BHEL- ISG बी एच ई एल BHEL Bangalore	Technical Enquiry Specification – Reversible Stacker cum Reclaimer Machine package for Coal Handling System for Talcher Thermal Power Project Stage-III (2x660MW)	Document Number
	Customer : NTPC	IS-1-22-2003/ RSCR

TECHNICAL ENQUIRY SPECIFICATION OF

REVERSIBLE STACKER CUM RECLAIMER MACHINE PACKAGE

FOR

NTPC TALCHER THERMAL POWER PROJECT STAGE-III (2X660MW)

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A. PROJECT INFORMATION:

Present proposal is for setting up Talcher Thermal Power Project Stage-III (2x660MW), for NTPC Ltd. with all the facilities as specified in the NIT. General information related to the project and site is available in **ANNEXURE-1**, which has been enclosed along with this enquiry specification.

B. BROAD SCOPE OF THIS PACKAGE BIDDER:

It is not the intent to list out complete scope hereunder. However broad scope shall include but not limited to the following:

BROAD SCOPE OF SUPPLY:

SUPPLY part comprising of design (i.e. preparation and submission of drawing /documents including As Built drawings and O&M manuals), design , engineering, manufacture, fabrication, assembly, inspection & testing at vendor's & sub-vendor's works, painting, maintenance tools & tackles, mandatory spares , spares for erection, start-up and commissioning as required, fill of lubricants & consumables and till COD of the units, forwarding, proper packing, shipment and delivery at site for project and package complete with all accessories for the total scope defined as per BHEL NIT & tender technical specification, amendment & agreements till placement of order.

SN	Description	Qty.	Remarks
1.	**Complete Reversible bucket wheel Stacker cum Reclaimer Machine** with accessories (including Design, Engineering, Manufacturing, Inspection, Supply with Mechanical and electrical and C&I accessories as per the scope mentioned in technical enquiry specifications, Rails & rail fixture for machine , including belting for boom conveyor, belt weigher, end stops, storm anchors, air conditioning for operator cabins, all electricals, hydraulic drives (as applicable) , with complete accessories , all Electrical and C& I items required for Machine as per NIT specifications.	1 set	a. Rated & guaranteed capacity 1760 MTPH b. Design capacity 1936 MTPH c. Peak Reclaim Capacity: 125% of rated capacity, (For bucket size calculations)- i.e. 2200 MTPH d. Boom length- 41 m minimum e. Rail gauge – to be decided by the Bidder based on design criteria given in specification. f. Boom conveyor: Design average capacity= 125% of rated reclaiming capacity i.e. 2200 MTPH. g. Boom conveyor Belt speed: Approx. 3m/sec. h. Boom drive: Electric motor with suitable coupling.

			i. Hydraulic drive (without gearbox) for Bucket Wheel. j. Hydraulic system for luffing k. Long travel drive: Electric motor with suitable coupling & electro hydraulic Thruster brakes l. Slew Drive: Pinion driven by hydraulic drive (with or without gear box) (Or) Pinion driven by Squirrel cage induction motor with gear unit & suitable coupling m. Vibro feeder/ belt feeder at tripper discharge as per bidder's standard n. Height of each coal stockpile: **10m** o. Width of each coal stockpile at base: 50m p. Rail size: 52 kg/m minimum q. Rail Length: Bidder to decide based on plot plan furnished in Annexure-3 and to achieve overall coal stockpile storage capacity of 1,50,000 MT minimum as per NIT spec.
2.	**Machine Mounted DS system** for reversible bucket wheel Stacker cum Reclaimer Machine	1 set	
3.	**Mechanical Mandatory spares** for Stacker Reclaimer Machine Note 1.: "if any item appears in more than one place same shall be considered by the bidder irrespective of duplicity and price shall be considered accordingly. Note 2: " Bidder shall not indicate 'Not applicable' against any of the spare (except for those items for which 'if applicable' is specified). In case of not applicability, functionally equivalent spare to be	1 lot	**As per enclosed Annexure-7**

	mentioned with price in the relevant price schedules"		
4.	**Stockyard Management System** shall be provided complying completely with the requirements as per NIT specification and C&I Annexure to sub section A-20, Part-B consisting of: a) 3D Coal Stockpile Mapping and Visualization b) Hotspot Detection system and interfacing for automatic Sprinkler Operation c) Readiness for Unmanned Operation of Reversible Stacker & Reclaimer Machine d) Operating modes for Reversible Stacker & Reclaimer Machine in Stockyard Management System e) Features of Automatic operation f) CCTV g) Interfacing with Other Systems and Packages at Site h) System Hardware i) Online Healthiness Monitoring of Bearings & Gearboxes of Reversible Stacker & Reclaimer Machine	1 lot	As per Annexure-23 of technical enclosures
5.	**Electrical and C& I Mandatory spares** for Stacker Machine Note: 1.: " if any item appears in more than one place same shall be considered by the bidder irrespective of duplicity and price shall be considered accordingly. Note 2: " Bidder shall not indicate 'Not applicable' against any of the spare (except for those items for which 'if applicable' is specified). In case of not applicability, functionally equivalent spare to be	1 lot	As per enclosed **ANNEXURE-7.**

	mentioned with price in the relevant price schedules"		
6.	Freight	1 lot	

Note: As per NIT spec, entire coal stockpile will be within stockpile shed. Construction of this Stockpile shed will be in BHEL scope based on the inputs like machine clearances, stockpile cross section from successful bidder. Bidder to design the machine ensuring that stockpile shed limiting dimensions as indicated in in Annexure-24 are not exceeded.

BROAD SCOPE OF WORKS/ SERVICES:

INSTALLATION SERVICES, ERECTION & COMMISSIONING, PG TEST, O&M, AMC		
SN	**Description**	**Quantity**
1.	Installation Services of Complete REVERSIBLE BUCKET WHEEL STACKER CUM RECLAIMER MACHINE including all equipment/sub-systems as per scope defined in NIT specification comprising of receipt, unloading, handling, transportation & storage at site, lifting/shifting to closed/open storage, in-site transportation, to make approach road wherever required, Round the clock security at open storage yard , closed storage shed & erected material till completion of work, assembly, complete Erection, alignment, carrying out Pre-Commissioning, Commissioning, trial run at site and carrying out Performance Guarantee Tests, Reliability Test Run, Smart Project Management system (as defined in the enquiry specification) , Functional/Demonstration tests at site (As applicable obtaining Provisional Acceptance Certificate (PAC), Final Acceptance Certificate (FAC) and handing over of REVERSIBLE BUCKET WHEEL STACKER CUM RECLAIMER MACHINE including equipment & sub-systems ,complete with all accessories for the total scope defined as per BHEL NIT & tender technical specification, amendment & agreements till placement of order.	1 lot
2.	Construction of open storage yard and closed storage shed: a. Construction of temporary closed covered storage shed for storage & preservation of all supplied material for this package **(with minimum dimensions: base area of 120 sq. m. x height 8m)** with concrete flooring, sloped roof and rolling shutter. b. Bidder shall also consider fencing of open storage and site fabrication	1 lot

INSTALLATION SERVICES, ERECTION & COMMISSIONING, PG TEST, O&M, AMC		
SN	**Description**	**Quantity**
	area as and when allocated at site. c. Bidder to build its own site office and make arrangement for field hostel for its staff.	
3.	Touch- Up painting at site after erection.	1 lot
4.	**Safety Training:** After the design and installation are developed and supervised by qualified engineers familiar with recognized safety features and requirements, the next priority should be personnel training. Operating and maintenance personnel and their supervisors should be initially and then periodically retrained in safe operating procedures, recognizable hazards, precautions and the maintenance of a safe work place. Accordingly, Contractor to provide the list of proper tools and tackles to operate and maintain the machine in an adequately safe condition. Employees should be made aware of, and forbidden to enter, hazardous areas. The training proposal by contractor must include safety training module for site personnel.	1 lot
5.	**TRAINING MODULE for Reversible Stacker Reclaimer machine** comprising following aspect: The Successful Bidder shall conduct training of engineers of the Owner on engineering, operation and maintenance of the Machine at the Successful Bidder's or Associates or Sub Vendor's premises where adequate training facilities are available during the design and manufacturing stage of the successful bidder. - Product design - Basic design features - Theory & principle of operation - Latest technological trends in Stacker Reclaimer Machines and design -Plant Visit - Operational feedback - O&M history/problems related to Stacker Reclaimer Machines - Visit to Manufacturer's Work - Manufacturing process of Stacker Reclaimer Machines - Testing facilities - Operation & Maintenance of Stacker Reclaimer Machines - Trouble shooting and fault analysis - Familiarization of special maintenance techniques - Special tool and tackles familiarization - Stock Yard Management System	1 lot

