0 List of Civil Engineering Drawings and Documents for Approval/ information



**TENUGHAT VIDYUT NIGAM LIMITED**  
**2x210 MW Tenughat Thermal Power Station**  
**Jharkhand**  
**Dry Fly Ash Collection & Disposal System**



**TECHNICAL SPECIFICATION (CIVIL WORK)**

**1.0 SCOPE**

- 1.1 The Tenderer's scope shall include complete engineering and construction on a turnkey basis inclusive of design, basic engineering, detailed engineering, supply of all materials, construction and testing in respect of all facilities required for completion and handing over of the work as per technical specification.

This section of the specification covers entire civil engineering work for Dry Ash collection and Disposal System with compressor house, main silo, intermediate silos, silo utility, MCC room, Utility building and other related works including equipment foundations for building and Plant & equipment, and all other miscellaneous civil engineering works as shall be necessary for completing this package on a Turnkey Basis within the battery limit.

This project shall be implemented within an existing thermal power plant, therefore the successful tenderer shall make the architectures./general arrangements of all buildings/structures such that it matches with the existing/adjacent ones.

- 1.2 All civil works for the structures, equipment foundations, facilities and miscellaneous civil works to be provided for the project shall include but not be limited to the following:
- a) Ash conveying air Compressor station including Compressor room, MCC/switch gear room, toilet etc.
  - b) Intermediate silo 2 nos. (capacity and size as per technological requirement) including all RCC foundation, column, tie beams, floor paving, drains etc and other works to be provided for technological requirement.
  - c) Main silo 2 nos. (capacity and size as per technological requirement) including all RCC foundation, column, tie beams, floor paving, drains etc and other works to be provided for technological requirement.
  - d) Providing Foundation / support dry ash conveying pipelines from boiler area to main silo area located at about 1.5Km distance.
  - e) RCC cable trench, concrete pavement, plinth protection & drainage system to all facilities shall be under the scope of bidder.
  - f) Foundation for structural platform, stairs and shed for truck loading bays near silos
  - g) Utility building including Toilet, Office, store Room, MCC Room.
  - h) Cement concrete roads to connect the above units with main plant existing road network.



**TENUGHAT VIDYUT NIGAM LIMITED**  
**2x210 MW Tenughat Thermal Power Station**  
**Jharkhand**  
**Dry Fly Ash Collection & Disposal System**



- i) RCC garland drains around all units and connection of the same to main plant drainage network at nearest point.
- 1.2.3 All necessary water proofing and anticorrosive treatment to structures/ reinforcements/ foundations including underground construction.
- 1.2.4 All necessary protective civil works below roadways for water and other services inside battery limit.
- 1.2.5 All temporary facilities, structures, offices, cement stores, labour colonies, staff quarters, approach roads and services for construction for this package are under the scope of the Tenderer at his own cost.
- 1.2.6 Micro leveling of the site upto 20m all-round the battery limit is within the scope of contract prior to completion of work at his own cost. The successful Tenderer shall remove the construction debris, scrap, dust etc. on regular basis, preferably weekly / or as directed by Engineer from time to time to meet the requirement of environmental policies till completion of the work failing which the same will be carried out through other agency at his Risk and cost with a single notice.
- 1.2.7 Dismantling of buried/ semi-buried structures, if any, encountered within the battery limit and disposal of it within plant boundary as directed by the Owner at his own cost.
- 1.2.8 Carrying out detailed soil investigation and geo data survey at the proper site and prepare report for obtaining approval of purchaser.
- 1.3 **The materials and services shall include but not limited to the following:**
- 1.3.1 Earthwork for structures and equipment foundations, trenches, pits, and other construction work including control blasting of soft rock or hard strata as required. If at all blasting is required, it shall be done at no extra cost with the prior approval of Owner.
- 1.3.2 Site clearing, dressing, leveling and grading of formation to required levels and soil compaction as necessary.
- 1.3.3 Backfilling, soling and sub grade work for all foundation, grouting, flooring, trenches, pits and other underground structures.
- 1.3.4 Foundations as required for building and equipment. DPC course at plinth level and Anti termite treatment of excavation pit and premises shall be provided as per technical specification.
- 1.3.5 Concrete and reinforced concrete work in columns, tie beams, beams, slabs, frames and other superstructures.



