

GLOBAL INVITATION FOR EXPRESSION OF INTEREST (EOI) FOR “CONSULTANCY WORK FOR DETAILED STUDY AND SYSTEM DESIGN FOR DEVELOPMENT AND FORMATION OF ASH MOUND”

INSTRUCTIONS TO APPLICANTS

Patratu Vidyut Utpadan Nigam Limited (PVUNL), is a JV Company of NTPC Limited and JBVNL. JBVNL is a state-owned company of Govt. of Jharkhand and NTPC is a leading power sector company of India. PVUNL is setting up 2400 MW Ultra Super Critical coal based thermal power plant at Patratu in Ramgarh District of Jharkhand state in India.

PVUNL invites EOI from reputed consultants for Consultancy work for detailed study and system design for development and formation of Ash Mound for dry ash disposal at Patratu Super Thermal Power Project.

Interested Applicants may download the documents of EOI free of cost from www.ntpctender.com and should submit the following documents with each page of the document submitted duly numbered, signed and stamped along with this EOI documents:

- a) [Schedule-1](#): Detailed Terms of Reference for Consultancy work for detailed study and system design for development and formation of Ash Mound
- b) [Schedule-2](#): Application format
- c) [Schedule-3](#): Past experience with regard to relevant Experience quoted in schedule-2 in similar type of project including client Certificates/ Other certificates

The documents will be available for download from **30.04.2021, 9:00 AM IST** onwards.

DATE, PLACE & METHOD OF SUBMISSION OF APPLICATION

For consideration of EOI, applicant(s) are required to e-mail soft copy of documents on bdash01@ntpc.co.in with a copy to spgarlapati@ntpc.co.in till **21st May 2021, 6:00 PM IST**. No hard copy submission is required. It may be noted that submission of EOI does not in any way constitute any kind of commitment on the part of PVUNL.

In case of any clarifications, applicants may reach out to:
Sh. B Dash, GM(Engg)-PVUNL; Email: bdash01@ntpc.co.in

Application received on or before due date would be considered for further evaluation.

TERMS OF REFERENCE FOR CONSULTANCY WORK FOR PREPARATION OF FR, DPR, ENGINEERING AND EXPERT ASSISTANCE FOR DEVELOPMENT AND FORMATION OF ASH MOUND ALONG WITH ASSOCIATED MATERIAL HANDLING AND INFRASTRUCTURE WORKS FOR PATRATU SUPER THERMAL POWER PROJECT, PHASE-I (3X800 MW), PATRATU, DIST. RAMGARH, JHARKHAND

1.0 INTRODUCTION:

Patratu Vidyut Utpadan Nigam Limited (PVUNL), is a JV Company of NTPC Limited and Jharkhand Bijli Vitaran Nigam Limited (JBVNL). JBVNL is state owned company of Govt. of Jharkhand and NTPC is a leading power sector company of India.

Patratu Super Thermal Power Project (PSTPP), Phase-I (3 x 800 MW) is proposed near Patratu town in Ramgarh district of Jharkhand having ultimate capacity of 4000 MW (Phase-I: 3x800 MW and Phase-II: 2x800 MW).

Proposed project site is well connected through rail, road and air routes. The site can be approached from Patratu Railway Station at about 4 km (located on Barkakhana-Barwadih Railway line) and National Highway no. 33 & 23 (approx. 21 km) & NH-75 (approx. 27 km). The nearest commercial airport is Ranchi (about 45 km).

2.0 OBJECTIVES:

Detailed study and complete system design for development and formation of Ash mound along with associated material handling and infrastructure works for dry ash disposal to be done for PATRATU STPP, Phase-I (3X800MW).

3.0 INTENT OF CONSULTANCY

- 3.1 The intent of this consultancy is that consultant should carry out the feasibility / viability study for ash mound system for Patratu STPP-I (3x800MW). Once the viability/ feasibility is established, the consultant will be required to make Detailed Project Report (DPR) establishing the mound planning and development with design of all associated systems i.e. material handling system, infrastructure system along with all associated electrical, Control & instrumentation systems. Further, consultant is required to identify the separate procurement packages for tendering equipment, system required to start formation of ash mound and make it fully operational and development of mound up to full height with landscaping and land reclaiming measures. It is duty of consultant to identify each and every requirement associated with mound formation & development and include the same in DPR and other assigned works such as engineering and expert assistance during erection & commissioning and O&M phase etc.
- 3.2 The consultants shall ensure design and engineering of the system for high reliability, availability, efficiency, no harmful impact on the ecology and environment of the area and optimum cost of the project consistent with the latest and well proven practices in the world in this field. Over and above, the services identified under scope of work, the work to be performed by the consultant shall also include imparting of any necessary information, design data, documentation drawings and specifications to the owner to enable the owner's engineers to carry out the complete design and engineering of future projects.