INSTALLATION SERVICES, ERECTION & COMMISSIONING, PG TEST, O&M, AMC		
SN	**Description**	**Quantity**
6.	Operation & Maintenance of Reversible BUCKET WHEEL STACKER CUM RECLAIMER MACHINE (shifts as defined in the specification)	60 shifts
7.	**Comprehensive Annual Maintenance Contract:** The contractor shall provide comprehensive Annual Maintenance Contract (AMC) for 3 years after completion of defect liability period (warranty). This shall cover total maintenance of hardware & software related to Stockyard Management System & shall include free repair/replacement of all components/cables/equipment etc. In case, any part of the system/ equipment is to be taken out for servicing / calibration etc., then substitute equipment / device shall be available at plant up to end of AMC period so that at no stage operation of Stacker / Reclaimer machine and Stockyard management system is affected in anyway. The above shall also include provision of software updates for software & database servers including OS security updates & firmware upgrades. During AMC period, the contractor's engineers shall reach site within 48 hours of reporting of the complaint.	1 lot

Scope for this package bidder shall include **Design, Supply and Erection, testing & Commissioning and O&M** of equipment complete with drives, electrics and C&I system as per enclosed NTPC Talcher Thermal power project Stage-III (2x660MW) NIT specifications, amendments, clarifications - however commercial terms and conditions shall be as per BHEL's GCC and SCC.

Design: Includes basic engineering, detailed engineering, preparation and submission of engineering & civil assignment drawings/ calculations/ datasheets/ quality assurance documents/ field quality plans, as built drawings, commissioning procedures, operation & maintenance manuals, Performance Guarantee test procedures and obtaining approval from Customer / Customer's Consultant / BHEL.

Supply: Includes manufacturing/ fabrication, shop floor testing, stage inspections, final inspections, shop floor painting, packing & transportation to site, customs clearance/ port clearance and any other statutory clearances, receipt and unloading at site.

Erection and Commissioning: Includes preparation of open & closed storage yard, preparation/construction of temporary closed storage for storage & preservation of all supplied material for this package, systematic storage, security, site handling, shifting to erection location, erection, testing & commissioning, trial

operation, preparation of protocols and getting signed from end customer, statutory clearance from electrical inspectorate, final painting at site after erection and satisfactory completion of Performance Guarantee Tests, training of customer's O&M personnel and handing over to the end customer until satisfactory completion and written confirmation from the end customer.

Operation & maintenance: for equipment and system under the scope of this package shall be in bidder's scope as defined elsewhere in this specification.

1. Bidder's scope shall also include supply of mandatory spares, start-up & commissioning spares. Applicable spares for equipment in this package to be considered by the bidder.
2. Bidder shall also furnish the list of recommended spares for three years' normal operation along with the offer.
3. Supply of rails and rail fixing accessories for entire Reversible stacker cum Reclaimer travel region shall be in bidder's scope. **Fixing of rails, its alignment and grouting of rails shall be in the scope of BHEL civil contractor, but same shall be supervised by bidder's civil engineers and no claim or issues shall be raised by bidder later on about the alignment issues as it will be a joint responsibility.**
4. All the rails & rail fixing accessories of this package as required for bidder's machine will be in bidder's scope only. So, bidder to quote for this enquiry considering this.
5. Supply and erection of counter weight shall be in bidder's scope.
6. Supply and E&C of machine mounted dust suppression system is in the scope of bidder. Water supply for D.S. System shall be provided by the BHEL at headers running besides coal stock pile @ 5 m3/ hr. flow and 4.5 kg/cm2 exit pressure at header with tapping points at 25m span. The connecting hose piping with quick release coupling, valves etc. from this header onwards to the machine mounted storage tanks of specified capacity etc. shall be in the bidder scope. Bidder to design & provide their machine mounted DS system with above parameters.
7. Air-conditioning system for machine mounted MCC and operator's cabin shall be in bidder's scope of design, supply and E&C.
8. Belt Weigher, anemometer, rail cleaners, manual rail clamps and electrically operated rail clamps shall be in bidder's scope of supply and erection.
9. Bidder's scope shall also include supply and filling of consumables, lubricants till final handing over to the end customer.

10. Belt for yard conveyor is in BHEL's scope, Tripper pulley selection shall be based on the yard conveyor belt supplier recommendation, inputs for the same shall be provided to bidder during detailed engineering.
11. Belt for boom conveyor shall be supplied and erected by bidder only. But supply and erection of belt for yard conveyors is excluded from bidder's scope.
12. Operation & Maintenance with all resources (man & machine) for each equipment and system under the scope of this package shall be in bidder's scope. The O&M shall be done under the overall supervision & responsibility of bidder's resident manager and qualified engineers as mentioned elsewhere.

    Each O&M shift shall be defined as deployment of following labour manpower for 8 working hours:

    a. Material handling operator: 1 no.
    b. Skilled labour: 2 nos.
    c. Un-Skilled labour: 3 nos.
    d. The charges for tools & tackles, all types of consumables required during Operation & maintenance shall be deemed included in the price quoted for O&M shifts.

Deployment for O&M shifts at any particular area will be at the sole discretion of BHEL's resident manager. Provision for part or pro-rata payment for some portion of O&M shift is allowed at mutual agreement with the BHEL's resident manager. Price quoted for O&M shift shall be applicable uniformly for day as well as night shifts; no separate price will be given for night shifts. All payment will be made on certification of BHEL's resident manager. In case bidder fails to provide O&M services at site till contract completion, suitable pro-rata deductions shall be made from RAB payables, for the duration of such absence, at the prevailing rate of BHEL manpower cost as penalty at the sole discretion of BHEL's resident manager whose decision shall be final and binding.

This O&M provision is over and above the requirement of normal scope of work under installation services like erection, testing, Pre-Commissioning & commissioning activities, integrated load trial, system stabilization, Performance Guarantee Tests, Reliability Test Run and attending warranty issues.

In case the number of O & M shifts gets extended beyond the quantity indicated in the price format, it will be paid extra on the basis of unit rate agreed in the contract.

13. Touch up Painting at site after erection shall be in the scope of bidder and price of same shall be deemed to be included with the installation services.

14. Bidder shall submit complete drive schedule including motor ratings for all equipment in this package without which the bidder's offer shall not be considered for evaluation. Tentative list is given below:

STACKER CUM RECLAIMER MACHINE - DRIVE SCHEDULE		
SN	**Description**	**Motor rating in kW**
1	Boom conveyor drive (Reversible Electric motor with suitable coupling., Electro Hydraulic Thruster (if applicable))	
2	Slew drive (pinion driven by hydraulic drive (with or without gearbox) or (pinion driven by squirrel cage induction motor with gear unit & suitable coupling) Speed control of slew drive motor (in case of electric drive) shall be through Variable Voltage Variable Frequency System (VVVF) with minimum 6 (six) pulse design.	
3	Luff drive (Hydraulic Pumps & Cylinder)	
4	Bucket wheel drive (Hydraulic Without Gearbox and Brake shall be integral with hydraulic motor)	
5	Travel drive (Electric motor with suitable coupling & electro hydraulic Thruster brakes, VVVF and Bi-directional) Speed control of long travel shall be through Variable Voltage Variable Frequency System (VVVF) with minimum 6 (six) pulse design.	
6	Operator Cabin Leveling (Hydraulic Cylinder)	
7	Intermediate Conveyor Drive	
8	Belt feeder/ Vibro feeder	

15. **Maximum wheel load permissible with impact for Reversible Stacker cum Reclaimer Machine shall be 270 KN.**

16. Bidder shall submit a signed copy of BHEL's tender enquiry specification with all enclosures along with the technical offer without any deviations.