**TENUGHAT VIDYUT NIGAM LIMITED**  
**2x210 MW Tenughat Thermal Power Station**  
**Jharkhand**  
**Dry Fly Ash Collection & Disposal System**



- 1.3.6 All masonry work with bricks in substructure and superstructure including plastering as required.
- 1.3.7 All finishing work to flooring, walling, ceiling, as required.
- 1.3.8 All finishing and painting work to masonry, buildings, concrete structures, steel works and wood works.
- 1.3.9 Doors, windows, ventilators, rolling shutters etc
- 1.3.10 All necessary technological and equipment supporting structures.
- 1.3.11 Hand railings, inserts, kerb angles, bolt etc.
- 1.3.12 All MS/GI inserts, GI conduits, bolts, handrailing, Kerbs etc as required to be embedded in concrete / masonry for supporting platforms, sitting of trench covers, cable galleries pipelines structure etc.
- 1.3.13 Providing Chequered plate/ removable grating over the pipe and cable trench.
- 1.3.14 Pavement around the building (excluding plinth Protection) along with surface drains connected to the nearby storm water drain and any other item of civil work required for proper functioning of system.
- 1.3.15 Any extra depth excavated beyond the depth specified in the construction drawing/design drawing shall be filled with PCC M-7.5, by the successful tenderer at his own cost.
- 1.4 The Successful Tenderer shall not make any additional claim if the total concrete quantity or quantity of any of the civil engineering items required for completion of the entire package as per terms of contract exceed the quantity/Nos. indicated by the Tenderer in Annexure-I of this section.
- 1.5 The Tenderer shall undertake within the battery limits any change in the location of units/ items and/or building numbers/ parameters, sizes etc which may be necessary during engineering/ execution from those indicated by the Successful Tenderer in their drawings at no additional cost to the Owner.
- 1.6 The Successful Tenderer shall submit architectural plan and elevation of the structures for approval of Owner.
- 1.7 For civil work, the Tenderer shall submit drawings, documents and design calculations for approval/ information as listed and enclosed in Annexure-2 of this section.
- 1.8 Protection of existing service lines beyond battery limits, if required, shall be done while executing the work within battery limit.
- 1.9 The drain inside the structure, if required, shall have the top level 100 mm below the



**TENUGHAT VIDYUT NIGAM LIMITED**  
**2x210 MW Tenughat Thermal Power Station**  
**Jharkhand**  
**Dry Fly Ash Collection & Disposal System**



finished floor level.

### **1.10 Site and local condition**

The Tenderer, before submission of his offer, shall visit the site and ascertain site and local condition, entry and exit restrictions of equipments, availability of material and labour, obstruction in the area in all site conditions. The tenderer shall also assess and ascertain the existing all underground structures, service lines (like power cables, water lines or any other services facilities) within the area of the scope and ensure safety of the same during the execution of the work. Diversion of such service lines, temporary or permanent, if required, for implementation of works under this package, shall be under the scope of successful tenderer. The successful tenderer shall take all measure to ensure safety of all such existing underground lines during the construction/ erection. The damage of any underground service lines done during the construction/erection shall be made good by the successful bidder without any additional cost. The successful tenderer shall also ensure that the general arrangement/elevation of new buildings/structures are similar to the existing/adjacent buildings structures as far as possible. Tenderer shall locate the space for their construction facilities i.e. store, fabrication yard, workshop, batching plants etc., offices, staff quarter, labour camp etc. No claim shall be entertained on these accounts from the tenderer after submission of Tender under any circumstances whatsoever.

### **1.11 Safety**

The Successful Tenderer shall take adequate precautions to ensure complete safety and prevention of accidents at site. The safety precautions shall be conforming to the relevant IS codes. The Tenderer shall also abide by the safety regulations of the Employer and other directives given by the Engineer In charge from time to time. The Successful Tenderer shall depute his safety engineers exclusively to ensure the safety at his own cost.

Necessary first aid treatment shall be made available at site by the Tenderer.