4.0 SCOPE OF WORK

The main scope of work is Preparation of Feasibility Report, Detailed Project Report, preparation of tender documents of necessary equipment's and system associated with ash mound, assistance in bid evaluation, assistance in review engineering during Detailed Engineering, expert assistance during erection & commissioning and O&M phase for setting up Ash mound facilities at Patratu STPP to handle ash generated from 3 x 800MW units:

It is proposed to divide all the above works of the consultancy services into following stages:

- i) Stage-I: Viability and Feasibility study
- ii) Stage-II: Detailed Project Report and scheme finalization
- iii) Stage-III: Concept of Packaging & Preparation of Tender Documents
- iv) Stage-IV: Detailed engineering of Ash mound and Review Engineering of Ash Disposal system package (at sl 4.3.1(i)) after award
- v) Stage-V: Expert assistance during erection and commissioning of ash mound system
- vi) Stage-VI: Expert assistance for implementation of scheme during Operation and maintenance

4.1 Stage-I: Viability and Feasibility study

The broad scope of work under Stage-I study is as given below:

- i. To study the viability of ash mound construction with dry ash disposal system giving due consideration to the local geology, tropical climate & existing area drainage pattern including conditions that will arise during the monsoon period.
- ii. Feasibility to design ash mound for maximum capacity of ash storage in the identified 340 acres (318 acres for ash mound & its facilities; 22 acres for pipe/ conveyor corridor) of land with a height restriction of 35m and maximum targeted ash storage capacity of 35 Million Cum. Further, multiple design storage capacity options using different techniques shall be furnished along with advantages & disadvantages including techno-commercial analysis. Owner may decide any of the above techniques for implementation, which will be finalized during DPR stage. Bidder shall note that the capacity of the conveyor system at the plant outlet is 2600 TPH. Accordingly, the proposed method shall be in commensurate with the ash production output.
- iii. Consultant shall prepare an inception report bringing out clearly the viability of the ash mound construction with dry disposal system with typical design of ash mound and associated systems.
- iv. Consultant shall formulate programme of additional investigations and design studies required if any, and shall execute these programmes by their own experts and / or under their direct supervision and with involvement of NTPC / PVUNL officials. The cost of such investigations/ studies is deemed to have been included in the quoted prices.
- v. Any other detail deemed necessary according to the Consultants/Owners.

4.2 Stage-II: Detailed Project Report (DPR) and scheme finalization

- i. Based on the feasibility study (sl 4.1), bidder shall design the ash mound based on one of the alternatives selected by the owner. Ash mound shall be designed such that, there is no spill into neighboring land.
- ii. To carry out all additional topographical survey & geotechnical investigation (if required) or any other investigation as required to finalize the design of ash mound for ultimate height. Rainfall data may be obtained from Indian metrological department (IMD).
- iii. To carry out ground improvement design in the ash mound areas as per recommendations in Geotechnical Investigation report, if required, to achieve the ultimate height.

