BEFORE THE HON'BLE JHARKHAND STATE ELECTRICITY REGULATORY COMMISSION AT RANCHI

CASE (TARIFF) NO. 17 OF 2025

IN THE MATTER OF:

The Tata Power Company Limited .....Petitioner

-Versus-

Tata Steel Limited ...Respondent

INDEX

BEFORE THE HON'BLE JHARKHAND STATE ELECTRICITY REGULATORY COMMISSION AT RANCHI

CASE (TARIFF) NO. 17 OF 2025

IN THE MATTER OF: Petition for MYT Business Plan & MYT Petition for FY 2026-27 to FY 2030-31 under Section 61, 62, 64 and 86 of the Electricity Act 2003 in accordance with JSERC (Terms and Conditions for Determination of Generation Tariff) Regulations, 2025 [hereinafter referred to as 'GTR 2025' or ' JSERC Generation Tariff Regulations, 2025'] for sale of electricity from Unit # 2 & 3 (2x120 MW) of Jojobera Power Plant of the Petitioner - The Tata Power Co. Ltd. to Tata Steel Limited, a Long-Term beneficiary and Distribution Licensee.

AND
IN THE MATTER OF:

The Tata Power Company Limited .....Petitioner

-Versus-

Tata Steel Limited ...Respondent

The Petitioner most respectfully submits that

1. The MYT Petition for FY 2026-27 to FY 2030-31 in respect of Unit # 2 & 3 (2x120 MW) of Jojobera Power Plant has been filed before the Hon'ble Commission on 24.12.2025.
2. Vide letter dated 10.02.2026, the Hon'ble Commission directed the Petitioner to furnish certain additional information in terms of the Order dated 06.02.2026.
3. The Petitioner in the instant submission, is filing the information directed by the Hon'ble Commission as **Appendix-A**.
4. For kind consideration of the Hon'ble Commission, please.

Appendix-A

The Petitioner, most humbly submits the reply to the queries of the Hon'ble Commission, as below:

Query-1

1. As per the details submitted in Annexure-P25, it is observed that the Petitioner has obtained approval for the capital expenditure scheme related to installation of Online Dissolved Gas Analysis (DGA) system for hydrogen and moisture sensors in power transformers of Units-4, 5 and 6. However, it is further observed from the Petitioner's submission that the proposal for capital expenditure towards installation of Online-DGA system for Units-2 and 3 is stated to be submitted for approval before the Commission by 30th December, 2025. In this regard, the Petitioner is directed to clarify whether approval of the Commission for the said capital expenditure for Units-2 and 3 has since been obtained, and if so, to submit a copy of the relevant approval.

Reply:

2. It is most humbly submitted that the scheme "Online Dissolved Gas Analysis (DGA) system for transformers" has been claimed by the Petitioner for FY 2025-26 under New Schemes proposed for FY 2025-26. The Petitioner has submitted letter dated 30.09.2025 by the beneficiary, Tata Steel Ltd (TSL), granting approval of the capex for the scheme in respect of Unit No. 4,5 and 6, at Annexure-P25 of the Petition for True up of FY 2024-25 and APR of FY 2025-26, which has been referred by the Hon'ble Commission in the instant query.

3. Notably, these Online devices are Sensors which provide real-time, continuous, online monitoring of hydrogen and moisture levels in transformer fluids, helping in early detection of fault and thereby, avoiding any critical failures in the transformers like GT/UAT etc. The lead time for procurement of Generator transformer is quite significant, and failure could severely impact the power supply in Jamshedpur. The requirement becomes even more crucial considering the age of the Generator Transformer which is completing 25 years.

4. On this backdrop, while approving the scheme for Unit No. 4,5 and 6, Tata Steel, being the distribution licensee in the command area of Jamshedpur city, recommended the Petitioner to submit the proposal for approval for the said scheme in respect of Unit-2 and 3 to the Hon'ble Commission by 30th December, 2025.

5. The Petitioner most humbly submits that in accordance with the recommendation by the beneficiary and on account of the necessity of the scheme, the Petitioner has submitted the proposal for approval by the Hon'ble Commission vide the instant Petition for True up of FY 2024-25 and APR of FY 2025-26 (case (T) No.13 of 2025), along with detailed justification.

6. As such, it is being clarified that the approval for the referred scheme "Online Dissolved Gas Analysis (DGA) system" is under active consideration of the Hon'ble Commission. The Hon'ble Commission is requested to kindly allow the same.

Query-2

7. The Petitioner has provided actual security expenses data for FY 2020-21 to FY 2024-25 and has projected the same for upcoming Control Period FY 2027-31. The Petitioner to provide the proof for the actual security expenses for FY 21-25 and reconcile the same with the Audited account of the said period.

Reply:

8. The Petitioner humbly submits that the Audited accounts for FY 2021-25, along with the Certificate for the security expenses by the concerned authority, have been submitted by the Petitioner along with the MYT Petition for the kind consideration by the Hon'ble Commission. The same have not been annexed herewith, for the sake of brevity and to avoid repetition.

9. As desired by the Hon'ble Commission in the instant query, reconciliation of the actual security expenses for FY 21-25 with the Audited account of the said period, duly certified by the Auditor, substantiating and evidencing the actual incurrence of the same, is being annexed with the instant submission as ***ANNEXURE-R1***.

Query-3

10. It is observed that the Petitioner has proposed several New Schemes as Additional Capitalisation for FY 2026-27 to FY 2030-31. In terms of Clause 14.5 of the JSERC (Terms and Conditions for Determination of Generation Tariff) Regulations, 2025, any additional capitalisation proposed at the fag end of the useful life of a generating station/ unit is required to be supported by detailed justification of necessity, cost-benefit analysis, Detailed Project Report (DPR), rate reasonableness, and the Residual Life Assessment report of the project. In this regards, the Petitioner is directed to submit scheme-wise detailed justification for the necessity of each line item proposed under the new schemes, along with a cost-benefit analysis demonstrating tangible operational, financial, or efficiency gains as well as DPR (if any). The Petitioner is also required to submit documentary evidence of approval from the competent authority/Management for each such scheme.

AND

Query-4

11. For all the assets claimed for FY 2026-27 to FY 2030-31 under Clause 14.3 (C) of the JSERC generation tariff regulation, 2025, the Petitioner is required to submit the Obsolescence certificate.

Reply

12. It is humbly submitted that the respective DPR/ detailed justifications for each of the schemes proposed for additional capitalisation for FY 2026-27 to FY 2030-31, supported by applicable documentary evidences, obsolescence certificate etc. are annexed with the instant submission and marked as ***ANNEXURE R2*** for the kind consideration of the Hon'ble Commission. Further, certain additional supporting documents with respect to the proposed schemes are being submitted as ***Annexure R2.a*** in soft copy being shared as an e-mail link, since the documents are quite voluminous. It is being humbly submitted that many of the assets have completed the asset life, rendering the spare parts unavailable and the asset non-serviceable. In such cases, even obtaining Obsolescence Certificate by the OEM is also practically not possible. In such a scenario, it is most humbly requested that unavailability of the Obsolescence Certificate may kindly be condoned by the Hon'ble Commission on said grounds and the proposed schemes may kindly be allowed considering the difficulty to service and repair the assets.

13. In respect of certain schemes which are necessitated on account of concerns regarding sustained plant operation and safety and security of plant, it is being humbly submitted that it may not be practical to conduct a Cost-benefit analysis for such schemes, since, the same may not provide an accurate account of the importance and criticality of said schemes. The petitioner would further like to submit that in case, further details, if desired by the Hon'ble Commission, shall be provided accordingly.

14. The Petitioner would like to submit that the Detailed Project Reports (DPRs) submitted herein have been prepared following the prudent utility practices, OEM recommendation, and lifecycle-based asset health assessments to ensure safety, reliability, and stable operation of Jojobera Plants. Each DPR sets out the technical rationale, scope of works, implementation plan, necessity of projects and cost estimates based on historical benchmarks, procurement of similar equipment for other units of Tata Power and tentative quotations from vendors wherever possible. In accordance with Tata Power's corporate procurement practice, Tata power will endeavour to do competitive procurement. The proposed projects/ schemes are essential for sustenance of plant, mitigate operational risks and align with current standards. These proposed projects/ schemes are essential to Jojobera Power Plant's broader commitment to ensuring availability and supply of power to Jamshedpur city.

15. It is further submitted that, in the MYT Petition, total proposed add cap was Rs. 108.70 Cr. (Table No. 10, Pg. No. 32-35 of the MYT Petition), however, based on the recent quotations received from vendors, there is a variation in the proposed cost of several schemes/projects. Now, total revised add cap is in the tune of Rs. 112.49 Cr. But these costs continue to remain tentative in nature. Thus, at this stage, Tata Power is not proposing changes in AFC due to change in Add Cap. The actual project cost will be known only upon capitalisation of the respective schemes. Tata Power

will accordingly apprise the Hon'ble Commission of the actual capitalised cost through quarterly submissions or at the time of the True-Up for the respective year.

