



Title: EPC contract for Basic engineering study, Calculation and Modification of Existing Ash handling plant for Capacity augmentation as per defined Scope-OPGC 2 x 660 MW, Banharpali, Jharsuguda, Odisha, India.



Odisha Power Generation Corporation, Banharpali



Scope of Work: EPC Contract for Basic Engineering study, Calculation and Modification of Existing Ash Handling plant for Capacity Augmentation as per scope.

Scope of Work

A. Brief Description:

OPGC Phase-II is a 2 x 660 MW power plant located at IB Thermal Power station, Banharpali, Jharsuguda, Odisha, India. The boiler is designed for coal firing & coal is sourced from nearby coal mines. Both units were commissioned & COD has been completed successfully.

As far as Ash Handling system is concerned, Fly ash collected in ESP, APH & Duct Hoppers are extracted up to buffer hopper through vacuum extraction system. Fly Ash Transportation from buffer hopper up to fly ash silo is done by means of lean phase pneumatic pressure conveying system.

B. Problems Faced:

The performance of ash handling plant was very poor at the beginning. Subsequently, with the implementation of system modification including installation of additional equipment namely compressors, dryers, etc., there has been some improvement in evacuation and conveying capacity of ESP fly ash handling system.

As per our assessment, as on date, the Ash Handling Plant is able to support operation of units up to 560 MW per unit with design worst coal of 43.7% ash. We are looking forward for a solution from reputed vendors in the field of Ash handling to resolve the issue regarding fly ash evacuation & conveying system.

The said proposal is for detailed study & execution of modification as proposed below. However, we also welcome any changes / addition in proposed modification in view of enhancing ash handling system capacity.

C. Scope of Work:

1. Basic engineering study of Fly ash evacuation system of ESP fields including proposed augmentation of 1st and 2nd ESP fields of Unit#3 & 4 as mentioned below.
2. Design, Engineering, Supply, Erection and Commissioning of independent "Dense Phase Pneumatic Conveying System" below ESP 1st & 2nd field Fly Ash hoppers with side tap-off arrangement (using existing facilities to the extent possible) up to New Intermediate Fly Ash Silo. From New Intermediate Fly Ash Silo, Fly Ash will be conveyed to existing Main Fly Ash Silo via existing 2nd stage Fly Ash Transportation pipeline.



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3. Site Visit and Inspection Prior to Proposal Submission:
 - Before Submission of the Proposals, Bidder must visit OPGC site and its surroundings to assess and satisfy themselves about the local conditions such as access roads to the site, water, air and power supply, applicable / details of taxes, duties, royalties and levies, nature of ground and subsoil conditions, general topography of the site, availability of accommodation, weather characteristics, minimum wages, labor and other related laws, environmental and safety laws, acts and regulations and any other relevant information, as required by them. The Bidder may obtain all necessary information as to risk, contingencies and other circumstances, which may influence or affect their Proposal. Bidder shall be deemed to have considered local conditions and information and to have satisfied himself in all respects before quoting his rates and terms and no claim whatsoever in this regard shall be entertained by the Owner at a later date.
 - Bidder shall send a request by email for the site visit to OPGC along with the details of the personnel, preferred date and itinerary.
 - The Bidder shall complete the site visit and satisfy itself with various information requirements and site conditions. Bidders shall become familiar with the Site and the surrounding areas, the Technical Specification, Contract and other information set forth in the RFP.
 - The bidder shall perform necessary analysis / test (i.e. coal, ash etc.) for designing, engineering of fly ash system augmentation work and submit techno commercial bid accordingly.
4. Proposed system shall be designed to handle fly ash while firing coal of quantity 470 TPH/ Unit with ash content in coal 48%.
5. Submission of Process Flow Diagram, Design basis report, C&I and electrical specifications, P&IDs at the time of bid submission & however detailed design basis report, schemes & other details to be submitted post placement of LOA (detailed schedule mentioned below).
6. Before start of manufacturing detailed design review shall be done by Owners engineers.
7. Provide new Intermediate Fly Ash Silo of capacity 600 MT in between Unit 3 & 4 ESP.
8. Modification/Replacement of existing MS adapters with new one for ESP-1st & 2nd field Fly Ash Hoppers of both units. Fluidizing arrangement shall be provided at inlet to the Ash vessels.