- iv. Based on earlier experience of the owner, the ash disposal area may be divided into (i) main ash mound area for bottom ash (BA) and fly ash (FA) (ii) temporary ash storage yard area, (iii) emergency ash storage yard area and (iv) balance area for peripheral drain, inspection road, filter lagoons and other facilities etc.
- v. To coordinate with vendor for ash handling system for inputs and interface issues.
- vi. Proven principles for mound design & construction to be used giving due consideration to the local geology, climate & existing area drainage pattern including conditions that will arise during the monsoon period.
- vii. Stability and seepage analysis to be performed through appropriate method. Analysis to be performed for both static & seismic conditions. Appropriate safety factors to be ensured for the intermediate and ultimate height of ash mound.
- viii. Design of ash mound & the methodology proposed for its construction should ensure stability of the mound at all times and ensure that pollution of the atmosphere and ground water is minimized. Liner, if required to avoid ground water contamination, shall specify suitable material.
- ix. Appropriate drainage design to be provided for surface water runoff to prevent pollution of adjacent natural drains/river and ground water. The slope drain shall be provided with energy dissipaters. Further, the collected leachate shall be properly treated in a designed leachate treatment system so that the treated effluent can be reused (for dust suppression system, ash conditioning, ash compaction or horticulture etc). Design of those systems such as leachate treatment, reuse / recirculation methodologies etc is in the scope of bidder.
- x. Ash mound design and its proposed methodology of construction to be flexible as to allow the ash to be handled in all circumstances that are likely to arise from climatic conditions, plant malfunction and different rates of ash production. It shall ensure measures for control of fugitive dust both at intermediate stages & final completion of ash mound.
- xi. The design and proposed construction methodology for ash mound and civil works to be done as per latest Indian Standards. Where a relevant Indian Standard does not exist British, American, German, US EPA or any other international standard may be used.
- xii. To furnish appropriate landscape design for final surfaces of the ash mound furnishing the recommended plant species to be planted on the surface to provide protection and stability and good aesthetic look considering that the ash mound is to be retained as a natural feature in the area during the life of plant (25 years) and thereafter. Provision for a trial planting area and plant nursery within the mound site shall be kept.
- xiii. Methodology for safe extraction of ash directly from mound by users. It is envisaged that there will be off take of ash from the mound in trucks/bulkers for use by the industry. The same shall be considered in the design and scheme & methodology for safe off take of the ash from mound for prospective users, shall be furnished.
- xiv. Design of all ancillary buildings like control and MCC/ switchgear buildings, administrative building, pump houses, safety centre, rest rooms with drinking water facilities, laboratory building, workshop etc. shall be provided for regular servicing of plant & equipment working on the mound and for the welfare and control of the personnel involved.
- xv. The ash handling plant and proposed method of construction of the ash mound shall be designed to control & minimize the extent of fugitive dust emissions. The main area of likely dust nuisance are the belt conveyors, ash moving equipment, Temporary & emergency yards, site traffic, wind erosion etc. including the ash mound construction / operation stage. A comprehensive dust control system/ scheme shall be provided.

- xvi. To design Ash mound, the following Mechanical & associated works are also to be included in DPR:
- All plant & equipment/ machines like conveyors (fixed, shiftable and extendable or any other technology), boom spreaders, Stackers/ Reclaimers, dust suppression system, drainage pumps etc. required for the development of ash mound including their number and capacities.
 - Mobile and earth/ ash moving equipment like Soil compactors, Bull dozers, Front loaders, Dumpers, Motor graders, Water bowsers, Hydras, Excavators, Tractors or any other technology required for construction/development of the Ash mound including their number and capacities, based on the amount of ash to be handled on daily basis.
 - Workshop along with equipment or special tools and tackles and facilities required for maintenance of the Ash mound equipment including their number and capacities.
 - Scheme and functional layout of maintenance workshop for servicing and maintenance of mobile/ earth/ash moving equipment required up to ultimate stage.
 - Water requirement and Dust suppression system at ash mound along with its equipment and Pump houses and its locations.
 - Development of the total scheme and layout of the Ash mound. Identifying the ash transportation corridor from plant boundary to Ash mound. Also indicate type of conveying system along with its capacity.
 - Examine the option for pipe conveyor / trough conveyor w.r.t. capacity and handling of ash.
 - Suggestion for Commercial uses for stored ash in mound and future recovery of bottom ash and fly ash separately from mound for utilization of ash and also for Light weight aggregate etc.
 - Ash mound, temporary and emergency storage system capacity & its layout. {Generally, temporary stock yard is required for stacking ash during monsoon (when ash cannot be compacted in permanent mound area due to flooding), during shifting of conveyor system or whenever stacking of bottom ash or fly ash is not feasible inside permanent mound area etc. Emergency stock yard is required when all the mechanical/ electrical facilities fail. Based on the experience at one of the NTPC projects, temporary stock yard shall be provided for a storage capacity of 15-30 days (separate yard for bottom ash & fly ash is preferable), and emergency stock yard shall be provided for a storage capacity of 1-2 days.}
If the bidder does not envisage these facilities, bidder shall provide suitable alternate solutions/ facilities to address the above issues.
 - A layout plan of the Ash mound facilities proposed including the Ash Handling system with respect to the 'grid system' of the Patratu Power Project including approach corridor along with roads has to be provided.
- xvii. Assessment of infra-structure, O&M and other facilities required for handling of ash in Ash mound area and preparation of detailed plan of the complete system.
- xviii. The scope also includes furnishing operational manual covering the aspects of construction and maintenance for the ash mound, safety instructions, testing & maintenance of records on short- & long-term basis, emergency/ disaster management plan etc.
- xix. Preparation and submission of report incorporating above details to obtain approval from NTPC / PVUNL. This should include consultant's recommendation clearly bringing out tangible/intangible benefit to NTPC / PVUNL on the subject.
- xx. The study also involves facilities to be developed at the proposed Ash mound for take-off of fly ash/bottom ash by road.