### **1.12 Keeping works free from water**

The Successful Tenderer shall provide and maintain at his own cost labour, pumps and other equipments to keep the entire work site free from water and continue to do so until the completion of the work. No water to be allowed to flow over areas beyond the battery limit. Proper drain is to be connected to nearby drainage system.

### **1.13 Rubbish**

The Successful Tenderer shall keep the site clean on continuous basis. All rubbish which may be generated during the course of work shall be disposed suitably in the



**TENUGHAT VIDYUT NIGAM LIMITED**  
**2x210 MW Tenughat Thermal Power Station**  
**Jharkhand**  
**Dry Fly Ash Collection & Disposal System**



designated area within the plant boundary at his cost. The frequency of removal may be weekly or as directed by E.I.C/Owner.

**1.14 Secrecy of information**

The Tenderer shall not divulge any information that he may obtain regarding the Tenughat Thermal Power Station project to any other party.

**1.15 Progress report**

The Successful Tenderer shall furnish the daily/weekly/monthly progress report of work to owner/consultant covering all activities such as procurement of materials, deployment of men and machineries etc. in the approved format of Owner/Consultant.

**1.16 Deployment of Manpower/ machinery**

The Successful Tenderer shall submit the manpower deployment schedule and machinery deployment schedule along with price bid. Any mobilization/demobilization of machinery and manpower should be done with prior approval of Owner/ Consultant.

**2.0 Civil work - material and workmanship**

**2.1 Earthwork**

- i) Earthwork and control blasting of soft rock/ hard strata shall be carried out generally as per specification for civil engineering works. The Successful Tenderer shall adopt a suitable dewatering system, if required, for carrying out earthwork, concrete and shuttering work, and other underground work. Site tests shall be carried out by the Successful Tenderer at his own cost prior to finalisation of the dewatering system. For discharge of sub-soil water pumping arrangement with a suitable piping system shall be provided. All water bailed out during dewatering shall be disposed off suitably to existing plant drainage system. The Successful Tenderer shall take the approval of Owner for routing and levels of discharge pipeline inside the battery limits. The Successful Tenderer shall also carry out any further compaction of sub-grade necessary to achieve the design criteria of floors and foundations taking into consideration the settlement limits. Method of compaction shall depend upon the materials to be used and verified by the Successful Tenderer by site testing at his own cost. Surplus and unsuitable materials shall be disposed suitably at locations within plant boundary indicated by the Owner. If required the backfilling material shall be brought to the site by the Successful Tenderer at no additional cost. Availability of dumping yard and borrow pit shall be outside the plant boundary. Dozing, compaction and spreading of the dumped earth, if necessary, shall be done by the Successful Tenderer at no additional cost to the Owner.





**TENUGHAT VIDYUT NIGAM LIMITED**  
**2x210 MW Tenughat Thermal Power Station**  
**Jharkhand**  
**Dry Fly Ash Collection & Disposal System**



- ii) Apart from shoring and temporary supports all other necessary measures like use of sheet piling etc. shall be provided, if necessary, for protection of existing underground services at no additional cost to the Owner.
- iii) Within the battery limit dismantling, diversion, relocation and protection of all underground structures and services shall be done at no extra cost to the owner.
- iv) The checking and correctness of all main centre lines is the responsibility of the successful Tenderer irrespective of any checking by the Owner.
- v) All serviceable hard rock will be the property of the Owner. The successful Tenderer has to stack the same after making the hard rock in serviceable sizes of 150 to 300 mm at designated area within the plant boundary at his own cost.

## 2.2 Concrete and reinforced concrete structure

- i) All concrete and reinforced concrete structures shall be constructed as per specification for civil engineering work 11-CIVIL-GS-07.
- ii) The mix design adopted shall be suitable for proper strength, workability and service condition of the structure. Minimum cement content and maximum water cement ratio shall be normally as per specification for civil engineering works. However, in case of exposure to aggressive environments, the mix design adopted shall be suitable to ensure durability of the concrete under that condition.
- iii) Unless specifically approved by the Engineer the maximum nominal size of coarse aggregates for different grades of concrete shall be as under:
  - a) For pre-cast concrete members of thickness not more than 100 mm and in cast-in-situ RCC members of thickness not more than 75 mm ..... 12 mm.
  - b) For all reinforced concrete work and plain cement work except as specified under (a) or (c).....20 mm.
  - c) For plain cement concrete of grade M-10 and M-5 of thickness more than 150mm .....40 mm.
- iv) Steel reinforcement to be used shall be as per specification for civil engineering works and Indian Standard Codes.
- v) Test on Harden concrete :