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9. Installation of 1 no. manually operated Plate valve, 1 no. Expansion Joint and 1 no. Dense phase fly Ash conveying Vessel (with associated accessories) for each New MS Adapters.
10. Fly ash from ESP-1st & 2nd field hoppers of each respective units will be conveyed up to new common Intermediate Fly Ash Silo which is to be located in between Unit 3 & 4 near ESP 1st field hoppers. The Material of Construction of Fly Ash Conveying Pipeline as under:
 - Pipe type: Pipe in Pipe
 - Outer Pipe: MS ERW pipe as per IS 3589, minimum thickness 9.5 mm
 - Inner Pipe: MS ERW pipe as per IS 1239, minimum thickness 5.2 mm
11. Fly Ash from ESP-3rd Field & onwards FA Hoppers will be extracted/evacuated with the help of existing Vacuum Extraction System. Also, existing Vacuum Extraction system below each ESP-1st & 2nd Filed Ash Hoppers (of Unit # 3 & 4, both) will not be disturbed and remains as it is to handle the FA of respective hoppers during any emergency condition.
12. Existing fluidization system including pads and accessories (available at site) may be used. However separate fluidizing arrangement to be provided by vendor at entry of ash conveying vessel being beneath ESP 1st and 2nd field hoppers.
13. Intermediate Fly Ash Silo 1 no. (Common for Unit 3 & 4) to be located between Unit 3 & 4 ESP area & silo shall be provided with 4 nos' outlet points.
14. Each outlet point of Intermediate Fly ash Silo will consist of 01 Set of Pneumatic Transportation System of capacity 150 TPH each. Total 04 Sets (03W+01S) Pneumatic Transportation System. Each outlet point having 2nos' dense phase pneumatic fly ash conveying vessel 1W+ 1S, so total population of pneumatic conveying vessel will be 8 nos'. Details of special device pneumatic conveying vessels shall be submitted at the time of bid submission for owner's approval.
15. Fly Ash Transportation System outlet Pipeline from intermediate fly ash silo will be connected to existing Standby FA Transportation Pipeline at suitable location. Conveying length will be approx. 250 meters for each line. Valves with sealing arrangement without having metal to metal contact, to be used for Conveying line interconnection. Details of valve shall be submitted at the time of bid submission for owner's approval.
16. Supply and Installation of Bag Filter (Reverse Pulse Jet with-out Fan Type) suitable at the top of New Intermediate Fly Ash Silo with radar type high frequency (85 GHz)



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Level Transmitters, DP transmitter, Pressure Relief valve & Suitable Fluidizing Arrangement consisting of Fluidizing Pads/Air Slide at bottom portion.

17. Fluidizing blower-2 nos' (1W + 1S) with drive motors, Heater- 2 No's (1W+1S) and related piping with Valve, Fittings, insulation & cladding shall also be provided.
18. Compressed/Transport Air system: New 03 nos' (2W+1S) Oil Free Screw type conveying air compressors of suitable Capacity (Flow & Pressure) with drive Motors, Air receiver tank, After Cooler-cum-Moisture separator & associated accessories for Unit # 3 & 4.
19. Transport air compressors shall be supplied along with Dryers of suitable capacity (Type: Refrigerant).
20. Ventilation & Air conditioning system: Installation of Ventilation system for compressor house and switchgear room with supply fan filter, louvers, exhaust fan, etc. Supply of Air conditioning system for UPS and PLC system.
21. Lifting Equipment's: Installation of EOT Crane of suitable capacity-1 No for Compressor House Building & Electric Hoist of 3 MT Capacity-1 No for New Intermediate Fly Ash Silo.
22. Supply & installation of 1 no. oil free screw air compressor for Instrument Air (Make: ELGI, Model no.: OF135/8, Rated capacity: 1359 m³/hr., Discharge pressure: 8 kg/cm²) along with energy efficient drive motor (Make: Siemens, Rating: 160KW, 415V) along with air receiver tank & related accessories.
23. Supply & installation of instrument air dryer (Make: Gem equipment, Model no.: HOC0903, Type: Heat of compression type air dryer, Capacity at rated pressure: 1359 m³/hr., inlet pressure; 8kg/cm²).
24. Supply & installation of instrument air piping for newly installed equipment / instruments. Interconnection (along with isolation valves) shall be provide between new instrument air line & existing Instrument air line of OPGC.

25. Electrical Scope:

- Supply & installation of HT switchgear for compressor at new switchgear room (2 nos' 3.3 kV HT feeder shall be provided by OPGC, approx. distance from proposed switchgear room: 1200 meters)
- Spare HT feeders to be provided for each feeder type.
- All 3.3 KV compressor motors shall be fed from vacuum circuit breaker with numerical relay for protection.



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- Supply & installation of 2nos' dry type transformer 3.3KV/415V of suitable rating for LT loads.
- Supply and installation of incoming HT cables (3.3kV UE) from existing OPGC switchgear to proposed new switchgear room, incoming HT supply and all outgoing cables will be under vendor scope.
- Supply & installation of 415V LT switch boards.
- Spare LT feeders to be provided for each feeder type or 10% of population whichever is higher.
- LT load from 90 – 200 KW shall be provided with Air circuit breaker, numerical relay for protection.
- Supply & installation of sub DCDB.
- Supply and installation of incoming LT cables (415V AC, 220V DC) and all outgoing cables from LT switch boards.
- Supply & installation of control cable for protection & interlock from OPGC HT switchgear to proposed compressor switchgear shall be under vendor scope.
- This DB shall be located in new Comp. house electrical building cum Control room.
- Supply & installation of illumination & welding receptacles in Compressor Building, switchgear room, Intermediate silo, Pipe racks.
- Supply & installation of Grounding & earthing for supplied system / equipment.
- Supply & installation of ventilation & exhaust system in compressor house & switchgear room.
- Supply & installation of cable tray & cable accessories.
- Supply & installation of Fire sealing material.
- All electrical equipment shall conform to IS standard.
- Related statutory approvals from CEI, Odisha to be obtained by vendor.

26. C & I Scope:

- One Set of new dedicated redundant PLC System has been envisaged for new proposed system. PLC with redundant CPU including communication to individual I/O racks & redundant power supply, with non-redundant I/O rack, etc. has been considered for the complete system offered.
- The 24 V DC redundant bulk power supply (2 source) from UPS system. Each I/O s shall be 32 channels. Digital inputs shall be potential free, which shall be interrogated by 24V DC. All digital outputs from PLC shall be 24V DC.