- xxi. The study shall include schemes of the Ash Mound planning to ultimate height with progressive placement of shiftable and extendable conveyors and uses of various other equipment and earth moving equipment in various stages of mound development.
- xxii. Identification of all the equipment including earth moving equipment with capacity and numbers required for the Ash mound development.

4.3 Stage-III: Concept of Packaging & Preparation of Tender Documents

4.3.1 The entire work related to the Dry Ash Transportation from Transfer point (near main ash Silo area at plant boundary) to Ash mound including the Ash mound formation, is proposed to be carried out by the consultant except package at sl iv below. The activity of contracting and procurement should be carried out in separate procurement packages preferably as identified below:

i. Ash Disposal system package (inside ash mound area):-

- Fixed conveyor system from the 1st TP inside the ash mound for complete ash mound including temporary & emergency stock pile etc,
- Shiftable & Extendable Conveyor system on ash mound along with associated equipment like stacker-reclaimer for temporary & emergency storage etc required at the disposal site for creating the ash mound.
- Battery of mobile equipment like Soil compactors, Bull dozers, Front loaders, Dumpers, Motor graders, Water bowsers, Hydras, Excavators, Tractors or any other technology required for construction/ development of the Ash mound.
- Commissioning, operation & maintenance and shifting of ash conveyor system for one year
- Garage, Workshop & Workshop equipment, Laboratory & laboratory equipment as required.
- Other equipment such as pumps & piping system for fugitive dust suppression, drainage system etc.
- All associated civil, architectural & structural works this shall include all equipment foundations, supports, trenches, conveyor galleries, trestle and their foundations, buildings, control room, pump house etc.
- All associated electrical (including switchgear, internal & external electrification & lighting in ash mound area) & C&I works.
- Any additional system / buildings/ facilities/ equipment required as per recommendations of consultant.

ii. Civil / Architectural works including ash mound formation

- Civil works in the ash mound area like site clearance, grading, leveling, liners, initial drainage layers, drains, diversion drains, roads, boundary wall, gate, watch tower etc. as required to facilitate proper implementation of ash mound scheme.
- Works like drainage of ash mound area, slope protections/covering of ash mound, treatment and disposal of mound, lagoons, settling tank (if required) and all works to prevent environmental pollution, erosion and sedimentation control etc.

iii. Nursery & landscaping of ash mound

- Landscaping work i.e. covering mound with earth layer (local soil) and plantation of specific plant species or converting it into agricultural land etc.

iv. Ash Disposal fixed conveyor system package (beyond Transfer Point near plant boundary to 1st TP inside the ash mound) - in the scope of owner.

- 4.3.2 Preparation of tender documents with basic engineering for all the packages at sl 4.3.1 (excluding package at 4.3.1 sl iv) including technical specification/detailed system design, BOQ, tender drawings, cost estimates, suggestive qualifying requirements, assistance during technical evaluation of bids as well as resolution of issues raised by bidders for Mechanical, civil & associated works for Ash mound package consists:
- All plant & equipment/ machines like conveyors (fixed, shiftable and extendable or any other technology), boom spreaders, Stackers/ Reclaimers, dust suppression system, drainage pumps etc required for the development of ash mound including their number and capacities.
 - Mobile and earth/ ash moving equipment like Soil compactors, Bull dozers, Front loaders, Dumpers, Motor graders, Water bowsers, Hydras, Excavators, Tractors or any other technology required for construction/development of the Ash mound including their number and capacities, based on the amount of ash to be handled on daily basis.
 - Workshop along with equipment or special tools and tackles and facilities required for maintenance of the Ash mound equipment including their number and capacities.
 - Preparation of scheme and functional layout of maintenance workshop for servicing and maintenance of mobile/ earth/ash moving equipment required up to ultimate stage.
 - Drawings for layout of control rooms, cabins and foundations related to the installation of Ash transportation system works and other associated facilities of Ash mound system.
 - Submission of list of spares, tools and plants and maintenance schedule.
 - Water requirement and Dust suppression system at ash mound along with its equipment and Pump houses and its locations.
 - Development of the total scheme and layout of the Ash mound. Identifying the ash transportation corridor from plant boundary to Ash mound. Also indicate type of conveying system along with its capacity.
 - Examine the option for pipe conveyor / trough conveyor w.r.t. capacity and handling of ash.
 - Suggestion for Commercial uses for stored ash in mound and future recovery of bottom ash and fly ash separately from mound for utilization of ash and also for Light weight aggregate etc.
 - Ash mound, temporary and emergency storage system capacity & its layout.
 - A layout plan of the Ash mound facilities proposed including the Ash Handling system with respect to the 'grid system' of the Patratu Power Project including approach corridor along with roads has to be provided.
 - Assessment infra-structure, O&M and other facilities required for handling of ash in Ash mound area and preparation of detailed plan of the complete system.
 - Preparation and submission of report incorporating above details to obtain approval from NTPC / PVUNL. This should include consultant's recommendation clearly bringing out tangible/ intangible benefit to NTPC / PVUNL on the subject.