In case the concrete quality falls under “Doubtful” category in view of the Owner. The Successful Tenderer shall further investigate the in-situ strength of concrete by carrying out non destructive test as follows:



**TENUGHAT VIDYUT NIGAM LIMITED**  
**2x210 MW Tenughat Thermal Power Station**  
**Jharkhand**  
**Dry Fly Ash Collection & Disposal System**



1. Taking out the concrete core and testing in accordance to IS 516.
2. Ultrasonic Pulse velocity and rebound hammer tests as per IS 13311.

The successful Tenderer shall take necessary measures to restore the quality of concrete to acceptable level without any additional cost implication to the owner implication if required.

### 2.3 **Roof finish**

Type of waterproofing for RCC roof of all buildings shall be as follows.

For RCC works : With 'multiplas' or similar (fibre glass based) in under ground structure and sealtex (with fibre glass cloth) or its equivalent to RCC roof slab

### **SPECIFICATION FOR 'MULTIPLAS - F' WATER PROOFING**

Supplying and providing water proofing treatment with Polymeric membrane of 4 kg/sq.m (Multiplas – F manufactured by IWL) with the following specifications:

Base preparation : surface shall be free from loose particles with no voids, honey combs or protrusions.

Laying : Bituminous emulsion is applied @ 100 grams/sq.m and allowed to dry. Membrane shall be laid over a layer of hot blown bitumen 85/25 or 90/15 @ 1.2 kg./sq.m and overlaps are sealed with torch application.

Topping : The entire surface is covered with a layer of hot blown bitumen 85/25 or 90/15 @ 1.2 kg/sqm and finished with Multiplas Bituminous Aluminium Primer at 100 grams/sq.m

Final topping : Final topping with cement screed of 1:5 ratio and 20 mm thick with chicken wire mesh reinforcements of 26 SWG. This shall be properly cured with water as per standard specification.

### 2.4 **Floors and floor finishes**

- i) The flooring and floor finishes shall conform to stipulation of Technical rule unless otherwise mentioned in this specification.
- ii) Any specific area requiring other type of flooring not covered by Technical rule shall be indicated by the Successful Tenderer..

### 2.5 **Wall and wall finishes**

- i) Wall and wall finishes shall conform to stipulation mentioned in the Technical rule.



**TENUGHAT VIDYUT NIGAM LIMITED**  
**2x210 MW Tenughat Thermal Power Station**  
**Jharkhand**  
**Dry Fly Ash Collection & Disposal System**



- ii) Any specific area requiring other type of wall finishes not covered by technical rule shall be indicated by the Tenderer.

**2.6 Doors, windows, ventilators and shutters**

All doors, windows, ventilators and shutters shall be in accordance with Technical Rule.

**2.7 Painting**

All painting work to masonry and concrete structures, doors, windows etc. shall be in accordance with Technical rule unless specifically mentioned otherwise. 1<sup>st</sup> quality paint of approved brand must be used for the same.

**2.8 Waterproofing**

Waterproofing of underground structures shall be done in accordance with Technical Rule with providing 225 mm PVC water bars at joints of rafts and walls and applying 'Multiplas – F' externally for prevention of water ingress.

**2.9 Service Lines and Plumbing**

i) All necessary plumbing and sanitary fittings, connections and service lines will be provided as per Technical Rule.

ii) All service pipelines, water supply, plumbing and other utility pipelines within the auxiliary structures of RC/ masonry construction shall be concealed within the masonry, concrete work etc or by removable wooden panels. All electrical wiring shall be concealed either within RC/masonry construction or by false ceiling.

2.10 Reference grid points and bench marks shall be made available to the Successful Tenderer at one place. The Successful Tenderer shall do other necessary work for controlling reference grid.

2.11 Hand railings – All hand railing shall be of GI pipes and no welding of joints permitted. Use of bend, socket, elbow is must.