17. **Successful bidder shall take prior approval from BHEL while placing the E&C order for this package to their sub-contractor. BHEL reserves the right to disapprove/reject any such E&C contractor which BHEL deems not fit for executing E&C for this contract.**

18. Complete detail engineering drawings, calculations, selection of components etc. shall be reviewed & subject to approval of BHEL/Customer/Customer's Consultant during detail engineering.

19. Complete hydraulic system such as hydraulic motor, power pack and hydraulic cylinders shall be from approved vendors only.

20. Bidder shall get the selected pulley's diameter vetted for its adequacy from the belt supplier. Any changes suggested in pulley diameter or its type by belt supplier shall thereof be done by the bidder without any commercial implications.

21. Tentative conveyor profile drawing of reversible yard conveyor BCN-6 is enclosed in Annexure-4.

22. Bidder shall validate the mechanical and structural design of Stacker cum Reclaimer by Finite Element Analysis method to demonstrate that the stresses are within allowable limits. The same shall be vetted by reputed institutions like IITs/IISc etc./International consultant before review of NTPC/ BHEL.

23. Bidder to meet the total required stockpile capacity of 1,50,000 MT (considering 0.8 T/cum bulk density of coal) and bidder's machine should be able to handle coal from the entire length of both the stockpiles.

24. Bidder to note that completion of engineering within the L1 schedule is a major milestone, so bidder shall put all endeavor to complete the same without linking to dispatch. As dispatches shall be sequential and it may so happen that actual requirement to site as per supply period, mentioned in L1 schedule is staggered/beyond the engineering completion schedule. In such event, successful bidder shall not delay the ordering of BOI/ SMI on the pretext /issues of deferred supply period, shelf life of item, warranty issue etc. All care to be taken by the bidder in this regard during offer preparation. Similarly, during contract execution successful bidder will ensure the same while ordering BOI to their sub-vendor such that there is no hindrance in drg submission & engg. completion.

25. Bidder to strictly adhere to the SAFETY MODULE in NTPC Technical Amendment No. 2 ANNEXURE to SUB-SECTION-A-21 COAL, LIMESTONE & GYPSUM HANDLING PLANT

26. Bidder should ensure the following SAFETY ASPECTS DURING CONSTRUCTION AND ERECTION:

    In addition to the requirements given in Erection Conditions of Contract (ECC) of NTPC spec, the following shall also be taken care by bidder:

    i) Working platforms should be fenced and shall have means of access.

ii) Ladders in accordance with Employer's safety rules for construction and erection shall be used. Rungs shall not be welded on columns. All the stairs shall be provided with handrails immediately after its erection.

C. LIMITING GUARANTEE POWER:

SN.	Eqpt/ BCN	Guaranteed Power	Duty Factor	Limiting Guaranteed Power in KW with duty factor
	(A)	(B)	(C)	(B) x (C)
Total power consumption for all the equipment including auxiliaries with single stream operation at its guaranteed capacity for:				
A	i. Coal flow path IA (Direct stream), as per clause no 1.03.07.03.1 (i) and one no. stacker reclaimer, one no of yard conveyor (maximum of stacking / reclaiming modes) and four (4) nos. paddle feeders.			
1	REVERSIBLE STACKER CUM RECLAIMER (**RECLAIMING MODE**)		0.50	
2	REVERSIBLE STACKER CUM RECLAIMER (**STACKING MODE**)		0.50	

For Aux power, **maximum of stacking mode & reclaiming mode** to be limited to **121.68 KW** (with duty factor for equipment as defined above), beyond this there will be loading during bid evaluation and LD during PG test as per applicable rates separately mentioned in respective clauses of commercial terms & conditions

D. DESIGN PARAMETERS FOR REVERSIBLE STACKER CUM RECLAIMER MACHINE:

1. One (1) number Reversible Stacker cum Reclaimer machine shall be provided on the Reversible yard conveyor. The Reversible Stacker Reclaimer machine shall operate on rails for stacking/reclaiming the coal in the stock yard area. During reclaiming operation, the reclaimed coal shall be conveyed to the yard conveyor by the boom conveyor of the machine for Conveying to Boiler Bunker. Electronic Belt weigher shall be mounted on Reversible stacker Reclaimer boom conveyor complete with all mechanical, supporting arrangement, electrical, and accessories. Reversible Stacker Reclaimer shall be provided with hydraulic drive for bucket wheel to reclaim at the required rate
2. The Reversible Stacker cum Reclaimer shall conform to the latest edition of the following standards and codes. Other internationally acceptable standards/codes, which ensure equal or higher performance than those specified, shall also be accepted.
    a. ISO 5049/1: Mobile Continuous Bulk Handling Equipment.
    b. FEM: Federation Europeanne De La Manutention Section-I-Rules for Design of Hoisting Appliances
3. As per the layout the Reversible stacker cum Reclaimer machine shall be suitable to operate and shall be able to form 2 nos. stockpile of total capacity = **150000 MT minimum** and the base of stockpile shall be **50m** and height shall be **10m**.
4. The design average capacities shall be not less than 110% of rated (guaranteed) capacities as specified elsewhere for both stacking and reclaiming. Reversible Stacker Cum Reclaimer shall be capable of operating at high wind velocities Upto 65 km/hr. It shall also be able to withstand maximum wind velocity as indicated in Project Synopsis, when it is not operating. A suitable anemometer shall be provided which shall indicate the wind velocity in the control cabin.
5. Electro-hydraulic thruster operated rail clamp and manual rail clamp shall be provided for holding the Reversible stacker cum reclaimer. Suitable arrangement shall be provided for keeping the Reversible stacker reclaimer in fixed stable position when the weather is stormy. The wheel load of Reversible stacker-reclaimer shall not exceed 27.0 tonnes. The ratio of boom length (as specified) to the rail track gauge shall not exceed 5. Top of rail level shall be maintained at 0.7 m above the ground level, i.e., coal pile base level unless specified otherwise. Suitable number of rail scrappers shall be provided. The machine shall be mounted on traverse carriage provided with driven and non-drive wheels of cast or forged steel and double flange design. The track wheels shall be combined in pairs in the track wheel bogies. The wheels shall rotate on self-aligning roller bearings.

6. The lower works of the under-carriage of the machine shall be designed to transmit load on the wheel sets of the travel carriage in such a manner that the equipment is stable during normal operating condition as well as during hazardous weather condition with maximum permissible variation in centre distance of rails and rail top levels. The rail mounting for under-carriage shall be four legged system with hydraulic/mechanical equalizing arrangement to make it three-point suspension system for the best stability during operation. The traverse carriage and the undercarriage shall be interconnected in a manner which will permit uniform distribution of overloads even if the rails are not level. The roller bearing slewing ring shall be sealed against penetration of water and dust. Angular movement points (hinge points) namely between equalizing beam and base frame, Luff pivots and hydraulic cylinder hinge points shall be provided with maintenance free bearings requiring no periodic lubrication during entire life span of bearings. Minimum life span of self-lubricating type bearings shall be 25 years with average 10 hrs. daily operation.
7. The luffing motion shall be through hydraulic pumps and cylinders. In case of more than one cylinder being used for boom luffing operation, necessary provisions shall be provided such that the differential oil pressure between two cylinders are always maintained within permissible limits, during luffing operation and as well as when the boom is fixed at any position. In case of any undue increase in differential pressure, the hydraulic circuit shall trip and suitable alarm indication shall be provided before tripping. The hydraulic system of luffing shall be such that in case of failure of hydraulic system due to leakage or any other reason the boom could be held in position.
8. Bucket size shall be selected for peak reclaim capacity based on maximum 80% degree of fill with respect to water fill capacity of the bucket. Further, not more than 50% of annular ring volume shall be considered as effective volume. Rate of bucket discharges shall not exceed 55 per minute. The teeth of the bucket shall be hard faced. The bucket wheel drive shall be complete with Hydraulic drive (without gear box). Bucket wheel drive system, structural members, mast, hydraulic system etc. shall be designed considering completely wet coal with max. surface moisture. Adequate safety devices shall be provided to prevent overloading of the bucket wheel drive, particularly when wheel will get stuck-up in the stockpile. In such an event the power supply of the drive shall get automatically cut-off. Suitable brake shall be provided to avoid backward movement of the bucket wheel after the power supply is cut-off and during maintenance work.
9. The slew speed shall be variable. Manual locking of boom shall be provided. The tripper shall be complete with supporting structure, walkways, platforms, railing, belt scrapper, head pulleys, bend pulleys, hold-

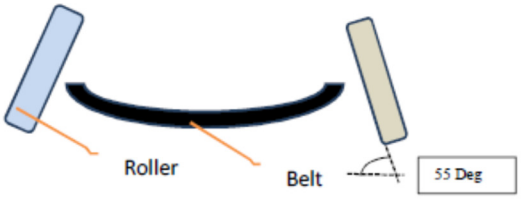
down pulley, chute and support with adequate number of wheels in bogie construction travelling on the same rails as those of the Reversible stacker-cum-reclaimer.