4.4 Stage-IV: Detailed engineering of Ash mound and Review Engineering of Ash Disposal system package (at sl 4.3.1(i)) after award

- Review Engineering of Mechanical, civil & associated works for Ash mound package at 4.3.1(i). This covers all Ash mound related facilities such as Shiftable and extendable conveyors, Ash conveyors, transfer points, Ash mound and its associated infrastructure equipment, roads & culverts, bridges, buildings, control rooms, workshops etc.
- Detailed engineering of Ash Mound for packages at 4.3.1(ii) & (iii). The scope will be limited to release of construction drawings during execution. Also, review of deviations or modification proposals arising out of the site conditions and subsequent detailed engineering shall also be considered in the scope.
- Review engineering of package at sl 4.3.1(iv) is in the scope of owner.
- To coordinate with Main plant EPC vendor and different vendors working in Ash mound for engineering/ technical related inputs and interface issues.
- The scope also includes furnishing operational manual covering the aspects of construction and maintenance for the ash mound, safety instructions, testing & maintenance of records on short & long term basis, emergency/ disaster management plan etc. Further, it shall also include details of closure plan of Ash mound.

4.5 Stage-V: Expert assistance during erection and commissioning of ash mound system (06 nos site visits)

- i) Construction supervision of the works shall be done by NTPC / PVUNL executives at site and role of consultant's experts at site will be advisory. Advisory role of consultant will cover advise on technical problems arising at site on all issues for which engineering is in the scope of consultant.
- ii) Consultant's visit shall be based on Owner's requirement & consent. Cost shall be paid per visit as per actual deployment. (One Visit means minimum 03 days stay at project site excluding days of travel).

4.6 Stage-VI: Expert assistance for implementation of scheme during Operation and maintenance (03 nos site visits)

- i) The scope includes providing expert assistance during actual operation & construction of ash mound and associate system after commissioning of unit-1 to 12 month beyond the commissioning of 3rd unit of Patratu STPP.
- ii) Consultant's visit shall be based on Owner's requirement & consent. Cost shall be paid per visit as per actual deployment. (One Visit means minimum 03 days stay at project site excluding days of travel).

Format for Submission of EOI Consultancy Work for detailed study and system design for development and formation of ash mound

(TO BE PRINTED ON THE LETTER HEAD OF THE INTERESTED PARTY/AGENCY AND SIGNED)

(This is only an enquiry for short listing of agencies towards enlistment for Consultancy Work for detailed study and system design for development and formation of ash mound of Patratu Super Thermal Power Project Phase – I (3X800 MW) project. Scanned copy of duly filled and signed form to be sent by email)

To
GM (Engg)
PVUNL Patratu

Dear Sir,

We are interested in Consultancy Work for detailed study and system design for development and formation of ash mound for Patratu STPP. We submit the following details of our firm and requirement.

Name of the Company and Address	
Whether the company is Govt. firm /Private /PSU/Listed Co./Indian Subsidiary/ Jvs/ Foreign Co.	
Is the company has any previous experience of detailed Feasibility Report (FR) and/or Detailed Project Report (DPR) study and design for development of ash mound?	Yes/No
Name of the plant & Year of Commissioning of the Plant, if known	
Date of commissioning and start of operation of ash mound	
Ash mound Capacity (Cu.m)	
Base diameter/Perimeter, Base area and height of ash mound	
Is the mound for only fly ash or both fly and bottom ash?	
Brief scope of works (P.O copy & date, completion certificate from employer along with specifications/ drawings to be attached as Schedule-3)	
Brief details of material handling system for conveying and discharge to mound.	
Name and Designation of the contact person	
Address	
Contact Number	
E-Mail Address	
Any other relevant information	

Place:

Date:

(Seal of the company)

(Authorised Signatory)