2.12 Water proofing works shall have 10 yrs Guarantee Bond and Performa of the same shall be collected from the Owner/ Consultant.

2.13 The successful Tenderer has to mobilize a well qualified survey team along with survey equipment for day to day survey work. They should use high precision survey equipments for this purpose. The Successful Tenderer has to facilitate the Owner/Consultant for checking of accuracy of survey work as and when desired by the Owner/Consultant at no extra cost to the Owner.



**TENUGHAT VIDYUT NIGAM LIMITED**  
**2x210 MW Tenughat Thermal Power Station**  
**Jharkhand**  
**Dry Fly Ash Collection & Disposal System**



2.14 The Successful Tenderer has to set up his own laboratory to facilitate the checking quality of the civil work e.g., for checking aggregate, sand, bricks, ash, water, earth etc. as per relevant Indian Standards at his own cost. The Successful Tenderer has to facilitate the Owner/Consultant for checking quality of material/work etc. as and when desired by the Owner/Consultant at no extra cost to the Owner. The Successful Tenderer shall depute well qualified quality engineers exclusively to ensure the quality of works at his own cost. The quality certificate duly signed by E.I.C must be enclosed in each R.A bills.

### 3.0 **PRINCIPAL FEATURES OF STRUCTURES AND OTHER FACILITIES**

#### 3.1 **GENERAL**

Design and construction of structures etc. shall take into account requirement for operation and maintenance of all equipments and its users. The structures will have good architectural features. The surrounding areas shall be properly micro-levelled, graded and paved with concrete within the battery limit.

#### 3.2 **Architectural Concepts for Structures**

The architectural design concept of structures shall be evolved considering the functional, technological and other requirements for efficient operation ensuring comfortable working environment for personnel, satisfying the aesthetic requirements. Special care shall be taken to provide elegance and aesthetics, with effective use of appropriate treatment, materials fittings and finishes. To achieve above objective, successful Tenderer shall employ a qualified architect/ architectural firm to carry out all design and hold all other architectural responsibilities for the project.

The successful Tenderer shall obtain and be conversant with all laws, by-laws, and regulations of local and Statutory Bodies as applicable to the project. The architectural concept evolved should also take care of these requirements. The drawings and documents for such statutory approvals shall be provided by the successful Tenderer.

#### 3.3 **Principal Features of structures, facilities etc. have been outlined below:**

Compressor house, Utility Building of required size shall be provided to accommodate all equipments, service facilities and maintenance/operational requirements. Minimal size wherever mentioned shall be provided unless the actual requirement is more than minimal size.

Compressor house shall be of RCC foundation, brick cladding and structural steel column with roof truss. Crane girders shall be of structural steel construction.

Utility building shall be of RCC foundation, brick cladding and structural steel column with roof truss. Crane girders shall be of structural steel construction.



**TENUGHAT VIDYUT NIGAM LIMITED**  
**2x210 MW Tenughat Thermal Power Station**  
**Jharkhand**  
**Dry Fly Ash Collection & Disposal System**



Main silos and intermediate silos shall be of RCC supported on RCC columns. Pipe trench, cable trench, sumps, drains, foundations for required equipments etc. shall be part of the system as required. Support shall be provided for manually operated traveling crane at the top of silo.

RCC silos with suitable size and shape as per requirement of effective capacity other technological requirements shall be provided to store fly ash. The silos shall be supported on as set of RCC column. The density of fly ash shall be as per IS code subjected to minimum  $600 \text{ Kg/m}^3$  for volume calculation and minimum  $1600 \text{ Kg/m}^3$  for load calculation.

Staging columns, terracing, platform etc. shall accommodate and clear the movement of trucks (or any other mode of transporting system) for unloading of fly ash under the silos between columns for silos.

Design of silos shall be as per IS 4995 part-I & II or inline with other international standard.

Ground floor shall have 200 thick M-20 grade RCC. Base course shall be 200mm thick compact stone boulders over which building paper and 50mm thick blinding concrete shall be provided.

PCC apron shall be provided with side drains around periphery of RCC floor area below silos.

Plinth level shall be 300mm above surrounding terrace level with suitable RCC ramps for truck entry.