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- Specification of PLC and PLC panel shall be as per manufacturer's standard design.
- One no. standard industrial engineering work station with 24" TFT monitor shall be supplied along with latest operating system and the same shall be loaded with Graphics runtime software and programming software.
- One (1) No. A3/A4 size colour laser printer shall be supplied along with the system.
- PLC will operate as an independent system and no communication with Plant DCS is envisaged.
- Existing 3 nos' instrument air compressors (apart from 1 new instrument air compressor) required inputs for interlock, protection to be included & vice versa.
- In addition, the following Elect & C&I works are also considered.
 - a. HT motor for compressors – 3 Nos'
 - b. LT DB – 1 No
 - c. PLC system - 1 Set with redundant
 - d. 2x5KVA UPS Panel with battery backup
 - e. 415 V AC motors – 1 Lot
 - f. HT Cables – 1 Lot
 - g. HT End Termination kits – 1 Lot
 - h. Control cables - 1 Lot
 - i. Signal cables – 1 Lot
 - j. Cable trays & supports – 1 Lot
 - k. Control Junction boxes – 1 Lot
 - l. Local Push button station – 1 Lot
 - m. Above ground earthing system – 1 Lot
 - n. Illumination system (LED lights) – 1 Lot
 - o. Cable lugs/glands/clamps, etc. – 1 Lot
 - p. Field Instruments – 1 Lot
 - q. Ventilation & exhaust system – 1 lot
 - r. Air conditioning system – 1 lot.
 - s. Sub DCDB – 1 lot

Above equipment shall be supplied as per tender technical specifications.



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27. Scope for Civil

- Building with aluminum roofing for accommodating 3 nos' conveying air compressors along with dryers, 1 no instrument air compressor including dryer, 2 nos' fluidizing blowers along with ventilation system, illumination, hoist of suitable capacity, Fire protection & detection system. The location of Compressor House shall be finalized jointly as per the site condition.
- Building for Electrical switchgear room which will contain 3.3KV HT switchgear, 2 nos' 3.3KV/415V dry type transformers, LT switchgear along with ventilation system, illumination, Fire protection & detection system, Fire rated doors. The location of Switchgear room shall be finalized jointly as per the site condition.
- Equipment, structures foundations.
- Supply & erection of various steel structures.

28. Scope under OPGC:

- 2 nos' 3.3KVHT Circuit Breaker (uncabled) from existing switchgear shall be provided for feeding power to proposed compressor HT switchgear (incoming cables shall be under vendor scope, approx. Route length 1200mtr.).
- 2 nos' 220 VDC source for switchgear operation (incoming cables shall be under vendor scope, approx. Route length 200mtr.).
- Source of cooling (clarified) water will be provided by OPGC. However line laying up to proposed compressor house & tap-off arrangement along with isolation valve will be under vendor scope (approx. distance 300 meters).
- Technical, parameters, historical data trends as required for analysis.
- Operational data (load, temperature cycle, etc) when necessary.
- Construction power & water source will be supplied by OPGC, free of cost. However required power cable, water pipeline laying & power, water distribution to be done by contractor.
- Space for installation of PLC panel & UPS system will be provided by OPGC in existing building, but required air conditioning system to be provided by vendor.

29. All related material Supply, Erection/Installation and commissioning with adequate manpower, Equipment's, Tools & Tackles, Consumables, etc. will be in EPC scope.



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30. Above scope is not exhaustive, if the bidder feels that any additional items are to be included to execute the project for achieving desired result, to be considered.

D. New Scheme Data:

1. Stage 1 – From ESP 1st & 2nd Field Fly Ash Hoppers to New Intermediate Fly Ash Silo:
 - ESP 1st & 2nd Field Fly Ash Conveying system – Dense Phase pneumatic Conveying System.
 - ESP 1st & 2nd Field Fly Ash Conveying capacity – 220 TPH/Unit.
 - Operation Time – 8 Hrs. Fly Ash collection to be evacuated in 5.5 Hrs.
 - ESP 1st & 2nd Field Fly Ash Conveying Stream – 8 No’s/unit (ESP 1st field – 4 No’s, ESP 2nd field - 4 No’s)
 - No & Location of New Intermediate Fly Ash Silo – 1 No (Common for Unit 3 & 4) located in between Unit 3 & 4 near ESP 1st field hoppers (Gap between Unit#3 & 4 ESP is 30 meters). Storage capacity of approx. 600MT of Fly ash collection.
2. Stage 2 – From New Intermediate Fly Ash Silo to existing main Fly Ash Silo:
 - Fly Ash Transportation system – Pressure Conveying system.
 - Fly Ash Transportation streams – 4 Set’s (3W+1S) of Fly Ash conveying vessel with 4 No’s (3W+1S) Fly Ash Transportation pipeline common for Unit 3 & 4. Individual line capacity should be 150 TPH.
 - Conveying Distance – To be connected to nearest point in existing Fly Ash conveying lines. Conveying length – approx. 300 meters for each conveying line.