16. The Petitioner also submits that given the volatile nature of global supply chains, fluctuating market prices, vendor availability and the technical complexities inherent in site-specific executions, Tata Power seeks liberty from the Hon'ble Commission to accommodate reasonable changes in price, scope of works and phasing of capex if required, that may arise during execution of the works and accordingly allow Tata Power to claim change in the components of AFC at the time of APR/ True Up for the respective year. Tata power will strive to undertake such changes strictly within the bounds of prudence, transparency, and cost competitiveness, with detailed justification/ supporting documentation. The same will also be submitted to the Hon'ble Commission through our quarterly submissions or at the time of APR/ True-Up of respective year.

Query-5

17. It is observed that with regards to Additional Capitalisation for FY 2026-27 to FY 2030-31 on account of Renovation and Modernisation of Unit 2 and Unit 3 for extension of life beyond the useful life, the Petitioner has sought liberty to modify/make additions to the Capex Proposal, as the Petitioner is in the process of conducting the RLA study. It is further observed that the RLA study for Boiler (Unit-3) was tentatively planned in Jan-2026.

    In this regard, the Commission deems it appropriate to reiterate that, vide its APR Order for FY 2019-20 dated 09.09.2020, and in all subsequent tariff orders thereafter, the Petitioner was consistently directed to undertake a Residual Life Assessment (RLA) study. A considerable period has elapsed since the issuance of the said directions; however, the Petitioner has not yet completed the RLA study. In view of the above, the Petitioner is directed to submit the present status of the RLA study, including the date of commencement of the study, the scope of work undertaken, and the tentative timeline for completion of the RLA study, along with any interim findings, if available.

Reply:

18. As has been referred by the Hon'ble Commission in the query, the Petitioner has made a prayer in the instant petition seeking liberty to modify/ make additions to the Capex Proposal for FY 2026-27 to FY 2030-31 on account of Renovation and Modernisation of Unit 2 and Unit 3 for extension of life beyond the useful life. The Petitioner, in its humble submission, finds it prudent to make such a prayer for the kind consideration of the Hon'ble Commission, viewing the probable expenditure required to be incurred in future years for Renovation and Modernisation; extent, phasing and accordingly estimated expenditure for which is contingent upon the results of the assessments which are essentially to be undertaken in the upcoming assessment cycles only, as explained in the subsequent paragraphs.

19. The Petitioner, as regards the reference of the Hon'ble Commission to the ***Residual Life Assessment (RLA)***, would like to submit that RLA for "Boiler Pressure Parts" has been carried out for Unit 2&3 as a practice in accordance with Indian Boiler Regulations (IBR) in December 2021 and February 2021, respectively. Similarly, RLA for Turbine and other critical components has also been undertaken in line with OEM recommendations and prevailing utility practices for Unit 2&3 in January 2025 and February 2021, respectively. It may be noted that the stipulated frequency of the Boiler RLA is every 6 years, whereas, for Turbine and other critical components, the same is typically every 5 years. Summary of the past and upcoming RLAs is presented in the table below.

Particulars	**Last RLA***	**Next RLA**
Boiler-Unit-2	Dec-21	Dec-26
Boiler-Unit-3	Feb-21	Feb-26#
Turbine-Unit-2	Jan-25	Dec-31
Turbine-Unit-3	Feb-21	Feb-28

Note:

** The Petitioner most humbly submits that the RLA reports, being quite voluminous documents, are being provided in soft copy to be shared via e mail link* ***(Annexure-R3)****. However, the petitioner shall provide the hard copy for the same, if required by the Hon'ble Commission.*

 # As scheduled, the RLA for Boiler in Unit-3 has been completed recently in February, 2026. The study report for the same is under finalisation.

20. It may be noted here that RLA is a condition-based evaluation, undertaken at defined intervals, based on operating history, metallurgical examination, and inspection findings. The stipulated 6 years Boiler RLA cycle implies that such RLA can provide a visibility for a period of 6 years. As such, in case of Unit-2, it is till Dec, 2026 and for Unit-3, it is till Feb, 2026. However, degradation mechanisms such as creep, fatigue, oxidation, and thermal ageing are progressive and time-dependent in nature. Accordingly, certain life-limiting conditions may develop or become detectable only in subsequent RLA cycles, depending upon actual operating regime, transient conditions, and accumulated service exposure. Further, the turbine RLAs undertaken so far, have indicated a sustained life post completion of the useful life of 25 years, with few observations and recommendations; which are being undertaken.

21. Further, as regards the RLA for "Balance of Plant", which is typically required post 25 years of life of the asset, is under active consideration of the management. The same shall be scheduled, keeping in consideration, the planned RLAs as mentioned herein above and requirement of outage for such RLA.

22. Accordingly, the capital expenditure for the upcoming MYT Control Period has been proposed based on currently identified requirements and available technical

assessment inputs as a result of the RLA undertaken so far in respect of the "Boiler Pressure Parts" as per the IBR and for Turbine and other critical components in line with OEM recommendations/ prevailing utility practices.

23. In this regard, it is pertinent to note that further RLA studies which shall be carried out as per the schedule, will play a crucial role in assessing the residual technical life of critical components and identifying further requirement of refurbishment, replacement, or upgradation works, as may be necessary for continued operation of the Units beyond the present PPA period. Such works are essential from the perspective of:

- Ensuring safe and reliable operation of the Unit
- Maintaining operational efficiency and performance
- Preventing forced outages and major failures
- Enabling optimal utilization of existing generating assets

24. Summarily, it is submitted that the requirement and scope of such life extension works are contingent upon the findings and recommendations of future RLA studies and, therefore, cannot be fully envisaged at this stage. Accordingly, the Petitioner prays before the Hon'ble Commission for liberty to approach at an appropriate stage with detailed proposals for additional capitalization, as may be necessitated based on future RLA findings, for life extension and continued operation of the Unit beyond the present PPA period.

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The Tata Power Company Ltd

Jojobera Power Plant Rohargora ,Jamshedpur- 831006

Security Service Expenses From FY 20-21 to FY 24-25 For Jojobera Unit 2 & 3

Particulars	Total Security Service Expense	Cost of Services Procured		Security allocation	
		Unit 2	Unit 3	Unit 2	Unit 3
FY 2020-21	24,607,318	9,041,152	9,041,152	6,151,830	6,151,830
FY 2021-22	27,577,456	10,043,512	9,217,772	6,894,364	6,894,364
FY 2022-23	31,328,124	13,908,725	13,308,227	7,832,031	7,832,031
FY 2023-24	30,129,800	13,188,541	12,786,527	7,532,450	7,532,450
FY 2024-25	38,276,816	18,658,605	17,989,368	9,569,204	9,569,204
Total	**151,919,514**	**64,840,535**	**62,343,046**	**37,979,878**	**37,979,878**

Note: Security Services has been considered under cost of services procured head in P&L certificate.

For, Govind Agarwala & Associates
Chartered Accountants.
FRN:- 001694C

Govind Agarwala & Associates Jamshedpur Chartered Accountants

CA Govind Prasad Agarwala
Partner
M No. 070743
Date: 14/02/2026
UDIN: 26070743FUWZYX1841

ANNEXURE-R2

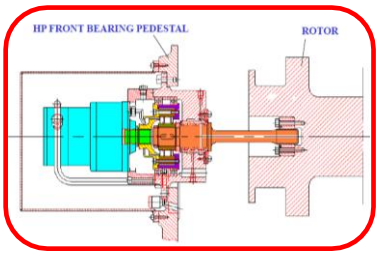
Summary capital expenditure proposed for MYT Period from FY27 to FY31

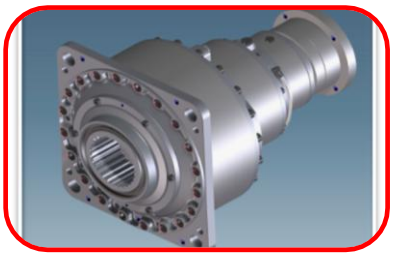
Sl. No.	Work Details	Reference	Pg. No.
1	Turning Gear Hydraulic Motor	DPR and supporting enclosed	A -1.
2	Turbine Parting plane fasteners	DPR and supporting enclosed	A-14
3	LP Turbine last stage blades	DPR and supporting enclosed	A-22
4	CT Tower Fills pack assembly	DPR and supporting enclosed	A-30
5	Ash conveying Pipe & Bends	DPR and supporting enclosed	A-41
6	Ash Slurry and Recovery pumps system	DPR and supporting enclosed	A-55
7	Main Plant Structure Refurbishment (Boiler, Coal Mill, Ash Plant & Aux. System)	DPR and supporting enclosed	A-68
8	APH Tube replacement	DPR and supporting enclosed	A-82
9	Coal Bends, MPO, Coal pipe	DPR and supporting enclosed	A-93
10	Chimney structure & Landing platform Refurbishment	DPR and supporting enclosed	A-109
11	Installation of Wheel gripper and other devices as per RDSO guideline (R33 rev.02) in wagon tippler	DPR and supporting enclosed	A-125
12	132 kV ABB BLK Breaker Replacement	Justification and supporting enclosed	A-143
13	Testing Equipment	DPR and supporting enclosed	A-147
14	U#2/3 Station Battery Bank (220V DC)	Justification and supporting evidence enclosed	A-150
15	U#2 Unit Battery Bank-220V		
16	U#3 Unit Battery Bank-220V		
17	CHP LT Breaker Replacement	Justification and supporting evidence enclosed	A-155
18	CHP HT Breaker Replacement		
19	U-2 24v bank-1 (UPS Battery Bank)	Justification and supporting evidence enclosed	A-154
20	U-3 24v bank-1 & 2 (UPS Battery Bank)		
21	FBT for change over relay	Justification enclosed	A-160
22	JEMCO MCC retrofitting	Justification and supporting evidence enclosed	A-162
23	Unit#2 Revamping of SWAS	DPR enclosed	A-165
24	Unit#3 Revamping of SWAS		
25	Master Clock System (GPS System)	DPR and supporting enclosed	A-171
26	CT Chemical dosing system	DPR and supporting enclosed	A-178
27	Fire equipment/system upgradation	DPR and supporting enclosed	A-190