Exposed surface of silo walls bunker cover slab shall have two coats of approved water repellent paint.

RCC silo vertical wall construction.

All cable trenches shall be of leak proof RCC construction with necessary waterproofing arrangement. The trenches shall be complete with inserts for installation of cable trays.

Accumulation of water inside the trench shall be drained by providing proper drains with slopes and sump with sump pumps.

### **3.4 Miscellaneous structures and facilities**

All foundations for structures and equipments, access facilities, drains etc. as well as any other items not mentioned herein but will be necessary for the process requirement and facilities shall be provided.

All structures shall have good architectural facade. Necessary paved areas shall be provided around the building for parking of mobilised equipments and vehicles.



**TENUGHAT VIDYUT NIGAM LIMITED**  
**2x210 MW Tenughat Thermal Power Station**  
**Jharkhand**  
**Dry Fly Ash Collection & Disposal System**



### 3.5 Toilet blocks:

The minimum number of toilet blocks for this package shall be provided as below.

- (i) One no. toilet block in compressor house and one water cooler of approved make.
- (ii) One no. toilet block in utility building and one water cooler of approved make
- (iii) Waste discharge of toilets shall be connected to the main sewer line constructed by other agency.

Toilet block shall be provided with toilets, drinking water connection, space for water coolers. Toilets will be properly vented. Floor should be of antiskid floor tile and wall to be finished with glazed tile of approved brand.

## 4.0 DESIGN CALCULATIONS, DRAWINGS AND DOCUMENTS

### 4.1 Design calculations

The design calculations to be submitted by successful Tenderer prior to submission of construction drawing shall include but not be limited to the following:

#### 4.1.1 Architectural design

The Tenderer shall follow the norms and basic schemes indicated in the Technical Specification. The Tenderer shall submit all catalogues/ specifications for various floors and wall finishes, painting, doors and windows, etc.

#### 4.1.2 Building Structural and foundation design

- i) The design calculations for all the structures and foundations including miscellaneous structures, all equipment foundations etc. shall be furnished. The design calculations shall include static design calculations for all structures and foundations, dynamic analysis for all important structures and foundation subjected to impact, vibrations etc. induced by equipment and other external forces.
- ii) building Structure data sheet showing specifications of materials, design standards followed, load data assumed including the loading on roof, walkways, different floors, bulk material density, crane and hoist loading, wind and seismic loading, wind thrusts and vibration considerations, deflection, etc. shall be furnished. Also, types of flooring, roofing are to be indicated. The loading combinations and other design assumptions made in design are to be furnished.



**TENUGHAT VIDYUT NIGAM LIMITED**  
**2x210 MW Tenughat Thermal Power Station**  
**Jharkhand**  
**Dry Fly Ash Collection & Disposal System**



- iii) Load combination shall be made as per IS 875. The wind load & seismic loads shall be mutually exclusive. The structure/foundation shall be designed for the combination giving severest effect.
- iv) Methods to be followed for (a) waterproofing, (b) Corrosion protection of structures exposed to water.
- v) Measures required for the safety of the structures and foundations.

## **4.2 Drawings**

### **4.2.1 Drawings for concrete reinforced concrete and other civil work.**

- i) The successful Tenderer shall prepare general layout drawings giving salient levels and dimensions of the whole area showing all over ground and underground services and facilities, structures, roadways, etc. Detailed working drawings shall be prepared on the basis of the general layout drawings considering overall structural system. The successful Tenderer shall ensure that no further drawing shall be required to be prepared by any other agency for successful implementation of the project. The successful Tenderer shall submit a comprehensive and complete unit wise classified list of drawings.
- ii) The successful Tenderer shall supply integrated drawings for different facilities.
- iii) The successful Tenderer shall submit for approval or information as the case may be as per annexure-2, general arrangement and detailed working drawings for all concrete, reinforced concrete and other civil works as follows:
  - Excavation drawings.
  - Foundation plans and sections for structure columns and equipment incorporating trenches, pipes etc.
  - Loading drawings indicating superstructure loading, equipment loading, floor loadings, etc.
  - Reinforcement details with bar bending schedule for all reinforced concrete works.
  - Drawings for all types of bolts, inserts, embedments, miscellaneous steel works, etc.
  - All drawings for masonry work, flooring, floor finishes, partitions, false ceiling/floors, if any, etc.
  - Drawings for approach roads, pavements, drainage including culverts, if any etc.