E. Execution Schedule:

SN.	Milestone	Execution schedule (Week)	Remarks
1	Kick-off meeting	NTP + 1 Week	
2	Detailed engineering & BOQ	NTP + 5 Weeks	
3	Material supply & Site mobilization	NTP + 21 Weeks	
4	Completion of material supply	NTP+ 25 Weeks	
5	Completion of all erection work (including Civil, Mechanical, Electrical, C&I)	NTP + 41 Weeks	
6	Hooking up with existing hoppers	NTP + 52 Weeks	



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7	Final commissioning	NTP + 56 Weeks	
8	Capability test	NTP + 60 Weeks	Within 4 weeks from final commissioning
9	Completion of Punch points	NTP + 72 Weeks	Within 12 weeks from capability test
10	Issue of Final acceptance certificate	NTP + 75 Weeks	3 weeks after liquidation of all punch points

*NTP: Notice to Proceed, LOA: Letter of Award

Note: Above schedule is indicative, same will be finalized after arriving at mutual agreement between OPGC & Vendor before placement of LOA.

F. Bidding Process :

1. Bid submission will be in two parts comprising of:
 - Techno-commercial bid along with EMD in form of DD / BG of value 50,00,000 INR.
 - Price bid
2. After opening of manual Price bids, E-RA will be conducted.

Note: Owner reserves the right to accept or reject any or all Price Bids submitted by Qualified Bidders and further reserves the right not to award the Contract to the lowest evaluated Preferred Bidder or not at all. OPGC reserves the right to declare Preferred Bidder as Successful Bidder for award of the Contract.

G. Payment Terms

1. Supply:
 - 10% of basic supply order value as interest free advance along with order acceptance and submission of ABG of equivalent basic amount. ABG shall be valid till completion of supply or 10 months from the date of issue, whichever is later.
 - Prorate Progressive: 65% of basic supply order value along with 100% GST as per approved BBU shall be released within 15 working days of receipt of material at site and inspection clearance.



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- Balance 20% basic order of supply contract value shall be released within 30 days after capability test and clearance from EIC, subjected to submission of warranty security 5% of basic supply contract value in form of BG, which shall be valid till specified defect liability period.
- Balance 5% of the supply Contract basic value shall be released after liquidation of punch points and issuance of Final Acceptance Certificate.

2. Services:

- 10% of the total service order value including GST within 07 days of mobilization of Site resources and submission of invoice. Payment shall be released within 15 working days from the date of receipt of original invoice.
- 65% of the total service order value including GST as per the agreed milestone basis, progressive payment per Unit basis within 15 working days of achieving of the respective agreed milestone/mechanical completion of work.
- 20% of the total service contact value including GST will be released after proving capability test, subjected to submission of warranty security 5% of basic service contract value in form of BG, which shall be valid till specified defect liability period.
- Balance 5% of the service Contract basic value including GST shall be released after liquidation of punch points and issuance of Final Acceptance Certificate issued by owner for the respective Unit and submission of capability test report.

H. Liquidation Damages (LD):

1. On account of delay in completion: In case of delay in completion of supply, work beyond stipulated period, liquidated damage will be imposed as mentioned below, subjected to a maximum ceiling of 10% of total contract value (including supply & services).

SN.	Criteria	LD Factor	Remarks
1	For every additional week delay in specified completion of supply	0.2% of total contract price / Week	
2	For every additional week delay in proving capability test	1.2% of total contract price / week	



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2. On account of shortfall in capability: In case of short fall from specified performance guarantee criteria, liquidation damage will be imposed as mentioned below, subjected to maximum ceiling of 10% of total contract value.

SN.	Criteria	Guaranteed Parameters	LD Factor	Remarks
1	ESP 1st & 2nd Field Fly Ash Conveying capacity	220 TPH/Unit	Every 1 TPH shortfall, LD 1% of total contract value	
2	Conveying capacity from Intermediate silo for each stream	150 TPH/line	Every 2 TPH shortfall, LD 0.5% of total contract value	

3. The overall cap on liquidation damage for delay & capacity guarantees shall be 15% of total contract value.

I. Offloading of Job

In case it is observed during the tenure of contract that vendor is not capable or in a position to complete the job, OPGC reserves the right to offload the same and get it done through other agencies at vendor cost & risk. However, OPGC shall serve an advance notice with a minimum period of 30 days before invoking the provision of this clause.

J. Supply of Start-up / Commissioning Spares:

Required commissioning spares to be supplied for achieving desired capacity.

K. Supply of Mandatory Spares:

Vendor to provide list of proposed mandatory spares and quantity (at least for 2 years), along with item wise cost (This cost will be separate from project bid value).



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Decision on mandatory spares will be taken by OPGC during finalization of contract.

L. Defect liability period:

Work shall be guaranteed against any defective material, workmanship & performance for a period of 12 months after issue of final completion certificate. Vendor shall rectify any defects found during this period free of cost without any financial burden to OPGC.

M. Training:

Agency to provide training on O&M for supplied system, without extra charges.

N. Special Terms & Conditions of Contract:

1. Contractor has to deploy administrative manpower (like- Safety officer, Supervisor, Electrician, storekeeper etc.) at his own cost for smooth execution of the work.
2. In case of engaging separate erection agency, prior approval to be taken from OPGC.
3. Since the jobs are to be carried out 24X7, the Contractor should also ensure availability of his consumable and T&P round the clock (i.e. 24x7), Up to completion of project.
4. The contractor must arrange required consumables (i.e. welding electrode, gases, gasket, gland packing & rope, fasteners, varnish, paints etc.) Required for completion of work.
5. Required Lubricants to be supplied by vendor until capability test.
6. In case of any emergency support is required by vendor from OPGCL's team in the interest of the job; charges @ actual cost incurred by M/s OPGCL for the procurement of any such facility shall be charged.
7. During the total period of contract, the contractor has to carry out the activities in a phased manner as required by OPGC and to meet the completion schedule.
8. The contractor to submit daily reports showing work carried out with details of available manpower, resources etc.
9. All required T&P to be arranged by the Contractor. All such tools have to be load tested and certified by the Competent Authority (as per Factories act) before being deployed for the job.
10. Any other fixtures as and when required for carrying out proposed system, will have to be fabricated by Contractor free of cost.
11. Scaffolding / working platforms required for the job will have to be erected by the Contractor with his own manpower & material.