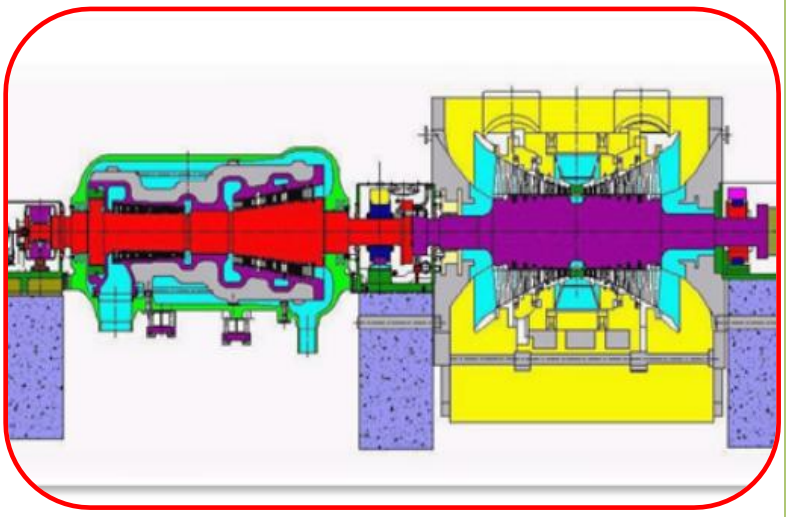
Sl. No.	Work Details	Reference	Pg. No.
28	IT infrastructure upgradation	DPR and supporting enclosed	A-199

Detailed Project Report

Turning Gear Hydraulic Motor







Unit 2 & Unit 3

Tata Power

Jojobera Power Plant

FY 2027-2031

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A1. BACKGROUND

Unit 2 & Unit 3 at Jojobera were commissioned on 1st February 2001 & 1st February 2002 respectively. Each unit is equipped with a steam turbine generator set designed to operate at a rated speed of 3000 RPM to generate electrical power at the desired load. The generator is directly coupled to the steam turbine, which derives its driving torque from high-pressure, high-temperature steam produced in the boiler through the combustion of pulverized coal.

The steam turbine is a machine designed to operate with maximum reliability, efficiency, and performance. To achieve these objectives, several auxiliary systems are integrated into the turbine, including lubrication oil systems, governing systems, sealing systems, and turning gear mechanisms. The overall efficiency and performance of the turbine depend on multiple mechanical and thermal factors, among which shaft eccentricity is one of the most critical.

Shaft eccentricity refers to the deviation of the turbine rotor's centreline from its ideal circular path during rotation. In an ideal condition, the rotor rotates perfectly concentric within the bearings. However, due to gravitational forces, thermal gradients, uneven cooling, and mechanical stresses, the rotor may experience bending or sagging, particularly during shutdowns or low-speed operation.

When the turbine is stationary, the heavy rotor tends to sag under its own weight. Since the entire turbine rotor is supported by five journal bearings, prolonged static conditions can cause permanent deformation or uneven thermal expansion. If the turbine is restarted without correcting this condition, excessive vibration, bearing wear, seal damage, and reduced turbine efficiency may occur. In extreme cases, high eccentricity can lead to rotor rubbing with stationary part or catastrophic mechanical failure.

To minimize shaft eccentricity and ensure uniform rotor temperature, a turning gear system (also known as barring gear) is installed on the turbine. The turning gear is a separate auxiliary drive, typically powered by a hydraulic motor which was operated with Jacking Oil. It engages the turbine rotor through a clutching mechanism once the main steam supply is isolated and turbine speed has reduced to a safe level.

The turning gear rotates the turbine rotor at a slow speed, typically around **100 RPM**, which is significantly lower than the rated operating speed of 3000 RPM. This slow, continuous rotation prevents the rotor from sagging under gravity and ensures even heat distribution across the rotor length. By maintaining rotor straightness and thermal symmetry, the turning gear plays a vital role in preserving turbine alignment and minimizing eccentricity.

The turning gear is critically important during both shutdown and startup phases of turbine operation. After a turbine shutdown, residual heat remains in the rotor, causing temperature gradients that can lead to differential expansion. Operating the turning gear during this period allows the rotor to cool uniformly, preventing thermal distortion.

For 120 MW turbines at Jojobera, the turning gear is generally operated for 100 to 120 hours after shutdown, depending on operating conditions and rotor temperature. Prior to turbine startup, the turning gear is run for 6 to 24 hours to ensure that the rotor is straight, uniformly heated, and free from excessive eccentricity before accelerating to rated speed.

In summary, the turning gear is an essential auxiliary system that significantly contributes to the safe, efficient, and reliable operation of steam turbines. By preventing rotor sagging, reducing shaft eccentricity, and ensuring uniform thermal distribution, the turning gear enhances turbine lifespan, minimizes vibration and mechanical wear, and supports smooth startup and shutdown operations. Proper operation and monitoring of the turning gear are therefore crucial for maintaining optimal turbine performance at Jojobera Units 2 and 3.

A2. NECESSITY OF THE PROJECT

A Residual Life Assessment Study (RLA) was carried out for 120 MW BHEL Turbine of Unit- 2 and Unit- 3 during FY 2020-21 and FY 2024-25 respectively. In the RLA, it was recommended to keep a spare of Turbine Turing gear assembly. Accordingly, being Critical Component of Turbine, it has been decided by the management of Jojobera plant, to keep spare of Turning Gear Hydraulic Motor for both the Unit-2 and Unit-3.

It is submitted that turning-gear assembly is a critical part of turbine, **imported spare** with **a long procurement lead-time**, a failure can force a shutdown that may extend **beyond 30 days,** causing a loss of electricity to end-consumers, significant impact for the plant generation, and heightened risk to grid reliability, while the CAPEX cost of a spare is far lower than the impact to plant equipment and loss to end-consumers from non-availability.

It is also submitted that Turning Gear Hydraulic Motor is critical part of Turbine required during unit start-up and shutdown to provide inertia to turbine at slow speed to avoid sagging of rotor, eccentricity, seisure of rotor and bearing failure due to High temperature approximately 540 °C maintain reliability / availability of units. Failing of operation of Turning Gear Hydraulic Motor will lead to stalling of Turbine at very high temperature. The absence of the same will lead to long outage of Unit and hamper plant generation. Due to its continuous operation, the motors have undergone wear and tear and have also outlived their useful life and will require replacements for continuous operation of the plant.

During normal operation the steam turbine runs at approximately 540 °C, and in the event of a machine trip it coasts down from its synchronous speed of 3000 RPM; it is therefore essential to bring the rotor to the barring speed of about 100 RPM and maintain that speed so that the turning gear continuously rotates the shaft. Even after shutdown, shaft temperature remains close to 500 °C and typically

requires 5–6 days to drop below the safe limit for opening bearing covers; if the turbine is stopped before adequate cooling, residual heat can transfer to the bearing metal.

The turbine bearings are lined with Babbitt metal, which has a much lower hardness and melting temperature than the shaft material, and exposure to elevated temperatures while stationary can cause Babbitt melting or wiping, leading to severe bearing damage and a serious risk of catastrophic turbine-generator failure. Moreover, the heavy rotor can sag under its own weight when stationary at high temperature, resulting in permanent deformation, uneven radial clearances, increased vibration, bearing wear, seal damage, reduced efficiency and, in extreme cases, rotor rubbing that can cause mechanical failure and prolonged forced outages. Because the spare turning-gear assembly is non-maintainable, its long lead-time, the risk of extended outages, the impact on power supply to consumers, and the safety and equipment-damage threats together make the implementation of this project essential for plant safety, equipment reliability and uninterrupted power delivery.