**TENUGHAT VIDYUT NIGAM LIMITED**  
**2x210 MW Tenughat Thermal Power Station**  
**Jharkhand**  
**Dry Fly Ash Collection & Disposal System**



- Storm water drainage drawings for areas and structures within the battery limit.
  - Drawings for roadways, paved areas and parking areas, etc. along with culverts, bridges etc. as required.
  - Painting schedule shall be provided for all structures.
  - Detailed bill of materials of all items of work.
- iii) All drawings required for obtaining approval from statutory bodies/local authorities etc. shall be prepared by the Tenderer.
- iv) The Successful Tenderer shall submit as-built drawings incorporating all site modifications as mentioned in the commercial part.

**5.0 General Sub-soil Conditions**

5.1 Soil Investigation work has been carried out for II phase expansion plan of TTPS in the adjacent to proposed site within the plant area. **The soil investigation report, if available with the Owner, bidder may take the same for reference.** The Tenderer is deemed to have studied the report to assess the subsoil conditions. The price quoted by the Tenderer shall be firm and no additional payment will be allowed on account of variation in subsoil condition.

5.2 The sub-soil conditions may deviate at site. It is the sole responsibility of the successful Tenderer to provide foundations as required based on actual site conditions. **The successful Tenderer shall carryout additional sub-soil investigation for the purpose at no additional cost to the Owner.** The investigation work (both field & laboratory) shall be carried out following relevant IS: Codes through approved agency and will be supervised by the Owner. The scope of soil investigation work, data and recommendation derived from the soil investigation (carried out by the successful Tenderer) shall have to be approved by the Owner before implementation in design and/or construction.

**6.0 Site conditions**

6.1 The area selected for the ash handling system is within the existing plant area.

6.2 Site clearance of muck, debris, concrete blocks, stones, masonry blocks, structural scraps etc. and disposal of the same shall be included in the Scope of Tenderer's work.





**TENUGHAT VIDYUT NIGAM LIMITED**  
**2x210 MW Tenughat Thermal Power Station**  
**Jharkhand**  
**Dry Fly Ash Collection & Disposal System**



- 6.3 Existing wells, pits etc., if any, shall be filled up with sand of approved quality. Also any loose materials from wells, pits etc. shall be removed and subsequently filled up with sand of approved quality.
- 6.4 The Tenderer shall be deemed to have visited and carefully examined the site and surroundings, to have satisfied himself about the nature of all existing structures, existing underground services, general site conditions, the site for disposal of surplus materials, debris etc. and all other matters affecting the work. Claims and objections due to ignorance of site conditions shall not be considered after submission of the tender.
- 6.5 The Tenderer has to make approach road to worksites at their own cost with prior approval of EIC/ Owner. They should also make their own arrangements to drain out storm water with the approval of EIC/ Owner accumulated at their site by pumping to suitable locations at their own cost.
- 6.6 The Tenderer has to make arrangements for segregation of ferrous and non-ferrous scrap materials as per requirement of ISO: 14000 and also as and when instructed/directed by the Owner to deposit the scraps at designated places and for which no separate payments shall be made.

**ANNEXURE-I**

**7.0 Estimated Quantities for Civil Works**

- 1) Excavation in
  - a) Soil (of all kinds)
  - b) Rock
- 2) Piling
- 3) PCC
- 4) RCC
- 5) Reinforcement
- 6) Masonry work
- 7) Doors and windows including fitting and fixtures
- 8) Flooring
- 9) Plastering, painting and other finishes
- 10) Roofing including water proofing



**TENUGHAT VIDYUT NIGAM LIMITED**  
**2x210 MW Tenughat Thermal Power Station**  
**Jharkhand**  
**Dry Fly Ash Collection & Disposal System**



- 11) Roads and drainage including culverts etc.
- 12) Area development including paving.
- 13) Plumbing and sanitary works including internal and external water supply and sewerage system

Note : All quantities for civil works as indicated above are non-binding.