10. Group-wise lubrication system shall be provided combining different zones of lubrication points under different groups depending upon location and number of lubrication points. Each group lubrication unit shall be independently functional through separate pump (motorized), grease container, valves, metering devices, pipes and other accessories etc. Preferably, the grease entry into various lubrication points shall be vertically downwards. The grease container shall have adequate capacity for supply of lubricants to all points and grease quantity for the points to be greased shall be adjustable. Further, all the lubrication points shall be easily accessible.
11. The Reversible stacker-reclaimer shall receive power through trailing cables. Separate motorized cable reeling drums / **Flexible cable carrier (Energy Chain System)** for power and control cable shall be provided with arrangements for winding and rewinding of the cables. The trailing cables/**Flexible cable carrier (Energy Chain System)** with shall run in a cable tray. Further, the trailing cable arrangement/ **flexible cable carrier (Energy Chain System)** shall be such that the cables run in-between the track rails. Cushion shall be provided in the cable reeling drums for about 15 m extra cabling length. Limit switches shall be provided to prevent traverse movement, slew and hoisting etc. beyond the respective safe extremities. Interlocking shall also be provided for Reversible S/R rail clamps and travel motors. Yard conveyor can be stopped from control panel of Reversible stacker – reclaimer. Provision also be given to trip the Reversible stacker-reclaimer from CHP control room. Travel drive equipment and slew drive equipment shall be suitable for 150 starts/hr. with continuous reversals. Speed control of long travel and slew drive motor (in case of electric drive) shall be through Variable Voltage Variable Frequency System (VVVF) with minimum 6 (six) pulse design. Necessary input & output devices to be provided to reduce harmonics, as per IEE 519. All necessary protections e.g. Input Phase Loss, Earth Fault, Over Voltage, Output Short Circuit, Load Loss, Input Transient Protection, Overload etc. to be provided. VVVF system shall be capable of generating suitable starting torque with/without encoder. Squirrel cage Induction motor with VPI insulation shall be provided with VVVF system.
12. Hydraulic control shall be provided for Hoisting/luffing, Operator cabin level adjustment and Equalizing arrangement for travel carriage (in case of hydraulic equalizing).
13. Should the Reversible stacker reclaimer under go any structural distress/ failure during operation or in the anchored condition during the plant life of 30 years, apart from meeting the other contractual

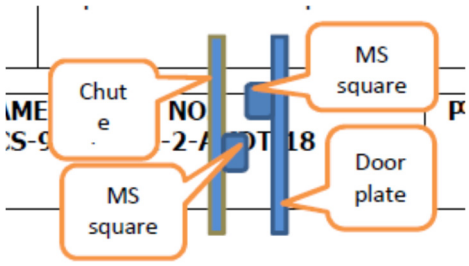
requirements specified elsewhere, the supplier shall have to furnish, to NTPC, the complete structural design document / calculations, pertaining to the equipment.

14. Continuous R.C.C Reversible Stacker/Reclaimer rail foundation to be provided throughout the length of travel zone and suitable RCC platform to be provided at one end of travel of the Reversible stacker cum reclaimer to rest the head end of the boom while either under maintenance or out of operation. Walkways with hand railings shall be provided on both sides of boom conveyor. The upper structure shall consist of rigid box type steel plate construction on which the super-structure supporting mast, boom with bucket wheel and counterweight boom with ballast are erected. The upper works shall be mounted on under-carriage by means of large diameter ring bearing of double roll roller type/ Ball roller combination type.
15. The Reversible stacker-reclaimer shall be provided with one enclosed dust proof & air conditioned operator's cabin and so located as to enable the operator to get clear vision of both sides of the track and the cutting of coal by buckets. The cabin shall be suitable for operation in monsoon and tropical conditions and the inside ambient temperature shall be maintained at 27 Deg C. The cabin shall be provided with toughened glasses with wipers and the arrangement shall be such that glasses can be cleaned from outside without any scaffolding, Cabin door shall be provided with hydraulic door closers. The cabin shall be kept in horizontal position through hydraulic cylinders irrespective of the angle of inclination of the boom conveyor. All controls for operation of all parts of the Reversible stacker-reclaim unit shall be provided in the cabin within easy reach of the operator. Lights and fan for operator's cabin and adequate number of flood lights for all necessary illumination for working at night shall also be provided. Coal cutting by bucket wheel shall be clearly visible from operator’s cabin. Electrical/MCC room shall be fabricated of sheet steel with suitable floor matting. The room shall be dust tight and air conditioned. Fire proof insulation shall be provided under the roof of MCC room. Further, the door shall be provided with hydraulic door closer. Dry type transformers, PCRD, CCRD or Flexible cable carrier (Energy Chain System) and all drives shall be suitably protected from accumulation of coal dust falling from the tripper section of machine by providing canopy.
16. Reversible Stacker-Reclaimer machine shall be designed to operate in equal load sharing mode between slew gear boxes provided (if applicable) in order to avoid unequal load sharing mode. Suitable electrical interlock to be provided for the drive units of slew gear boxes, such that in case of any unequal load sharing, the drive units shall trip immediately.

17. Belt scale shall be provided on Reversible Stacker cum Reclaimer Boom Conveyor. Belt scale shall have accuracy (in the horizontal position of Boom) of (+/-) 1 percent for the range of 20% to 120% of boom conveyor rated capacity. For the belt weigher, the contractor shall furnish one (1) necessary test load chain sets required for calibration and periodic testing of the equipment. The test load chain shall be 'two idler spaces' longer than the weighing length of the weigher and shall be complete with chain reset equipment with weight adding reels of adequate size. The calibrated weight parameter length of the test chain shall be stamped at a suitable location on the body of the equipment. Alternatively, supply of test weights for calibration of belt scale is also acceptable.
18. Air conditioning system shall be furnished for MCC room on Reversible S/R, operator's cabin in Reversible Stacker Reclaimer.
19. Inter locking of yard conveyor with Reversible stacker-cum-reclaimer boom conveyor shall be provided.
20. Guide rollers to be provided at the discharge point of coal from the skirt board in Reversible Stacker Reclaimer, in belt feeder (if applicable) as per the sketch shown below.



21. Fire resistant fibre grating/ steel grating for walk ways on Reversible stacker reclaimer and trippers to be provided to reduce weight.
22. Water tank along with pumps and pipeline to be provided on stacker/reclaimer for plain water dust suppression system for boom conveyor, intermediate conveyor, belt feeder (if applicable), tripper discharge, yard conveyor receipt.
23. In the inspection doors & chute plate jointing area joints area to be provided with MS round or strip to give a labyrinth effect. Inspection doors to be provided with hinge.



E. OTHER IMPORTANT POINTS:

Points mentioned below also form part of technical specification and bidder to also consider these things in their scope apart from referred bid documents and broad scope mentioned above.