Additionally, the turbine rotor comprises three in line shafts HP, IP, and LP modules. These heavy rotors, if allowed to remain stationary at elevated temperatures, are susceptible to thermal sagging. Prolonged exposure may result in permanent deformation, leading to non-uniform radial clearances. This condition manifests as high vibration levels during subsequent operation, further increasing the risk of machine damage. Collectively, these issues can cause prolonged forced outages and necessitate premature turbine replacement, resulting in substantial financial loss.

The turning gear assembly, consisting of a gear motor with clutch arrangement housed within a hydraulic motor, is driven by oil pressure from the lube oil system. This assembly plays a critical role during both startup and shut down by maintaining rotor rotation at barring speed. Continuous rotation ensures uniform temperature distribution around the turbine rotor, thereby preventing rotor bowing, bearing damage, Babbitt melting, and uneven radial clearances.

At present, Unit 2 &3 of Jojobera Thermal Power Station does not have a spare turning gear assembly available in inventory. The need for such a spare has become evident following multiple instances during recent startups where the turning gear ‘AUTO’ operation failed, requiring manual intervention to initiate rotor movement from standstill. These incidents strongly indicate the onset of deterioration or malfunction in the existing turning gear assembly.

Furthermore, Tata Power’s experience during the commissioning of similar units in recent years highlights the critical nature of turning gear failures. In one such case, even the OEM required 5–7 days to diagnose the issue despite deploying expert resources. Eventually, the OEM recommended complete

replacement after unsuccessful troubleshooting. As the turning gear assembly is an imported item, procurement involves a long lead time, significantly extending outage duration.

These experiences confirm that the turning gear assembly is a critical, non-maintainable spare of replacement nature, failure of which can severely impact unit availability and reliability.

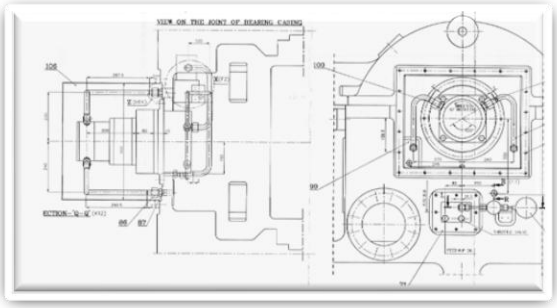
Considering the operational risks, past incidents, and high implications of an unexpected failure, it is strongly justified to maintain a spare turning gear assembly. This proactive measure will significantly reduce the risk of prolonged forced outages and safeguard the turbine-generator against catastrophic damage, thereby ensuring sustained plant reliability and operational continuity.

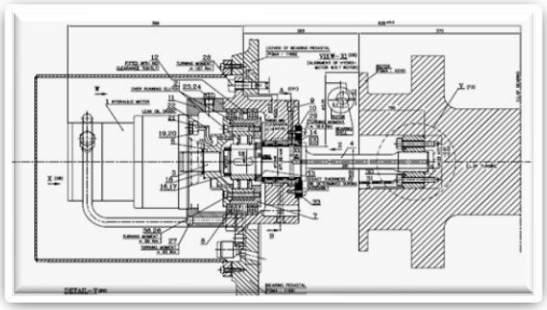
A3. PROJECT DESCRIPTION, EXECUTION & TESTING

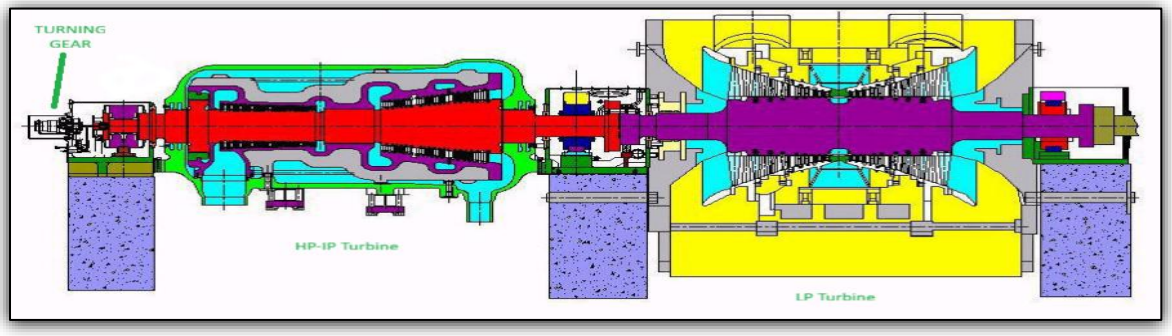
- Process/Project Description:

  During steam turbine warm-up, the main steam stop valves downstream of the boiler are equipped with bypass lines that allow a controlled flow of superheated steam to bypass the valves. This enables gradual heating of the steam lines and the turbine, minimizing thermal stress. When no steam is admitted to the turbine, a turning gear is engaged to rotate the rotor slowly. This rotation ensures uniform heating of the shaft and prevents thermal bowing. After an initial period of rotation, sufficient time is allowed for the rotor to stabilize and assume a straight condition. Once the rotor is confirmed to be free of bowing, the turning gear is disengaged, and steam is cautiously admitted to the turbine. Steam is first directed to the astern blades, followed by the ahead blades, causing the turbine to rotate slowly at approximately 10–15 RPM (0.17–0.25 Hz). This controlled low-speed rotation allows the turbine to warm evenly before normal operation.

- The hydraulic turning gear is located at the forward end of the front bearing pedestal of the HP-IP turbine cylinder. The arrangement and components of this assembly are illustrated in the accompanying figure.







- Project Execution & Project Testing:

Replacement of the turning gear assembly shall be carried out based on the assessed criticality of the existing assembly's condition or in emergency situations, such as catastrophic failure of the operating unit.

At the time of replacement, the following activities shall be performed in the specified sequence:

1. Remove the cover of the turning gear after confirming that the turbine shaft temperature has reduced to below 150 °C.
2. Close the input oil supply lines to the hydraulic motor control valves.
3. Remove the top cover of the first journal bearing.
4. Disconnect the oil lines connected to the hydraulic motor.
5. Remove the hydraulic motor from the No. 1 bearing housing.
6. Install the new hydraulic motor into the bearing housing.
7. Perform blue matching between the hydraulic motor mounting face and the bearing housing to ensure proper contact.
8. Inspect and measure turbine shaft run-out with respect to the hydraulic motor position.
9. Align the hydraulic motor with the turbine rotor.
10. Reconnect the oil lines to the new hydraulic motor.

11. Open the oil supply valves and verify that all connections are leak-free.
12. Reassemble (box up) the bearing housing.
13. Start the lift oil pump to ensure proper lifting of the turbine shaft at all six bearings.
14. Start the turbine lubricating oil pump and place the lube oil system into operation.
15. Conduct a trial run of the hydraulic motor by actuating the solenoid valves.

After delivery of the equipment at the Jojobera Power Plant, offline testing of Hydro Motor will be performed by application of pneumatic pressure equivalent to oil pressure of 5 Kg/cm2 in presence of the OEM Engineers.

A4. Benefits Of The Project

- ✓ The spare Turning Gear Assembly will reduce the risk of extensive unforeseen outage of the Unit due to irreparable damage of the existing set.
- ✓ Eliminates risk of prolonged forced outages
- ✓ Ensures safe shutdown and startup of turbine
- ✓ Protects turbine-generator from catastrophic failure
- ✓ Reduces dependency on OEM emergency support
- ✓ Improves unit availability, reliability, and safety
- ✓ Aligns with best practices for critical spares management

A5. Financial Details (Project Cost)

The proposed scheme is for Unit 2 and Unit 3; hence, proposed project cost is to be allocated equally among these units. The project cost is estimated at Rs. 92.50 Lakh based on rates available in the earlier Purchase Orders for supply and services. The total project is planned in phased manner, and the expenditure will be as per the table below.

Projected Cost including capitalization phasing is shown below:

Total Project Cost with Capitalization Phasing						
Particulars	**UoM**	**FY 27**	**FY 28**	**FY 29**	**FY 30**	**FY 31**
Project Cost allocated to Unit 2	Rs Lakh	46.25				
Project Cost allocated to Unit 3	Rs Lakh		46.25			
Total For Unit 2 & 3	**Rs Lakh**	**46.25**	**46.25**			

A6. CONCLUSION

Considering the above it is therefore, humbly requested to the Hon'ble Commission to approve the Capex Scheme of Turning Gear Hydraulic Motor for Unit 2 & 3.

A7. ENCLOSURE

Annexure- 1A: Final Report of Residual Life Assessment Study of 120 MW BHEL Turbine Unit- 2 (Pg. No.10).