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12. Necessary permanent platforms / grating shall be provided by contractor where ever necessary & instructed by EIC. Vendor to submit details of the same during detailed engineering for approval from owner.
13. Transportation of material to/from stores or site or workshop will be Contractor's responsibility. Material handling equipment like hydra, trailer/ hywa /tractor etc. to be arranged by vendor at his own cost.
14. Transportation arrangement for Engineers, supervisors, workers has to be arranged by contractor.
15. Accommodation may be provided by OPGC on chargeable basis but subjected to availability. However responsibility for arranging accommodation lies with contractor.
16. Disposal of all scraps to the scrapyard and installation and dismantling of scaffolding material as per the requirement shall be under the scope of contractor.
17. Any work related to removal / laying / repairing / rerouting /replacement of existing pipeline, structure, cable & cable tray etc. which are essentially required for carrying out Fly ash system augmentation work (beyond specified scope) shall be under the scope of contractor at no extra charges. However material required for the same shall be provided by OPGC.
18. Area housekeeping will be responsibility of contractor.

O. MANPOWER

1. The Contractor should clearly understand that close and technically competent supervision of work is an extremely important part of the work specified in this contract. The Contractor shall have a site-in-charge exclusively for the contract. In addition to the site-in-charge, the Contractor has to ensure supervision of work in progress by deploying technically competent site supervisor. The site-in-charge of the Contractor shall authorize his representative to collect/return materials from/to OPGC LTD as per requirement of work.
2. Contractor shall ensure deployment of required skilled and unskilled manpower as per the job requirement & as instructed by EIC.
3. The contractor has to mobilize adequate human resource to carry out the job on day & night shifts on all days including Sundays, holidays and national holidays.

P. Works Programme / Quality Assurance Plan / Safety Plan:

For every supplied OEM / bought out items, vendor to submit factory test report/ certificate. The decision to carryout pre dispatch inspection will be taken by EIC of OPGC. Before start of manufacturing / procurement of bought out items vendor to provide proposed make list for approval from OPGC. Before starting work, contractor shall submit details works programme, milestone of different activities, Safety and quality assurance plan of the work to Engineer In-Charge for his approval after which work will be started as per approved programme. Any other



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documents required by the engineer-in-charge for the above work shall be submitted. Vendor is also liable to submit approved DBR, Calculation sheets, datasheets, drawings, O&M manuals, test certificates, equipment warranty certificates, commissioning protocols, As-built drawings & others documents as instructed by EIC.

Q. Safety, Health & Environment:

The contractor shall ensure compliance with all the Acts, Rules & Regulations pertaining to HSE (Health, Safety & Environment) as applicable from time to time. The contractor shall be fully responsible for the safety of his workmen & shall take necessary precaution to avoid any accident.

1. The contractor has to deploy safety supervisor. All employees of the contractors shall undergo the safety induction before the start of the job. (CLASS ROOM TRAINING 1 DAY)
2. The contractor's workmen will be required to work at various heights, location & in vicinity of rotating/running/charged equipment and also equipment in not working conditions. He should also give proper instructions to his workmen to be careful to avoid accident.
3. The contractor shall arrange proper and sufficient no's of PPE appliances such as hand gloves, helmets, safety goggles, nose mask, ear muffs, safety shoe, full body harness with double lanyard etc. & first aid box and ensure that his workmen use them during execution of work.
4. Contractor has to provide the Method statement along with HIRA/JSA for approval of OPGC before start of the execution.
5. Electrical Appliances: The contractors have to ensure that all the electrical equipment/gadget used by them are ISI marked only. All the electrical work should be carried out as per the norms in the Indian Electricity Act, 2003 and Indian Electricity Rules, 1956. All types of electrical equipment should be provided with ELCB/RCCB & body earthing. Only authorized persons should be engaged for any kind of repair, maintenance job.
6. Industrial Gas Cylinders: All types of Gas cylinders should be handled in proper manner with safety cap on it.
7. Tools & Tackles: Valid test certificates for all lifting/pulling T&Ps are to be submitted by the contractor before starting of work.
8. Any violation in the safety norms like not using PPE at the work, a token of penalty will be imposed as deemed fit by the OPGC LTD's Safety Officer.
9. Compliance with statutory rules, regulation and local conditions: The