1. The machine shall have BHEL's logo along with the OEM's logo and it should be clearly visible from at least 200-meter distance from the equipment.
2. Bidder to quote for reversible stacker cum reclaimer considering layout drawings enclosed in **ANNEXURE-3** i.e. Plot Plan, drg. no. PE-DG-497-100-M001-R0 and Flow Diagram, drg. No: IS-1-FD-765-100-M001.
3. For all other items like idler, pulley, belt, brakes, gearbox, couplings etc. relevant clauses of enclosed NTPC NIT specification CS-4540-001A-2 shall be referred. For seismic design parameters, bidder to refer NTPC NIT specification and shall suitably design his Reversible stacker cum reclaimer meeting these seismic criteria (refer pages in Annexure-22).
4. The design, manufacturing, inspection and testing of the equipment shall comply with all the currently applicable statutes, regulations and safety codes in the locality where the equipment is to be installed and shall also conform to the latest edition of Indian and other international standards and codes. Nothing in this specification shall be construed to relieve the contractor of the required statutory responsibility. In case of any conflict & ambiguity in the standard to be followed the decision of BHEL shall be final and binding.
5. **Bidder's shall raise all ambiguities, conflict in the standard & specification and/or interpretation of clauses, if any, in this enquiry spec. and its enclosures during pre-bid stage itself, failing which it shall be understood that bidder has no issue and at later date successful bidder shall have no right to take any technical and commercial advantage out of any ambiguity, conflict in the standard & specification and/or interpretation of clauses and the decision of BHEL shall be final and binding and any change due to this shall have no price implication on BHEL and shall have to be absorbed by successful bidder.**
6. Bidder shall visit the site to familiarize with the site constraints before submitting the complete offer to BHEL in all respects. No issues arising out of site condition or layout constraints shall be entertained later on during detail engineering and any modification required due to site condition or layout constraints shall be done by successful bidder without any cost implication to BHEL.
7. Bidders to note that even though this tender is for yard machine only, bidders shall read and comply to all relevant NIT specifications, Technical Specifications, Clarifications/Addendums/Amendments pertaining to subject package including associated equipments and items such as belt conveyor, drive chain equipments, gearboxes etc. for better clarity of scope of work.

8. Bidder shall submit the credentials for PQR clearance as per **ANNEXURE-13** Sub-vendor questionnaire & contractor's proposal cum evaluation report for BHEL & NTPC approval.
9. Bidder shall strictly follow and adhere to the guidelines laid down in the enclosed BHEL's health, safety and environment manual (HSE) and BHEL's PPE manual per **ANNEXURE-21**. Supply of safety gears/PPE for bidder's/bidder's sub vendor personnel deputed at site for E&C, PG tests etc. shall be in bidder's scope.
10. Cost towards the participation in discussions/ meetings, providing technical assistance during technical discussions/ meeting with customer for approval of drawing / documents, engineering review & Project review at BHEL-ISG/Customer place/Site etc. TA/DA, boarding and lodging to attend these meetings shall be borne by the bidder and shall be inclusive in price quoted by bidder.
11. Material of construction (MOC) for various equipment's / items shall be as per enquiry specifications or any superior material with better properties. However, for other MOC's not specified in the enquiry specifications then it shall be subject to BHEL / Customer / Customer consultant's approval and must be taken care by the bidder during detail engineering without any cost implication to BHEL.
12. Bidder shall strictly adhere to BHEL/Customer/Customer consultant's approved vendor list. In case bidder proposes a new vendor for an item, acceptance shall be subject to approval by Customer/Customer consultant/BHEL. In case of items not covered in the list, bidder shall obtain prior approval from Customer/Customer consultant/BHEL-ISG before placing order.
13. It shall be the complete responsibility of the successful bidder(s) to obtain "Sub Vendor Approval" for all equipment & components being supplied for the subject package. Any delay in sub vendor's approval should not affect the project schedule. If any of the sub vendors does not have the approval of Customer/ BHEL including bidder's own make, the same may be replaced with another customer approved sub vendor only, without any price implications to BHEL.
14. Quality assurance and inspection of equipment shall be as per NIT specification. However, modalities of inspection (Stage, Final, In-process) shall be finalized during detail engineering after submission of quality assurance plan. It shall be reviewed by the customer/ customer's consultant and bidder shall follow the procedures of inspection as per the approved QAP & FQP. Bidder has to submit following documents along with inspection call and if any other documents required as per approved QAP & FQP: -
    - Raw material inspection certificate.
    - Internal Test reports (Type test certificate shall be produced for exactly the same rating/specifications)
    - Statutory certificates as required.

- All Inspection & Testing shall be carried out based on the following documents: -
  a. Relevant Standards
  b. Specifications
  c. Approved Drawings
  d. Approved Data sheets
  e. Approved BOM
  f. Calibration Certificate of all the measuring instruments

NOTE: Bidder should also coordinate in getting the MDCC's (Material Dispatch clearance certificate) and all types of IC's (Inspection Certificates) from the Customer/Customer's Consultant along with BHEL.

15. Bidder's scope shall also include supply and filling of consumables, lubricants till final handing over to the end customer.
16. Supply of grouting cement and grouting of all mechanical equipment / items and its drive base shall be in the bidder's scope. BHEL / BHEL's civil contractors shall provide only the foundation pockets for pedestals (wherever necessary) as per GA drgs of the bidder. Any small modification (braking/chipping) required in the foundation pocket (various up to +/-10% of size) during execution is to be taken care by bidder without additional cost to BHEL-ISG.
17. Supply of stools, foundation bolts and other embedment in concrete shall be in scope of bidder. Erection of the same will be done by BHEL's civil contractor. However, correctness of erection shall be checked by bidder.
18. Supply of base frame and fixing/foundation bolts (as applicable) for all equipment /items shall be in bidder's scope.
19. Supply of foundation bolts & structures for storm anchor shall be in bidder's scope.
20. Buffer stoppers on the machine and rails shall be supplied and erected by bidder along with the buffer fixing/ mounting structures. The machine shall be fitted with energy absorbing impact buffers and have an anti-collision system installed.
21. Necessary sensors, interlocks, etc. shall be provided by the bidder to avoid collision of the machine in entire travel zone.
22. Rust preventive paint after inspection at shop floor before dispatch shall be in bidder's scope.
23. Input and output couplings with coupling guards shall be in bidder's scope.
24. Storage of items at site shall be done over concrete sleepers.

25. Supply of special tools and tackles as applicable for the equipment / system shall be in the scope of bidder.
26. Bidder shall make their own arrangements well in advance for erection of equipment like crane, hydra, tools, tackles, welding machines, cutting sets, lifting tools, winches, etc. that are required for E&C purposes.
27. Minor chipping i.e. up to 50mm thk, micro leveling, and providing shim plates for erection of equipment / items shall be in the scope of bidder.
28. Cleaning of any debris produced by the bidder during E&C shall be done immediately at each front.
29. Provision of any temporary supports/platforms required for E&C of mech. equipment / items shall be in the scope of bidder.
30. Drive alignment for all equipment/systems shall be in the bidder's scope.
31. All working parts requiring lubrication shall be of sealed construction so that dust, dirt and other foreign matter do not come in contact with wearing surface.
32. All bearings shall be properly lubricated. Grease nipples and reservoirs shall be furnished wherever necessary.
33. All the equipment shall be of robust construction, suitable for operation in dusty, humid and outdoor operation. Dust seal shall be provided for all equipment.
34. Integration with entire CHP shall be in scope of bidder. Necessary provisions shall be considered in the equipment/ items/ systems which are in bidder's scope for integrating with equipment/ systems/ items which are part of BHEL's other contractors' scope. Bidder's scope shall also include system integration & control requirements and control philosophy w.r.t. other auxiliary systems like dust suppression, dust extraction, ventilation and water systems, done by BHEL's other contractors.
35. Bidder shall co-ordinate with BHEL's other vendor during E&C of yard conveyor.
36. Bidder shall furnish the L-2 project schedule indicating various milestones and constraints along with the bid. Successful bidder shall furnish the L-3 project schedule in-line with L-2 schedule after award of the contract.
37. Bidder shall submit the weekly engineering progress reports in BHEL's format and depute full project team for attending all project review meetings called by BHEL/ Customer/Customer's Consultant without fail.
38. Bidder to note that CHP fronts during erection will be given progressively in a staggered manner. So, bidder has to consider and envisage mobilization of all resources required, including manpower, in a shortest possible time during execution time. For this bidder has to consider advance resource planning so that erection by the successful bidder is not delayed.