Executive Summary

Sr. No.	Component	Test	Key Observation/Condition Assessment Findings	Remarks
01.	**HP-IP Turbine Rotor:** a. Gland Area (Front, Intermediate, BP & Rear) b. Blades c. Interstage Area d. Coupling Hub e. Journal	**Visual**	**HP side**: • Minor rubbing marks are noticed on journal area. • Sealing strips of stage 1 – 12 found damaged about 30-60 % area. Also at few locations sealing strips found bent at edges. • Brownish color observed on HP front axial. • Intermediate Gland sealing strips found damage. • Blades of rotor found in good condition. **IP side** • Minor rubbing marks and blackness color are noticed on journal area. • In stage 19 of IP side, 3nos of blades near balancing wedge found with erosion and dents marks. • Inter stage sealing strips of stage 1 to 19 found partially damaged about 20-60 %. Also minor bents/damage observed on sealing strips.	Damage seals to be replaced as per OEM practice. Plan for spares of Turbine Turning Gear Hydraulic motor (Critical spares). Overall findings and analysis shows that the component found in satisfactory condition and still fit for continued operation. **Based on Microstructure no degradation observed, hence remaining life is approximately more than 80% of original design life in light of the defects and ageing factors** **RLA is to be carried out after 5 years.**
		DC	Dimension checks have been carried out and recorded.	
		DPT	No surface indication observed on rotor components during DPT.	
		MPI	No surface & sub-surface indication observed during coil MPI.	
		UT	No recordable indication observed during ultrasonic testing.	
		MT	Microstructure shows coarse bainitic grains with ferrite structure.	
		HB	Hardness values found satisfactory. Range: PM:199- 210 BHN	

Arun kumar	Vinay Kasana	Mohar Lal	Plant Assessments Group	PAGE No.
Prepared by-	Checked by-	Approved by-		- 1 -

Annexure- 1B: Final Report of Residual Life Assessment Study of 120 MW BHEL Turbine Unit- 3 (Pg. No. 38)

RESIDUAL LIFE ASSESSMENT
120 MW BHEL TURBINE U#3
TATA,JOJOBERA

Component	Location/Quantity	TEST CONDUCTED	Major findings	Run/Repair/Replace Recommendations
Cross over pipes	TG Floor IP to LP	VT, DPT, MPI	No Significant test findings observed	Accepted
Extraction Pipeline	Weld Joints in condenser	VT, DPT, MPI & TM	No Significant test findings observed	Accepted
Condenser	Water box	VT	No Significant test findings observed	Accepted

Major Recommendations:-

- Turbine & Generator Bearing supports replacement recommend for reliable operation.
- HP control valve both left & right valve seat excessive erosion observed. Need to repair / replacement of Valve seat on next Overhaul.
- HPSV & CV valve body clearances were higher side need to repair / replacement on opportunity basis
- HP-IP &LP Turbine casing parting plane fasteners and HP-IP Valve body fasteners recommendation for replacement. Last 20 years continuously Turbine parting plane bolts exposed to high-temperature steam and high pressure it leads to Creep / fatigue failure.
- LP Stage 7,8 & 9 blades were eroded due to wet steam. Need to replacement on next overhaul.
- Turbine Turing gear assembly keeps as the critical spare.
- MS, HRH, CRH and extraction L-Ring along with Lock nut and fasteners set replacement recommendation due to these rings are deformed due to continuously exposed to high-temperature and pressure steam and cyclic operation.
- HP-IP to LP and LP to Generator Coupling fasteners set replacement recommendation due to last 20 years running at high torque condition also in every in-shutdown the Coupling bolts were elongation tightening.
- HP Bypass (BP, BD and BPE Valves) spindle and seat steam erosion.
- HP Bypass valve (BP, BD and BPE Valves) body fasteners set recommendation (Critical spares & Long Lead Time)

Steam Power Services
Repair Development

GE POWER INDIA LTD

CERTIFICATE OF AUTHORISATION

M/s Metals & Engineers

Located at 254A Govind Puri, Ranipur, 249407 Haridwar, Uttrakhand, India

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Peter Dössegger
Head of Sales

Lukas Ziegler
CEO

rollstar
Your vision is our drive

Ganesh Sorapalli

From: METALS & ENGINEERS INDIA <maeindia09@gmail.com>
Sent: 10 February 2026 16:02
To: Ganesh Sorapalli
Cc: Kumar Pravin
Subject: Re: Techno-Commercial budgetary offer for ROLL STAR Hydraulic Motor/Epicyclic Gear Box Type M14R-5.143B
Attachments: Certificate Rollstar Indien - Metals and Engineers (1).pdf

[EXTERNAL sender, Exercise caution..!]

Dear sir,

We thank you for your below enquiry for Rollstar make Hydraulic Motor M14R-5.143B

Please find below our best offer:

HYDRAULIC MOTOR
M14R-5.143B
MAKE: ROLLSTAR AG,SWITZERLAND

PRICE: INR 45,32,450.00

TERMS & CONDITIONS
GST: 18% EXTRA
P&F: NIL
FREIGHT: NIL
DELIVERY TERMS: FOR STORES, TATA POWER,JOJOBERA
PAYMENT TERMS: WITHIN 30 DAYS FROM INVOICE DATE

Authority letter from Rollstar,AG,Switzerland attached.

Hope you will find the above in line with your expectations.

1

Look forward for your valuable PO.

For more information we always remain.

Thanks in advance & regards

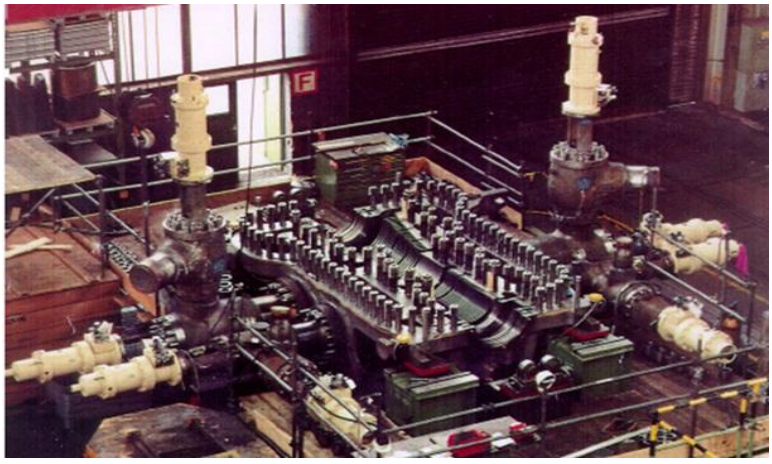
kapil
Metals & Engineers India
Haridwar,India
Cell.no. 0091 9412071410

On Tue, Feb 10, 2026 at 3:06 PM Ganesh Sorapalli <sorapalli.ganesh@tatapower.com> wrote:

> Dear sir,
>
> Please provide the Techno-Commercial budgetary offer for ROLL STAR Hydraulic Motor/Epicyclic Gear Box Type M14R-5.143B.
>
> Regards,
>
> Sorapalli Hari Venkata Ganesh
>
> Group Head - Turbine & Auxiliaries
>
> The Tata Power Company Limited, Jojobera Power Plant, Jamshedpur 831 016 Jharkhand, India
>
> Mobile: 8092222029

Detailed Project Report

Turbine Parting Plane Bolts & Coupling Bolts



Unit 3

Tata Power

Jojobera Power Plant

FY 2027-2031

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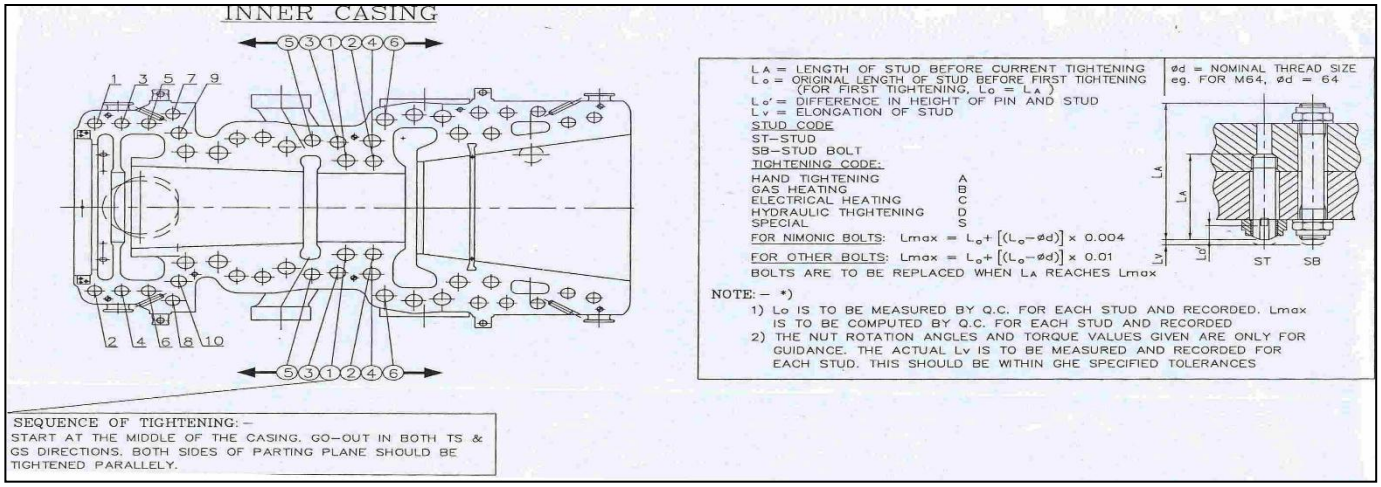
A1. BACKGROUND