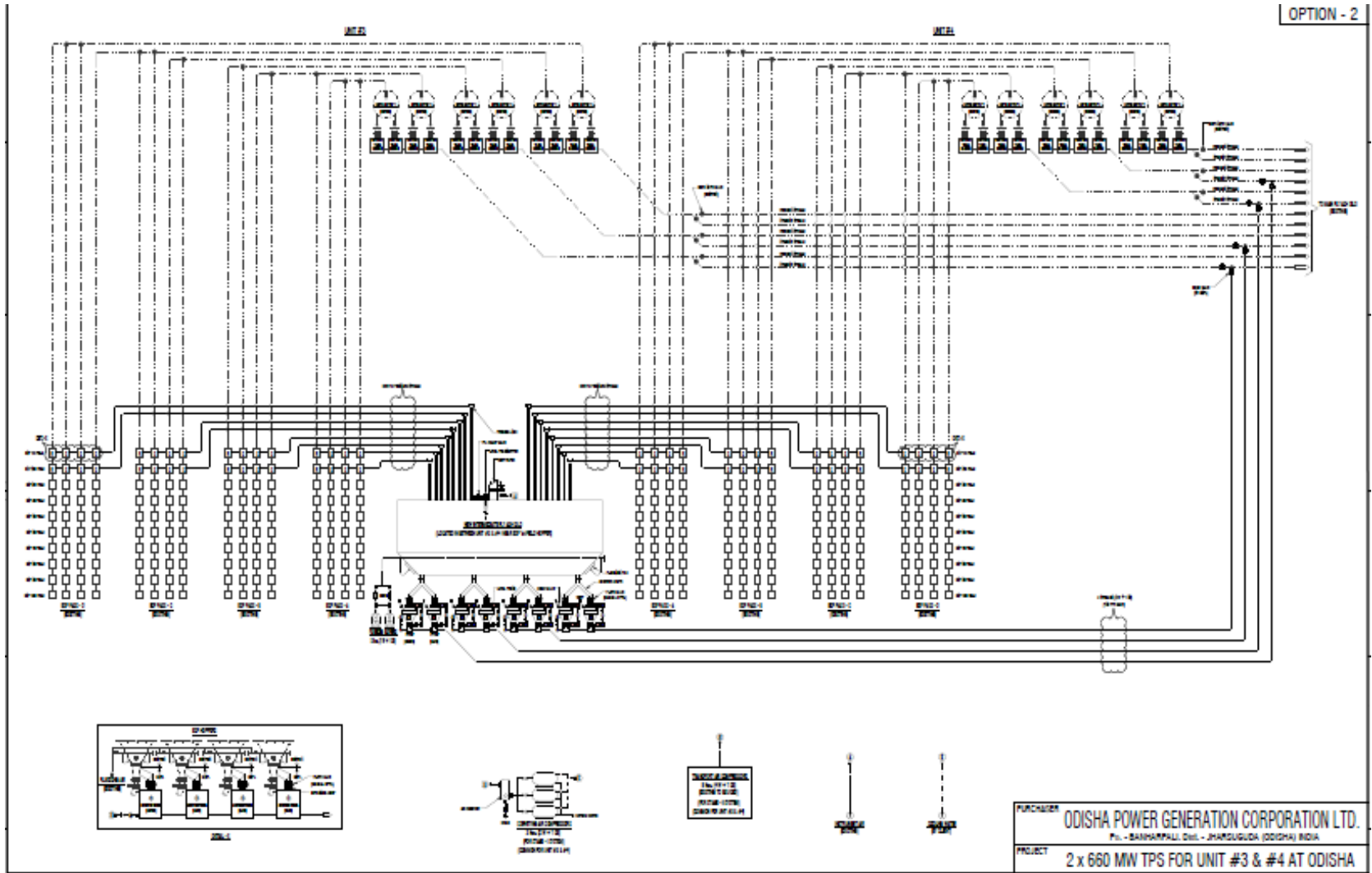


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contractor shall comply with provision of all statutory rules, regulations and acts as applicable from time to time.

10. All inflammable materials should be removed from the vicinity of the place where sparks/hot metal from welding/gas cutting/grinding are likely to fall. Coverings are to be provided for inflammable materials for permanent installations.
11. D/A carrying hoses should be kept away from the welding cables & should have flash back Flame arrester. The hoses should be healthy with proper clamping to prevent chances of gas leaks. Gas cylinders should not be rolled on the ground or carried on bicycle. Trolleys should be used for their transportation. For lifting and lowering the cylinders proper cage should be used.
12. Working platforms at height should have adequate space and proper railings. Toe Guards should be provided in the platforms. Proper approach should be made up to the work area. Scaffoldings and platforms should be properly supported. Contractor has to ensure that workmen working at heights should wear full body harness with double lanyard.
13. The used cotton waste, cloth or muslin contaminated with used/ waste oil should be properly disposed at designated place and finally carried over to the stores at the storage facility before being finally disposed in accordance to the statutory environment regulations.
14. Contractor has to ensure that all man and material have been cleared from the work site after completion of work and before trial of the equipment.
15. Indemnity: OPGC LTD shall not be responsible for any accident to the labor employed by the contractor. The Contractor shall provide necessary Medical aid to his workmen at his own cost during any incident/accident at site. The contractor shall be responsible for all risk involved, liabilities & obligation arising out of the contractor under any provision of law in force from time to time.