**ANNEXURE-II**

**8.0 List of Civil Engineering Drawings and Documents for Approval/ Information**

**Group-1 : For Approval**

Item No.	Description
1.	Drawing numbering system
2.	List of drawings with drawing Nos. and title
3.	Basic design criteria and loading for all structures and foundations.
4.	Site plan/ layout drawing with battery limit in 1:500 scale
5.	General arrangement drawings for RC structures/ framed structures showing dimensions of structural elements like slabs, beams, columns, foundations etc.
6.	Design calculations along with load data for buildings, foundation for equipment and structures, auxiliary facilities etc. (design calculations shall be submitted along with or before submission of G.A. and design drawings).
7.	General arrangement plan and sectional drawings with all dimensions and details for foundation of equipment and structures, auxiliary facilities etc.



**TENUGHAT VIDYUT NIGAM LIMITED**  
**2x210 MW Tenughat Thermal Power Station**  
**Jharkhand**  
**Dry Fly Ash Collection & Disposal System**



8. Layout and sectional details of paved areas

**Note: Design calculations shall be submitted along with or before submission of GA & design drawings.**

**Group-2: For information and comments, if any**

-----  
Item No.            Description  
-----

1.            Detail reinforcement drawings.
2.            Detail of bolts, inserts/ embedment, coverings, hand railings, ladders etc.

**Note: Design calculations shall be submitted along with or before submission of GA & design drawings.**



**TENUGHAT VIDYUT NIGAM LIMITED**  
**2x210 MW Tenughat Thermal Power Station**  
**Jharkhand**  
**Dry Fly Ash Collection & Disposal System**



**ANNEXURE-III**

Sl. No.	IS Code	Year of Publication	Description
1.	IS:269	1989	Specification for 33 grade ordinary Portland cement (fourth revision) (Amendments 6).
2.	IS:383	1970	Specification for coarse and fine aggregates from natural sources for concrete (second revision) (Superseding IS:515).
3.	IS:1542	1992	Specification for sand for plaster (second revision)
4.	IS2386 (Part- 1 to 8)	1963	Part-1: Methods of Test for aggregates for concrete : Part-1 Particle size and shape (Amendments 3).  Part-2: Methods of Test for aggregates for concrete : Part-2 Estimation of deleterious materials and organic impurities (Amendment 1).  Part-3: Methods of Test for aggregates for concrete : Part-3 Specific gravity, density voids, absorption and bulking.  Part-4: Methods of Test for aggregates for concrete Part-4 Mechanical properties (Amendments 3).  Part-5: Methods of Test for aggregates for concrete Part-5 Soundness.  Part-6: Methods of Test for aggregates for concrete : Part-6 Measuring mortar making properties of fine aggregates (Amendments 2).  Part-7: Methods of Test for aggregates for concrete : Part-7 Alkali aggregate reactivity (Amendment 1).  Part-8 : Methods of Test for aggregates for concrete Part-8 Petrographic examination (Amendment 1).
5.	IS:2430	1986	Methods of sampling of aggregates for concrete (first revision)
6.	IS:3495 (Part-1 to 4)	1992	Methods of test of burnt clay building bricks (third revision) Part-1 : Determination of compressive strength Part-2 : Determination of water absorption Part-3 : Determination of efflorescence Part-4: Determination of warpage
7.	IS:3812	1981	Specification for fly ash for use as pozzolana and admixture (first revision)
8.	IS:4032	1985	Method of chemical analysis of hydraulic cement (first revision) (Amendment 1) (Superseding IS:1298)



**TENUGHAT VIDYUT NIGAM LIMITED**  
**2x210 MW Tenughat Thermal Power Station**  
**Jharkhand**  
**Dry Fly Ash Collection & Disposal System**



9.	IS:4139	1989	Specification for Calcium Silicate bricks
10.	IS:5454	1978	Methods of sampling of clay building bricks
11.	IS:8112	1989	Specification for 43 grade ordinary Portland cement (first revision) (Amendments 6).
12.	IS:12269	1987	Specification for 53 grade ordinary Portland cement (Amendments 6 )
13.	IS:12894	2002	Pulverised fuel ash (fly ash) lime bricks – Specification (first revision)