Unit 3 of Jojobera was commissioned on 1st February 2002. The 120 MW Generator is driven by the Steam Turbine which is rotated by the high-pressure steam generating out of the Boiler. The steam enters the turbine at 540o C and 126 kg/cm2. The turbine is divided into two cylinders-

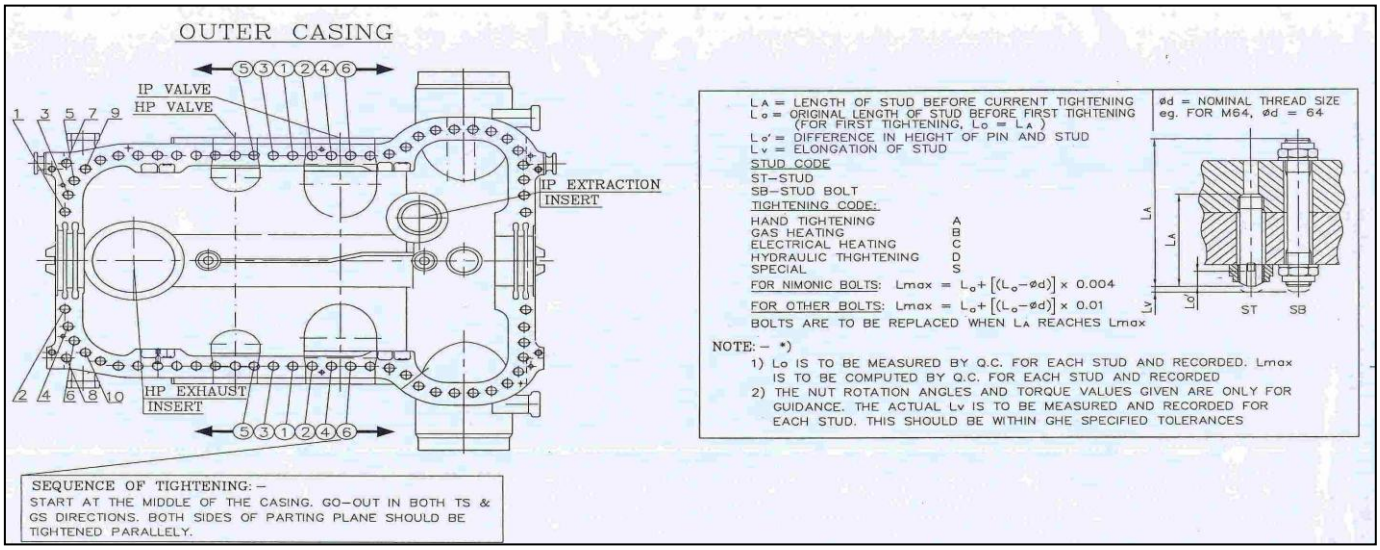
- ✓ High Pressure Cylinder
- ✓ Combined Intermediate Pressure-Low Pressure Cylinder

The steam after doing work on the HP Turbine moves out and enters the reheater to elevate the temperature of steam to 540^{o} C at 32 kg/cm^{2} for entering into the IP-LP Turbine. The Turbine cylinder is generally enclosed within double shell casing. The casing is essentially a pressure vessel which is capable of withstanding the maximum working pressure and temperature produced within the Turbine. The turbine cylinders are supported at each end. The cylinders are extremely stiff in the longitudinal direction in order to prevent bending and to allow clearances to be maintained between the fixed and moving parts of the Turbine.

In the turbine of Unit 3, the HP cylinder is of the double shell design; the inner shell carries the stationary blading and diaphragms and is subject to full steam pressure, whilst the space between the two shells is subject to the exhaust steam pressure of the HP cylinder. Each casing is again divided into the Top and the Bottom casing. The two halves of the casings are hold together at the level of the dividing plane of the casings by means of robust type Parting Bolts. Further, the HP, IP-LP and the Generator shaft are coupled together by similar type Coupling Bolts. Shaft



Coupling Bolts are required to transmit torque, allow angular misalignment, provide torsional resilience and transmit axial thrust.



A2. NECESSITY OF THE PROJECT

For Unit-3, a Residual Life Assessment Study (RLA) was carried out for 120 MW BHEL Turbine during FY 2020-21. In the RLA, it was recommended that in the last 20 years continuously Turbine parting plane bolts exposed to high-temperature steam and high pressure it leads to Creep / fatigue failure. Therefore, HP-IP & LP Turbine casing parting plane fasteners and HP-IP Valve body fasteners recommended for replacement.

Accordingly, it has been decided by the management of Jojobera plant to replace above mentioned parts in the coming overhaul in FY 2026-27.

Moreover, it is submitted that the Hon'ble Commission has already approved the additional capital expenditure for Unit-2 for FY 2024-25 and the same has been submitted in the True Up of FY 2024-25. The same scope of work is also required for Unit-3 as part of its planned major overhaul scheduled in FY 2026-27. As these components are critical for ensuring vibration control and safe turbine operation, their replacement at the time of overhaul is mandatory to avoid potential failures and associated risks to plant availability and safety.

Since the Unit-3 activity is planned two years after the Unit-2 execution, the cost of materials and services is subject to normal industry-wide escalation. Accordingly, the estimated expenditure for Unit-3 reflects the prevailing market prices applicable for FY 2026-27. In view of the critical nature of the work and the time-linked cost escalation, the Hon'ble Commission is prayed to approve the additional capital expenditure for Unit-3.

Turbine parting plane fasteners are required for assembly of Turbine HP-IP Module and valve assembly which are torque tightened and stretched as per specification. Implementing the renewal of turbine part-plane bolts and coupling bolts for Unit 3 is an imperative step because the existing fasteners have already exceeded the OEM-mandated service life of two dismantling cycles or ten years of operation, whichever occurs first. Unit 3 has been in service for 20 years. These fasteners fit in high temperature zone and have been torque tightened and stretched many a times during turbine major overhauling. Over-aged fasteners with elevated hardness and higher elongation due to multiple times stretching pose failure risk. Replacement of parting plane fasteners prevents forced outages in major turbine assemblies. Over the life of the turbine, these bolts endure repetitive heating-and-cooling shocks, high-pressure (≈135 kg/cm²) and high-temperature (≈535 °C) conditions, and frequent removal and re-installation during overhauls. Such operating stresses induce fatigue, and any bolt failure would immediately compromise the stiffness between the casing halves, allowing steam to leak through the parting plane, generating severe vibration, and potentially causing misalignment that could make rotating blades rub against static casings. In the worst-case scenario, the turbine could disengage from its assembly, leading to catastrophic destruction that threatens human lives and results in substantial asset loss. Consequently, timely renewal is essential not only for the safety of personnel and equipment but also to maintain uninterrupted power generation for end-consumers; preventing prolonged outages and unplanned shutdowns mitigates downstream impacts on operations of beneficiaries and people in Jamshedpur. The renewal process involves, during scheduled overhauls, removal of the part-plane and coupling bolts to access turbine internals, followed by a strict re-fit sequence prescribed by the OEM: initial hand tightening, heating of the studs by induction or gas to an elevated temperature, and a final torque tightening to OEM-specified values, with nuts hammered to achieve zero clearance between the nut and casing surface. Alignment checks of shafts will be performed to preclude misalignment, and zero-leakage tests will be conducted at start-up to certify machine health. The entire execution will be managed by an external agency under the supervision of Tata Power's Mechanical Maintenance Department, ensuring that the project adheres to the planned schedule (FY 27-31) and avoids future lead-time constraints. By addressing these critical issues now, the

project nullifies the risk of catastrophic failure, safeguards plant and personnel safety, and guarantees reliable electricity supply to consumers.

A4. Project Description, Execution & Testing

- **Process/Project Description:**

Turbine cylinders have horizontal split casings. These casings are kept steam tight by series of fasteners to keep the casing hub together. These fasteners are termed as Parting Plane Bolts. There are three separate shafts for HP Turbine, IP-LP Turbine and the Generator rotor. All these shafts are bolted with one another co-axially to form a single shaft for rotation around a single axis. These shafts are fastened to one another by means of Coupling Bolts.

Turbine HP and IP-LP Module have two sets of Parting Plane Bolts, one in the inner casing and another in the outer casing. The normal process for tightening these bolts is by hammering up to zero clearance between nut and the casing surface. Then these bolts are heated by means of induction heating or gas heating up to the elevated temperature and then tightened again up to the desire torque level. The same will be applied for the new Parting Plane Bolts, both inner and outer casing, as well as the Coupling Bolts. During opening of Parting Plane Bolts and Coupling Bolts before renewal reverse process will be followed. In such case, the bolts will be heated up to the elevated temperature by gas heating or induction heating and then loosened by means of spanner.