R. Proposed Modification Layout:



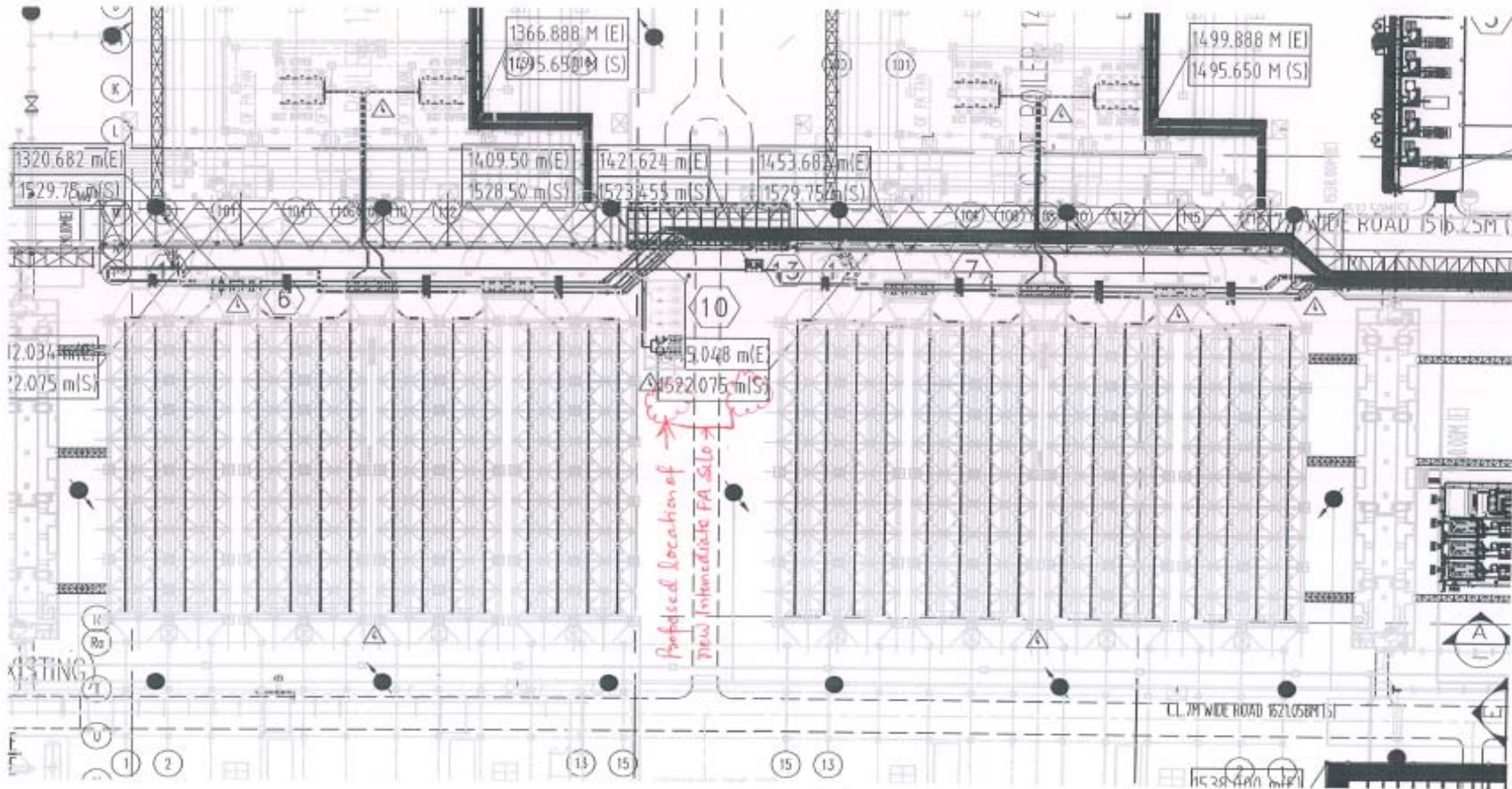
OPTION - 2

PURCHASER
ODISHA POWER GENERATION CORPORATION LTD.
 P.O. - BAHARIPALI Dist. - JHARSUGUDA (ODISHA) INDIA
 PROJECT
2 x 660 MW TPS FOR UNIT #3 & #4 AT ODISHA