39. Bidder to ensure sufficient manpower throughout the contract for carrying out engineering and erection & commissioning activities in parallel at site.
40. Bidder to ensure the availability of qualified safety officer thought the contract period and daily/weekly/monthly report shall be submitted to BHEL's safety officer/Resident Manager.
41. Bidder to extend all help and documentary support for compliance and addressing any statutory issues raised at site which pertains to the area / work under bidder's scope.
42. Bidder to note and follow the scope matrix between mech. vendor and civil & structural vendor as attached in Annexure–11.
43. Painting scheme shall be submitted by bidder in line with specification as enclosed in ANNEXURE-19 and same shall be subject to NTPC approval.
44. Bidder to note that time is the essence of this contract, thus they shall furnish the submission schedule for drgs. along with the offer.
45. Bidder shall carefully read all the NIT documents and specifically the following Chapters from NTPC document and its corresponding clarifications and amendments:
    1. TECHNICAL SPECIFICATION SECTION - VI, PART - B BID DOC. NO. CS-4540-001A-2, SUB-SECTION – A-20, **COAL, LIMESTONE, GYPSUM HANDLING PLANT (CHP, LHP & GHP)** all 101 pages
    2. TECHNICAL SPECIFICATION SECTION–VI, PART-A, BID DOC.NO. CS-4540-001A-2, SUB-SECTION II-A-15 **COAL HANDLING PLANT** all 7 pages
    3. TECHNICAL SPECIFICATIONS SECTION-VI, PART-A BID Doc. No. CS-4540-001A-2 SUB-SECTION-IV, **FUNCTIONAL GUARANTEES** ALL 73 PAGES
    4. TECHNICAL SPECIFICATION SECTION-VI, PART-B, BID DOC. NO.: CS-4540-001A-2, SUB SECTION-A-01, **EQUIPMENT SIZING CRITERIA**
    5. TECHNICAL SPECIFICATIONS SECTION VI, PART-C BID DOC. NO.: CS-4540-001A-2, **GENERAL TECHNICAL REQUIREMENTS** ALL 114 PAGES

46. Important Points w.r.t Document/Drawing Submission to Customer/Consultant (through BHEL): -

a. During detail engineering, bidder(s) to strictly adhere to BHEL/Customer/Customer's Consultant drg. formats, document numbering, quality plan & FQP formats.

b. Complete detail engineering drawings, calculations, selection of components etc. shall be reviewed & subject to approval of BHEL/Customer/Customer's Consultant during detail engineering.

c. **Bidder shall furnish necessary inputs & drawings (GA drawing of the equipment, civil assignment drawings for stockpile layout, necessary civil inputs etc.) in editable AutoCAD format.**

d. Preparation of GA drawing and civil assignment drgs for stockpile layout, necessary civil input drgs shall be in the scope of bidder and the drgs shall be submitted in soft editable format.

e. Successful bidder shall prepare and submit editable 2D AutoCAD as well as **editable 3D model (in SmartPlant 3D version only)** of Reversible stacker cum reclaimer machine along with the storm anchor details, rails foundation and boom resting arrangement details associated with the scope of work of this package. The bidder shall also submit all the configuration files, customization files, templates and all referenced databases. **Bidder to refer TECHNICAL SPECIFICATIONS SECTION VI, PART-C BID DOC. NO.: CS-4540-001A-2 GENERAL TECHNICAL REQUIREMENTS Cl. 8.03.04 DRAWINGS and adhere to the clauses therein for 3D/2D drawings and documents.** The 3D models shall include visual interference check, walk-through animation, video simulation for major equipment placement and removal, visual effect, photo realism etc. After the completion of engineering of the corresponding complete 3D model shall be handed over to the NTPC & BHEL for its reference. Successful bidder shall ensure that the 3D model preparation is started within 1 month of LOI and are available to make a presentation of the same every 3 months to BHEL & NTPC for review the progress of engineering or as & when required by BHEL & NTPC. If bidder fails to provide 3D Model drgs on time, then BHEL reserves the right to place the order for 3D modeling at successful bidder's risk and cost. Also, the editable SmartPlant 3D model of bidder shall be integrated with BHEL's intelligent 3D software and bidder shall depute their engineers in assisting such integration in BHEL PEM Noida premises as and when required.

   The price of editable 2D AutoCAD drawings and editable SmartPlant 3D models shall be deemed to have been included in the total bid price.

f. Bidder shall vet and give their comments (if any)/ confirmations for the correctness of the civil drgs, which will be prepared by BHEL based on bidders' civil assignment drgs for Reversible Stacker cum Reclaimer machine and its GA drgs. Later if any mismatch is observed during erection, then the same shall have to be taken care by the bidder at site by engaging his own resources without any cost implication to BHEL.

g. List of Drawings to be submitted for each item/system shall be intimated to the successful bidder during detailed engineering and drawings shall be submitted in line with the list. Engineering

drawings/documents must essentially contain the drawings as listed in **ANNEXURE-15** (given as part of enclosures) including the following but not limited to these and any drawing/document required by BHEL/Customer shall be furnished by bidder during detail engineering:

a. General Arrangement drgs, etc.
b. Wheel Load Diagram
c. Stability Calculation considering seismic and wind loads.
d. Civil assignment drgs with Load data
e. Various Schedules
f. Design & Capacity Calculations
g. Data Sheets
h. Operation Philosophy
i. Review and vetting of Fabrication drgs & other structures (if applicable)
j. O&M Manuals, E&C Manuals (to be available prior to start of E&C work)
k. Commissioning, PG Test Procedures & Test Program
l. QAPs
m. FQPs (Procedure Qualification Record &Welding Procedure Specification)
n. Inspection Categorization Plan (Mechanical and Electrical)
o. Painting Schedule

h. Bidder to ensure submission of hard copies as per end customer's requirement for all engineering drg/doc and for all subsequent revisions along with a soft copy sent through email addressed to Project manager and concerned project team. Bidder to also ensure submission of additional 4 sets of hard copies over & above end customer's requirement to BHEL's site office. However, all the engineering related information shall be furnished in soft form to BHEL.

i. During detail engineering, successful bidder(s) shall ensure flow of drgs/docs as mentioned below:
   i. All drawings/documents and its subsequent revisions shall be submitted to BHEL for initial review and comments.
   ii. All BHEL comments shall be sent back to vendor for incorporation/correction within 7 days of receipt of drgs from vendor.
   iii. Vendor to incorporate these comments without changing the BHEL revision number in the drgs/docs and re-submit within maximum 5 days along with the compliance sheet.

iv. Upon receipt of corrected drgs/docs from vendor, if the same are found OK, then it shall be submitted to Customer/Customer's Consultant for their review/approval. But in case the drgs/docs are not found OK, then the same shall be again sent back to vendor for incorporation of comments/corrections and step 1 to 3 shall repeat till drgs/docs are found in order. Only when the drgs/docs are found in order by BHEL, onward submission to Customer/Customer's Consultant shall be done by BHEL.

v. Bidder shall refer workflow in **BHEL's wrench web portal** about the drgs/ docs submission status to end customer/ customer's Consultant.

vi. Thereafter it shall be bidder's responsibility for obtaining time bound approval on all the engineering drawings and documents from Customer/Customer's Consultant and resolving the technical queries raised by BHEL/Customer. BHEL's role shall be limited to that of an enabler for arranging such technical discussion, meetings, video conferencing with Customer/Customer's Consultant.

vii. In the event Customer/Customer's Consultant doesn't approve the drgs then the commented drgs/docs as received from Customer/Customer's Consultant shall be sent to the vendor for revision.

viii. Revised drgs/docs with compliance in next revision shall be submitted maximum within 5 days along with the compliance sheet as per the attached format.

ix. The process as mentioned in point no. 1 to 8 above shall follow till approval is received Customer/Customer's Consultant.

47. Construction Power and Construction Water Facilities shall be provided at one location. Bidder to make his own arrangements to take it to his working location.
48. During trial operation of plant, all equipment should run for a minimum period as per NIT specifications during which the equipment including stand-by shall run at its rated capacity. All PG test parameters of end customer shall be complied by bidder without any price implication to BHEL.
49. Painting scheme shall be submitted by bidder and the same shall be subject to approval of Customer/Customer's Consultant. Final approved painting scheme shall be followed by bidder without any price implication to BHEL.

50. Any comments/ clarifications on technical/ inspection requirements furnished as part of bidder's covering letter shall not be considered by BHEL, and bidder's offer shall be construed to be in conformance with the specification. Any specific deviation (any such which is contradicting with the specification), exclusion shall be mentioned in the deviation/cost withdrawal format only. Deviation mentioned elsewhere shall stand null and void and no deviation from the enclosed tender documents shall be acceptable unless and until written approval from BHEL/ Customer/Customer's Consultant has been accorded.