- **Project Execution:**

During shutdown of the Unit, all these Parting Plane Bolts and the Coupling Bolts will be removed to access the turbine internals. After completion of overhauling, all these studs will be renewed maintaining the same sequences of fitment as recommended by OEM. After that nuts will be tightened by hammering to ensure zero gap between parting planes and the shafts. Subsequently, the studs will be heated by induction heating or gas heating to elevated temperature and further tightening will be done as per the torque setting given by OEM.

The entire Project will be executed by external agency under the supervision of Tata Power Mechanical Maintenance Department.

- **Project Testing:**

During starting of the machine and putting steam inside the machine zero leakage from parting plane will be ensured to certify the healthiness of the machine. In case of Coupling Bolts, alignment checking of the shafts will be performed to rule out the possibility of any misalignment.

A4. Benefits Of The Project

✓ Risk of occurrence of any catastrophic destruction due to failure of Parting Plane Bolts and Coupling Bolts endangering human lives will be nullified.

A5. Financial Details (Project Cost)

The proposed scheme is for Unit 3, hence; proposed project cost is to be allocated. The project cost is estimated at Rs. 860.00 Lakh based on rates available. The total project is planned for FY 27 as per the table below.

Projected Cost including capitalization phasing is shown below:

Total Project Cost with Capitalization Phasing						
Particulars	**UoM**	**FY 27**	**FY 28**	**FY 29**	**FY 30**	**FY 31**
Project Cost allocated to Unit 3	Rs Lakh	860.00				
Total For Unit 3	**Rs Lakh**	**860.00**				

A6. Enclosure

Annexure-2: Final Report of Residual Life Assessment Study of 120 MW BHEL Turbine Unit- 3 (Pg. No 38)

RESIDUAL LIFE ASSESSMENT
120 MW BHEL TURBINE U#3
TATA,JOJOBERA

Component	Location/Quantity	TEST CONDUCTED	Major findings	Run/Repair/Replace Recommendations
Cross over pipes	TG Floor IP to LP	VT, DPT, MPI	No Significant test findings observed	Accepted
Extraction Pipeline	Weld Joints in condenser	VT, DPT, MPI & TM	No Significant test findings observed	Accepted
Condenser	Water box	VT	No Significant test findings observed	Accepted

Major Recommendations:-

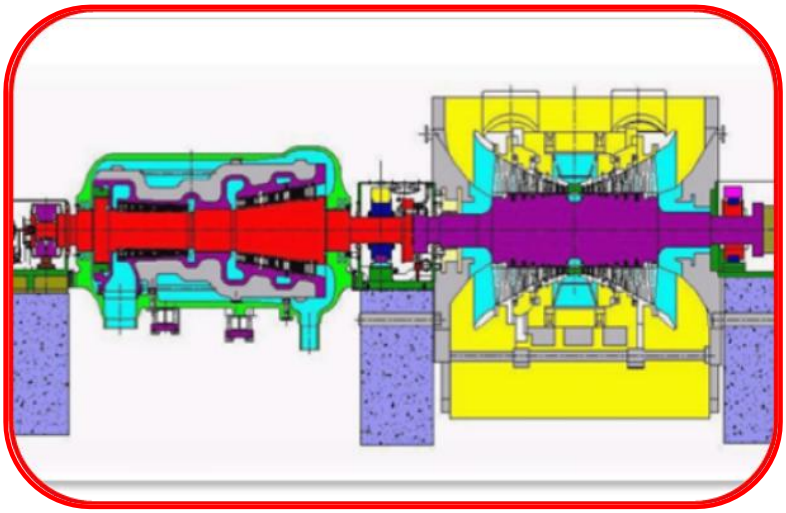
- Turbine & Generator Bearing supports replacement recommend for reliable operation.
- HP control valve both left & right valve seat excessive erosion observed. Need to repair / replacement of Valve seat on next Overhaul.
- HPSV & CV valve body clearances were higher side need to repair / replacement on opportunity basis
- HP-IP &LP Turbine casing parting plane fasteners and HP-IP Valve body fasteners recommendation for replacement. Last 20 years continuously Turbine parting plane bolts exposed to high-temperature steam and high pressure it leads to Creep / fatigue failure.
- LP Stage 7,8 & 9 blades were eroded due to wet steam. Need to replacement on next overhaul.
- Turbine Turing gear assembly keeps as the critical spare.
- MS, HRH, CRH and extraction L-Ring along with Lock nut and fasteners set replacement recommendation due to these rings are deformed due to continuously exposed to high-temperature and pressure steam and cyclic operation.
- HP-IP to LP and LP to Generator Coupling fasteners set replacement recommendation due to last 20 years running at high torque condition also in every in-shutdown the Coupling bolts were elongation tightening.
- HP Bypass (BP, BD and BPE Valves) spindle and seat steam erosion.
- HP Bypass valve (BP, BD and BPE Valves) body fasteners set recommendation (Critical spares & Long Lead Time)

Steam Power Services
Repair Development

GE POWER INDIA LTD

Detailed Project Report

LP Turbine last Stage blades



Unit 3,

Tata Power, Jojobera Power Plant

FY 2027-31

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A1. BACKGROUND

Unit 3 at Jojobera were commissioned on 1st February 2002 respectively. Each unit is equipped with a High Pressure, Intermediate Pressure (HP–IP) steam turbine, a Low Pressure (LP) turbine, and a generator set designed to operate at a rated speed of 3000 RPM to produce electrical power at full load. The generator is directly coupled to the HP–IP and LP steam turbines.

The HP turbine derives its driving torque from high pressure &temperature steam generated in the boiler through the combustion of pulverized coal. After performing work in the HP turbine, the steam is returned to the boiler for reheating. The reheated steam then enters the IP turbine, where further expansion and energy extraction take place. Upon exiting the IP turbine, the steam now at low pressure and temperature enters the LP turbine.

The LP turbine represents the final stage of energy extraction in the steam cycle. Its primary function is to convert the remaining thermal energy of low pressure, low temperature steam into mechanical work before the steam is discharged to the condenser. By recovering exhaust energy from the IP turbine that would otherwise be wasted, the LP turbine significantly enhances the overall thermodynamic efficiency of the plant. Typically, the LP turbine contributes approximately 50% to 70% of the total gross power output.

As steam pressure decreases, its specific volume increases substantially. To accommodate this large volumetric flow, the LP turbine is designed with a large casing diameter and long last-stage blades. The LP turbine employs a double flow configuration, in which steam enters at the center and flows outward in opposite directions. This arrangement effectively balances axial thrust on the rotor, thereby reducing the load on the thrust bearings.

The LP turbine blades operate under severe mechanical and thermal conditions, including high centrifugal stresses, moisture induced erosion, and vibration. Over prolonged periods of operation, degradation of blade material and associated components is inevitable, adversely affecting turbine efficiency, reliability, and operational safety.

The units have been in continuous operation since commissioning, and periodic inspections have revealed progressive wear and deterioration of the LP turbine last-stage blades. In view of the plant's age, prevailing operating conditions, replacement of the LP turbine last-stage blades is proposed under the CAPEX.

A2. NECESSITY OF THE PROJECT

For Unit-3, a Residual Life Assessment Study (RLA) was carried out for 120 MW BHEL Turbine during FY 2020-21. In the RLA, it was recommended that LP Stage 7,8 & 9 blades are getting eroded due to wet steam and need to replacement on next overhaul (Reference Pg. No. 38 of

enclosure). Accordingly, it has been decided by the management of Jojobera plant to replace above mentioned parts in the coming overhaul in FY 2026-27.

Further, it is submitted that Unit- 3 has been in service for more than 20 years. During this period severe wet steam erosion have occurred in the Turbine last stage blades impacting reliability and unit availability. Therefore, it required to replace for reliable operation of turbine and Unit availability. There is high probability of vibration instance due to unbalance of LP Rotor blades causing forced outage of Unit. Additionally, due to failure of Turbine blade it may cause catastrophe due to damage of equipment.

During the last major overhaul of the turbine, it was observed that the LP turbine rotor blades had suffered significant erosion due to prolonged exposure to wet steam conditions. The surface finish of the LP turbine blades was found to be severely deteriorated, indicating material loss and profile distortion caused by moisture erosion. Such degradation of blade surface quality adversely affects the aerodynamic performance of the turbine, leading to increased losses and a measurable deterioration in turbine heat rate. Poor surface finish increases steam flow resistance and reduces the effective energy conversion efficiency, thereby increasing specific steam consumption and overall fuel usage.

In addition to surface degradation, Non-Destructive Testing (NDT) conducted on the LP turbine rotor blades revealed that the natural frequency values of several blades were outside the desired and OEM-recommended limits. Deviation of blade natural frequencies from design values significantly increases the risk of resonance under normal operating conditions. This condition elevates dynamic stresses and vibration levels in the blades, which can accelerate fatigue damage and ultimately result in blade cracking or catastrophic blade failure.