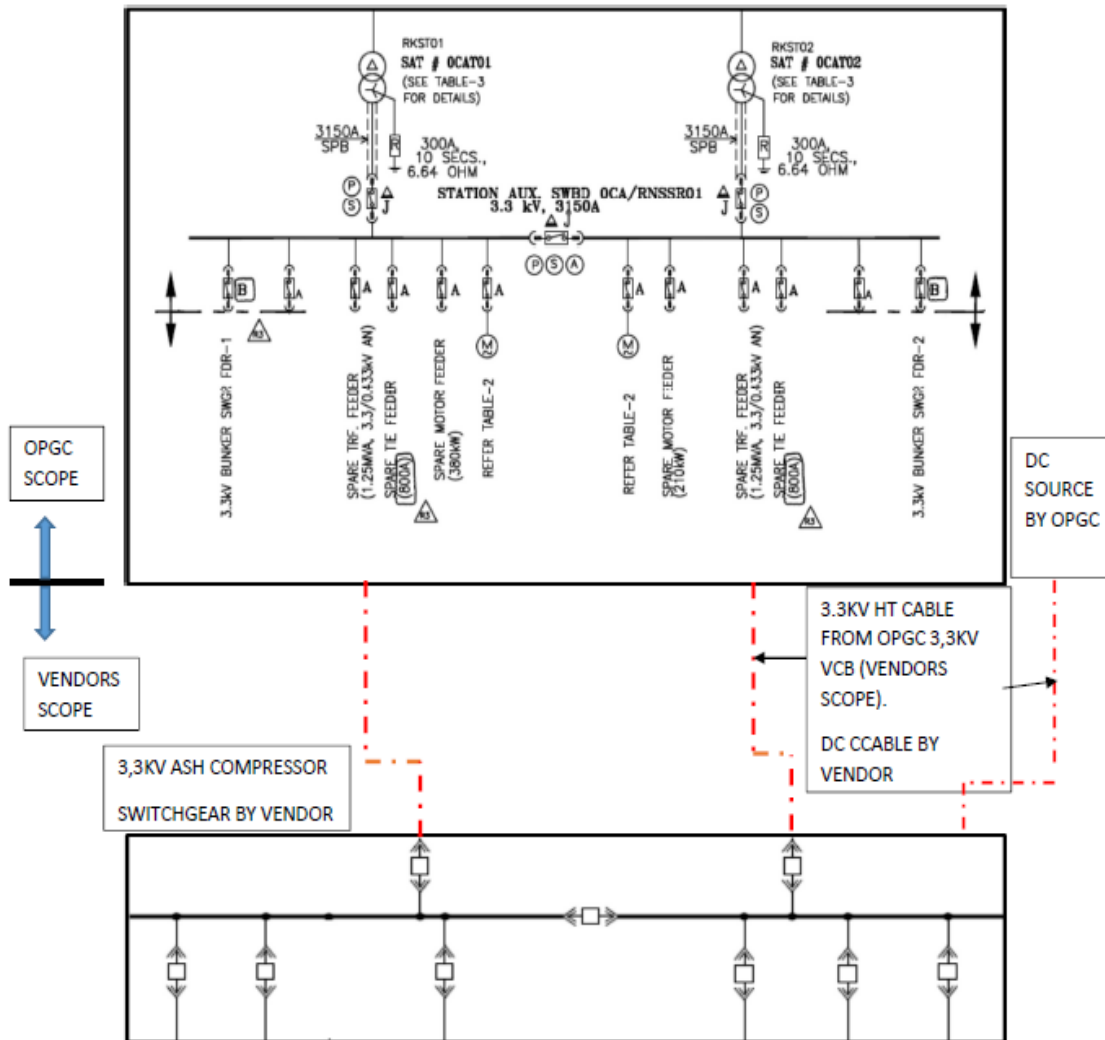


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S. Proposed Modification Location:

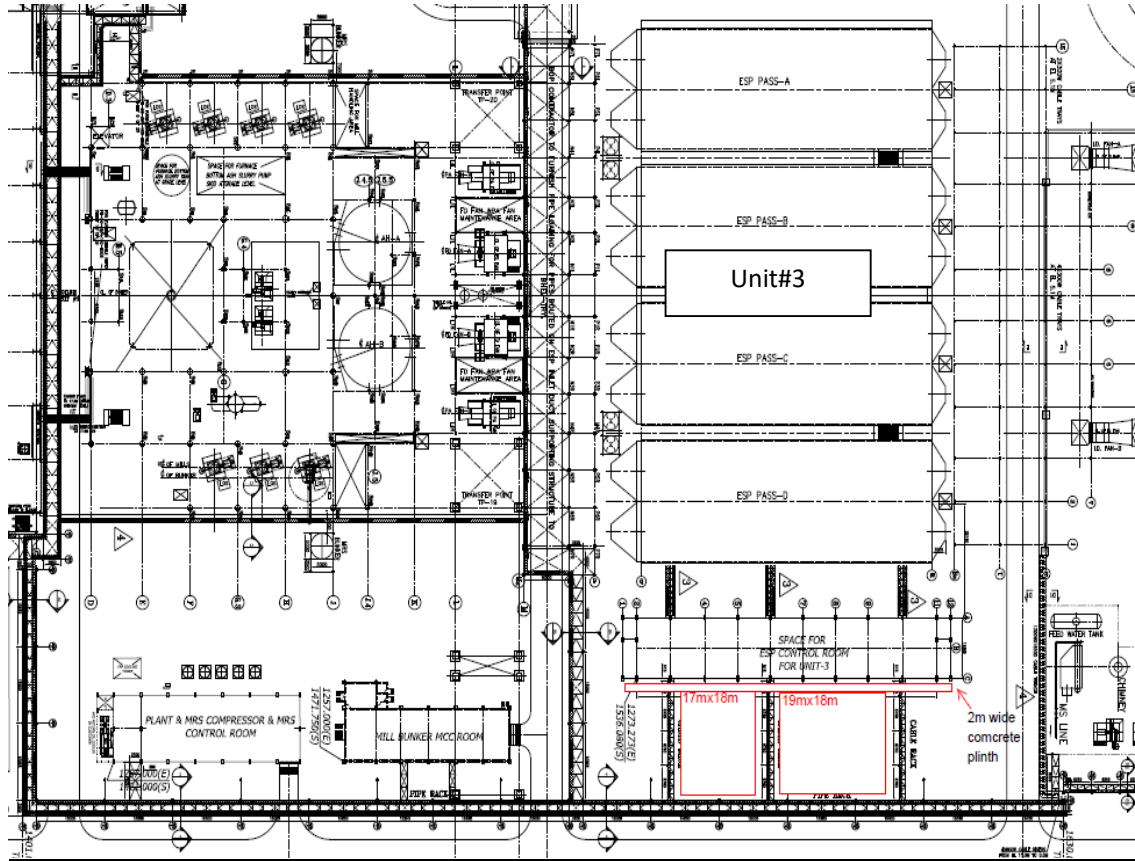


T. SLD for power supply arrangement to vendor 3.3 KV switchgear:



Scope of Work: EPC Contract for Basic Engineering study, Calculation and Modification of Existing Ash Handling plant for Capacity Augmentation as per scope.

U. Proposed location for Compressor & Switchgear building:



Note: In case of any query OPGC may please be contacted.