51. Bidder to note that list above is not exhaustive and any work / items required for completing the system and ensuring its satisfactory running shall also be in the scope of this package bidder.
52. Bidder to note that time is the essence of this contract, thus bidder to adhere to the document submission schedule as per enclosed ANNEXURE-15 and overall project execution time schedule.
53. Bidder to refer to ANNEXURE-20 for pro-rata progressive payment for drg submission and approval.
54. Bidder shall submit the signed and stamped copy of all the pages which constitutes this technical enquiry specification signed by authorized signatory and clearly mentioning each clause under following two categories to avoid any ambiguity in scope understanding & the scope division along with technical offer.
    a. "Accepted without deviation and considered in scope of work"
    b. "Not considered in scope of work"

F. ELECTRICAL SCOPE: -

Scope of Electrical and C&I for this package shall be as per ANNEXURE-2 of technical enclosures

G. GUIDELINES FOR BIDDERS W.R.T. STORAGE, ERECTION & COMMISSIONING, SERVICES ETC: -

1. Bidder shall submit the credentials (CV) of the staff for evaluation of competency level at least 10 days before deployment to site. BHEL's resident manager reserves the right of accept or reject such executive/staff, if found not competent for the job (before or after deployment) and in such scenario bidder shall submit credential of another competent executive/staff as per the satisfaction of BHEL's resident manager without any delay or hampering the execution job.
2. Bidder shall depute continuously and maintain following minimum nos. of qualified engineers and supervisors at site for E&C, coordination and commercial activity for the bidder's supplied equipments.
    a. Resident Manager – 1 member

b. Mechanical Engineer (min 2 years' site experience) or mechanical supervisor (min 5 years' site experience) – 3 members

c. Civil & structural Engineer (min 5 years' site experience) - 1 member

- The role of the engineer shall be to cross-check and supervise the correctness, compatibility and suitability of civil & structural works w.r.t E&C of bidder's mechanical systems/ equipment. A joint protocol shall be prepared and signed by the bidder and BHEL's civil personnel for record after casting. Later on, no claims from bidders shall be entertained regarding misalignment of pedestal castings, footings, cutouts, pockets etc. if not prepared as per bidder's drawings/requirements.

d. Electrical Engineer (min 2 years' site experience) or Electrical Supervisor (min 5 years' site experience) - 1 member

e. Quality cum safety engineer (Minimum 2 years' site experience) – 1 member

f. Storekeeper - 1 member

g. For commercial activity - 1 member

h. Security – 2 person/shift as mentioned in the scope

In case bidder fails to maintain the above minimum manpower at site till contract completion, suitable pro-rata deductions shall be made from RAB payables, for the duration of such absences, at the prevailing rate of BHEL manpower cost as penalty at the sole discretion of BHEL whose decision shall be final and binding.

3. Bidder's staff shall necessarily comply and ensure following at site: -

a) Correctness checking during civil construction as per mechanical drawings.

b) Frequent condition checks of stored material and its transportation to erection front.

c) Stage wise erection of all Mechanical, Electrical and C&I equipments & accessories.

d) Arranging technical specialist for supervision of specialized jobs from respective OEMs.

e) Measurement Protocols

f) Preparation of Protocols

g) Any Protocols as per FQP

h) Any other activity required for successful E&C at site

4. **Bidder shall arrange technical specialist for commissioning of its special bought out items (such as hydraulic system - hydraulic motors, hydraulic circuit etc., VVVF drives and PLC etc.) from the respective OEM**. In case bidder fails to maintain or arrange supervision & commissioning specialist within the stipulated time, BHEL shall arrange for the same at bidder's risk & cost and/or suitable pro-rata deductions shall be made from RAB payables, at the prevailing rate of BHEL manpower cost, at the sole discretion of BHEL's Resident Manager, whose decision shall be final and binding.

   Commissioning Services for Specialized Job: -

   i. PLC
   ii. VVVF Drives
   iii. Hydraulic motor, Hydraulic cylinder, Power Pack, Hydraulic system and its piping

5. Bidder shall necessarily comply and ensure following w.r.t **Storage & Preservation** for main supply material & mandatory spares at site: -

   a) Prepare and submit the "Dispatch & Receipt Reconciliation Report".
   b) Make periodic condition checks for the safety of boxes/items during storage of main material, mandatory spares etc.
   c) Maintain requisite inventory records.
   d) Bidder has to keep the material properly as per storage WI. In case bidder fails to adhere the WI and any consequential damage/missing items due to non-adherence of storage WI, no insurance claim can be entertained by BHEL and items shall be replaced by vendor without cost implication to BHEL.
   e) Monthly inspection report to be submitted by successful bidder to BHEL site-in charge / Resident Manager for storage and preservation of materials kept under closed / open stores as part of RAB. In case bidder fails to report the status in anyone of the month, further any damages reported in the subsequent month will not be entertained by BHEL and entire item has to be supplied by bidder at their own cost. No insurance claim shall be entertained.
   f) Bidder has to report the damage/theft/fire, etc to Resident Manager, BHEL-ISG immediately along with detailed incident report, Joint inspection report by bidder/BHEL, photograph, copy of invoice with received seal, etc to report to insurance agency within a week time of incident followed by FIR. If, bidder fails to produce the document in the stipulated time as mentioned above, BHEL will not entertain for any insurance claim and entire items are to be supplied by bidder without additional cost to BHEL.

6. Bidder shall necessarily comply and ensure following w.r.t **Testing, Trial Run & Commissioning activities: -**

a) Initiate start-up and commission the complete unit (all mechanical, electrical & C&I equipments and machine as a whole) in an integrated manner under his sole responsibility.
b) Perform the required adaptation, adjustment and hot run the equipment to demonstrate its guaranteed capacity.
c) Rectify the defects observed during commissioning under his sole responsibility.
d) Results of start-up tests and commissioning etc. will be recorded jointly by the bidder and Customer/ Consultant.

9. Bidder shall necessarily comply and ensure following w.r.t **Post-Commissioning & PG testing of the machine and preparation and submission of signed test protocols: -**

a) Submit all final documents in compliance with the provisions of this specification.
b) Submit test procedures, and test evaluation methods prior to taking up Performance Tests etc.
c) Offer the machine for conducting Performance Guarantee Tests etc.
d) Carry out the PG tests etc. under their instruction and take full responsibility of the operation.
e) Supply all consumables, change parts, special tools and tackles and commissioning spares in coordination with bidder's headquarter.
f) Undertake O&M Services (as described and required for the subject package).

Note:

1) Bidder should have met, to the satisfaction of Customer/ Consultant, all the observation, if any, contained in the Preliminary Acceptance Certificate.
2) The performance tests for all plant equipment will be carried out to satisfy all operating parameters as per the relevant clauses of the contract technical specification for the equipment under consideration.

10. It shall be the sole responsibility of bidder's staff to do measurement and other protocols, prepare, maintain (record keeping) and follow all stage wise erection & commissioning protocols in line with FQP and customer requirement. Also, getting the protocols signed by all concerned agencies - BHEL's Engineer and Customer/Consultant shall be the responsibility of bidder's staff. Special care shall be taken for all payment linked protocols so that it is ensured that such protocols are signed well within time and no payment to BHEL is held up by end customer on account of these protocols.

11. Bidder shall furnish his civil assignment drawings with all the required details:

- BHEL/ BHEL's civil contractors shall provide only the foundation pockets for pedestals at locations indicated in the bidder's GA drgs. If any extra pedestal is not indicated in the drawing, but is required at site, then the same shall have to be taken care by the bidder at site by engaging his own resources without any cost implication to BHEL.
- BHEL/BHEL's civil contractors shall provide insert plates/pockets at locations indicated in bidder's drawings only. If any extra insert plate is not indicated in the drawing, but is required at site, then the same shall have to be taken care by the bidder at site by engaging his own resources without any cost implication to BHEL.

12. If any modification in sub-assemblies is required due to mismatch among bidder's GA drgs, detail drgs & actual supplied material, either bidder shall send it back to his works and get it corrected. Or if rework is to be done at site then all logistics support (as required) shall be arranged by the bidder and all re-work charges (labour, machines etc.) shall be borne by the bidder. If any item/part needs to be taken to OEM's factory for repair/rectification, then the cost towards transportation, rework etc. and the complete responsibility shall be in bidder's scope.
13. Bidder to ensure that there shall be no loss of erection time due to any of the following reasons: -
    a) Faulty/ Defective supply of parts/equipments
    b) Improper packing and transportation
    c) Any short supply/ delay in supply
    d) Any mismatch/ wrong supply
    e) Non-availability of replacement item
    f) Any site modification, if it is due to mismatch between bidder's GA, detail drgs. etc.
14. No material should touch ground in open yard. Storage of items shall be done over wooden/concrete sleepers.
15. Bidder shall take care of following points:
    a. In general, BHEL's working hours/Holidays/weekly off at site shall be followed by bidders and it shall be informed time to time by BHEL's Resident Manager. Accordingly, bidder to align their site staff's working hours/Holidays/weekly off at site so that there is no loss of work and delay in project milestones& targets.

b. BHEL's Resident Manager (at his sole discretion) may require bidder's services on weekly off/ holidays due to project exigencies; bidder to extend necessary support required during such events.

c. While leaving the site, bidder's staff shall inform &take written permission from BHEL's resident manager as well.

d. Suitable replacement shall be ensured during any personal emergency to the bidder's executive deputed at site at any given point of time and all such changes shall be brought to the notice of BHEL's Resident Manager.

Note: The job descriptions covered above are not exhaustive and bidder shall consider any other activity required for the successful installation of the total machine as a whole.

H. WORK INSTRUCTIONS FOR STORAGE & HANDING OVER OF MANDATORY SPARES: -

Following work instructions for storage & handing over of mandatory spares shall be complied and ensured by the bidder:

1. Spares shall be sent in pre-decided lots in containers/secure boxes. This shall be applicable to both shop items as well as BOIs.
2. All boxes/containers are to be distinctly marked in red color with boldly written "S" mark on each face of the containers
3. Unless technically not feasible, BBU number should be put on the item(s) in a durable manner (punching/painting, etc.), so that items can be easily linked with approved BBU for ease of handing over to customer.
4. Expiry date for short shelf life items (oils, chemicals, insulation material etc.) should be put on the item as well as on the packing box.
5. Storage, safety of boxes/items and maintaining requisite inventory records will be the responsibility of bidder's representative at site.
6. Bidders shall make periodic checks for safety of boxes/items, as the case may be.
7. For handing over of mandatory spares, getting MRC from customer and physical reconciliation with customer shall be the joint responsibility of the bidder's site representative and BHEL's site representative.

I. DOCUMENTS / INFORMATION TO BE FURNISHED ALONG WITH THE TECHNICAL OFFER:

a. GA drawings of equipment along with load data
b. Data sheets of equipment
c. Maximum Wheel Load data of the equipment
d. Consumed power values and motor ratings of all the equipment
e. Confirmation of scope in line with Tender.
f. Drawing/document submission schedule
g. L-2 schedule
h. List of special tools and tackles.
i. Un-priced price schedule for supply & erection work mentioning "Quoted" against each item in our price format.
j. List of recommended spare parts.
k. Electrical Load list/Feeder list with type/rating/power requirement.
l. Type and quantity of oil, lubricants & consumables for initial fill and till successful commissioning and handing over of equipment.
m. Technical data sheet to be filled by bidder as per **ANNEXURE-8**

J. FACILITIES TO BE PROVIDED BY THE OWNER/ BHEL:

1. Land at free of charge as available for the construction of handling plant. No space will be provided by the Customer/ BHEL for the Contractor's labour colony. All facilities for labour housing shall be the sole responsibility of the Contractor.
2. Construction power (chargeable): BHEL will provide one Source of Construction Power from where Vendor to tap power by installing Electric Meter and Electricity charges will be deducted from their bill at per rates prevailing to Site. Further distribution including tariff/energy meter, Power Cabling and other equipments required installation, shall be carried out by the bidder as per his requirement. Location of the tap point shall be at any place in the power plant. Location shall be provided during detailed engineering.
3. All temporary wiring must comply with safety erection regulations and shall be subjected to Engineers inspection/ approval before connection to supply. NTPC/BHEL shall not be responsible for any interruption in power supply. Contractor shall make his own arrangement for alternative source of power supply through deployment of adequate capacity and number of DG sets to meet the construction needs without

any extra cost to NTPC/BHEL. The non-availability of supply or its quality shall not be cited as hindrance of work execution.

4. Construction Water (chargeable): The Contractor shall make his own arrangement for water for erection & drinking purposes. Vendor may draw construction water, if required, from one source provided in CHP area**.**

K. MILESTONE SCHEDULE: -

Bidder to prepare L2 schedule and submit to BHEL within 10 days of LOI for BHEL's approval. In this L2 schedule Bidder to indicate following milestone activities along with detailed micro level planning and ensure that the schedule is within the overall time period as indicated in the CTC and ensure all resources are mobilized accordingly.

1. Completion of basic engineering
2. Completion of detail engineering
3. Completion of bidder's bought out items ordering - (un-priced PO to be submitted to BHEL)
4. Completion of construction of temporary open & closed storage shed
5. Start of dispatches
6. Completion of all dispatches
7. Start of erection & commissioning
8. Completion of erection & commissioning
9. Readiness of System /Equipments / Machines

L. EXCLUSIONS:

a. Civil rail foundation throughout the length of travel zone and retaining walls for Stacker cum Reclaimer are excluded from bidder's scope. However civil inputs w.r.t this shall be furnished by the bidder to BHEL.

b. MVWS fire protection for Boom conveyor, intermediate conveyor and Tripper shall be in the scope of BHEL- PE&SD. However, successful bidder shall keep provision for MVWS for fire protection in the machine and will submit all necessary inputs as required by BHEL PE &SD/ their vendor. Bidder to keep provision for below in his reversible stacker-cum -reclaimer machine.

   i. Tentative space required on stacker cum reclaimer machine for BHEL PESD's equipment – 1.5 M x 2.5 M x 2.0 M.

ii. Equipment: DV Control station arrangements (Piping & Valves) - 150 Kgs. tentative

iii. In addition, a pipe will run along the boom and intermediate conveyors with the load of 50 Kg/m tentative

Actual details will be furnished to successful bidder after award of order.

M. LIST OF ENCLOSURES:

Following enclosures are an integral part of this technical enquiry (enclosed in soft form) and must be signed & stamped and submitted along with the offer:

1. NTPC NIT Specification BIDDING DOCUMENT NO.: CS-4540-001A-2 (total 6333 pages)
2. Amendments & Clarifications (30 documents)
3. Annexure-1 Project information
4. Annexure-2 Electrical, C&I Scope
5. Annexure-3 Plot plan and Flow diagram
6. Annexure-4 Yard Conveyor Profile drg.
7. Annexure-5 Technical Data Sheet
8. Annexure-6 Auxiliary Power Format
9. Annexure-7 Mandatory Spares List & Spare Category
10. Annexure-8 Technical Data Sheet (to be filled by bidder)
11. Annexure-9 Guarantee Declaration Functional Guarantee
12. Annexure-10 Billing Break-Up format
13. Annexure-11 Scope Matrix between Mechanical & Civil-Structural Vendors
14. Annexure-12 Indicative Sub- Vendor List
15. Annexure-13 Sub-vendor questionnaire & contractor's proposal cum evaluation report
16. Annexure-14 DELETED
17. Annexure-15 Drg & document Submission Schedule
18. Annexure-16 Drive List to Be Filled by Bidder
19. Annexure-17 Bought Out Ordering Schedule
20. Annexure-18 Time Schedule
21. Annexure-19 Surface Preparation and Painting (10 Pages)
22. Annexure-20 Weightage for drawings & BOI ordering for Pro-Rata Payment

23. Annexure-21 BHEL's HSE Manual & PPE Manual (16 Pages + 142 Pages)
24. Annexure-22 Wind & Seismic criteria
25. Annexure-23 Stockyard Management system
26. Annexure-24 Coal stockpile shed limiting dimensions