Failure of LP turbine blades poses a serious operational risk, as a liberated blade can cause extensive secondary damage to critical turbine internals, including the casing, diaphragms, shaft, bearings, and condenser. Such events often result in prolonged forced outages, substantial repair costs, loss of generation, and significant capital damage. Historical industry experience indicates that LP turbine blade failures are a major contributor to unplanned outages in aging thermal power plants.

Furthermore, degradation of LP turbine blade profiles and surface conditions leads to a sustained decline in turbine efficiency and output capability. If left unaddressed, this condition compromises the long-term reliability, safety, and availability of the unit. Considering the observed erosion, unfavourable natural frequency characteristics, operational risks, and OEM recommendations, replacement of the LP turbine blades is essential to restore turbine

performance, improve heat rate, mitigate failure risks, and ensure sustained safe and reliable operation of the unit over its remaining service life

A3. PROJECT DESCRIPTION, EXECUTION & TESTING

The proposed project involves the procurement of LP turbine last-stage blades and the replacement of the existing LP turbine last-stage blades with new blades fully conforming to Original Equipment Manufacturer (OEM) specifications, design standards, and material requirements. The objective of this activity is to restore turbine efficiency, enhance operational reliability, and mitigate the risk of blade failure associated with aging and erosion-related degradation.

The scope of work includes complete disassembly, inspection, replacement, reassembly, and recommissioning of the LP turbine, encompassing the following activities:

- Dismantling of the LP turbine outer and inner casings in accordance with OEM-approved procedures.
- Thorough cleaning of turbine internals, including diaphragms, rotor, blade path, and casing internals, using alumina grit to remove deposits, erosion products, and contaminants.
- Removal of existing LP turbine last-stage blades, followed by detailed inspection of the rotor disc, blade roots, locking arrangements, and associated components for signs of wear, cracks, fretting, or deformation.
- Dimensional checks and Non-Destructive Testing (NDT) of critical components to ensure their fitness for continued service.
- Installation of new LP turbine last-stage blades strictly in accordance with OEM-recommended fitment sequences, tolerances, and locking arrangements.
- Restoration of turbine internals, including diaphragms and sealing components, ensuring correct clearances and alignment.
- Reassembly of LP turbine inner and outer casings, with tightening of parting plane bolts, coupling bolts, and fasteners as per OEM torque specifications and approved tightening sequences.
- Static and dynamic balancing of the LP turbine rotor, as applicable, to ensure smooth and vibration-free operation.
- Verification of shaft alignment, rotor run-out measurements, and bearing clearances to confirm mechanical integrity.
- Final inspection and preservation of turbine internals prior to rolling.

The execution of the job shall be carried out during a planned unit shutdown and will follow a systematic and controlled sequence to ensure safety, quality, and schedule adherence:

- Planned shutdown of the unit with safe isolation of all turbine systems, including steam, condensate, lubrication oil, and electrical systems.
- Opening of LP turbine casings using certified lifting tools and fixtures, following OEM-approved methods.
- Cleaning and preparation of internal components and rotor to facilitate accurate inspection and assembly.
- Removal of worn blades and inspection of critical interfaces, with corrective actions taken as required based on inspection findings.
- Installation of new last-stage blades with precise control of blade seating, locking, and orientation to ensure uniform load distribution.
- Completion of casing closure, fastener tightening, and sealing checks.
- Performance of shaft alignment checks, rotor run-out measurements, and balance verification.
- Controlled turbine rolling, with continuous vibration, temperature, and axial displacement monitoring during speed ramp-up.
- Load build-up and stabilization with close monitoring of vibration levels, bearing parameters, and steam conditions.
- Final verification of turbine performance and operational parameters.

A4. BENEFITS OF THE PROJECT

1. By eliminating erosion damaged blades and restoring proper dynamic characteristics, the likelihood of unexpected blade failures and associated forced outages will be substantially reduced, leading to more predictable and reliable unit operation.
2. Restoring the original aerodynamic blade profiles and surface finish will improve steam flow efficiency through the LP turbine. This will reduce internal losses, improve energy extraction from low pressure steam, and result in measurable improvement in turbine heat rate.
3. LP turbine blade failure represents a significant safety hazard due to the potential for high energy fragments to cause extensive secondary damage to turbine internals and pose risks to personnel. Replacement of aging and frequency deviated blades will mitigate these risks, ensuring safe operation.
4. The replacement will assist further deterioration of the LP turbine section, extend the useful service life of critical rotating components, and support sustained long term operation

of the unit. Improved mechanical condition will translate into higher unit availability and reduced downtime over the remaining life of the plant.

5. Replacement of LP turbine last stage blades under a planned outage will minimize the need for frequent corrective maintenance and eliminate the high costs associated with emergency repairs, major secondary damage, and prolonged forced outages. This will result in optimized maintenance expenditure and improved lifecycle cost.

A5. FINANCIAL DETAILS

The proposed scheme is for Unit 3; hence, proposed project cost is to be allocated to unit 3. The project cost is estimated at Rs. 500.00 Lakh. The total project expenditure is as per the table below.

Projected Cost including capitalization phasing is shown below:

Total Project Cost with Capitalization Phasing						
Particulars	**UoM**	**FY 27**	**FY 28**	**FY 29**	**FY 30**	**FY 31**
Project Cost allocated to Unit 3	Rs Lakh	500.00				
Total For Unit 3	**Rs Lakh**	**500.00**				

A6. ENCLOSURE

Annexure- 3: Final Report of Residual Life Assessment Study of 120 MW BHEL Turbine Unit- 3.

RESIDUAL LIFE ASSESSMENT
120 MW BHEL TURBINE U#3
TATA,JOJOBERA

Component	Location/Quantity	TEST CONDUCTED	Major findings	Run/Repair/Replace Recommendations
Cross over pipes	TG Floor IP to LP	VT, DPT, MPI	No Significant test findings observed	Accepted
Extraction Pipeline	Weld Joints in condenser	VT, DPT, MPI & TM	No Significant test findings observed	Accepted
Condenser	Water box	VT	No Significant test findings observed	Accepted

Major Recommendations:-

- Turbine & Generator Bearing supports replacement recommend for reliable operation.
- HP control valve both left & right valve seat excessive erosion observed. Need to repair / replacement of Valve seat on next Overhaul.
- HPSV & CV valve body clearances were higher side need to repair / replacement on opportunity basis
- HP-IP &LP Turbine casing parting plane fasteners and HP-IP Valve body fasteners recommendation for replacement. Last 20 years continuously Turbine parting plane bolts exposed to high-temperature steam and high pressure it leads to Creep / fatigue failure.
- LP Stage 7,8 & 9 blades were eroded due to wet steam. Need to replacement on next overhaul.
- Turbine Turing gear assembly keeps as the critical spare.
- MS, HRH, CRH and extraction L-Ring along with Lock nut and fasteners set replacement recommendation due to these rings are deformed due to continuously exposed to high-temperature and pressure steam and cyclic operation.
- HP-IP to LP and LP to Generator Coupling fasteners set replacement recommendation due to last 20 years running at high torque condition also in every in-shutdown the Coupling bolts were elongation tightening.
- HP Bypass (BP, BD and BPE Valves) spindle and seat steam erosion.
- HP Bypass valve (BP, BD and BPE Valves) body fasteners set recommendation (Critical spares & Long Lead Time)

Steam Power Services
Repair Development

GE POWER INDIA LTD

Detailed Project Report

CT Tower Fills Pack assembly

Unit 2 & Unit 3

Tata Power

Jojobera Power Plant

FY 2027-2031

TABLE OF CONTENTS

A1. BACKGROUND

Units 2 and 3 at Jojobera Power plant were commissioned on 1st February 2001 and 1st February 2002, respectively. In these units, coal serves as the primary fuel for generating heat in the boiler. The coal is pulverized in the coal mill, and the pulverized coal is then fed into the steam generator (boiler), where it is combusted to produce steam at the required pressure and temperature as per the plant load demand. The generated steam flows through various parts of the boiler and subsequently enters the steam turbine, where it expands and performs mechanical work. This mechanical energy is converted into electrical energy through an electrical generator coupled to the turbine. After leaving the turbine, the exhaust steam enters the steam condenser, where it rejects its latent heat to the cooling water and condenses back into water for reuse in the cycle. The heat gained by the cooling water in the condenser is equal to the heat lost by the steam, as per the principle of heat exchange.

The cooling water, after absorbing heat in the condenser, is circulated by cooling water pumps to the cooling tower. During this process, the water gains sensible heat in the condenser and is cooled again in the cooling tower before being recirculated back to the condenser. The cooling tower plays a crucial role in rejecting the waste heat absorbed by the cooling water from the condenser. It reduces the temperature of the hot return water from the condenser and supplies cooled water back to maintain condenser performance. A lower inlet water temperature to the condenser results in a higher vacuum, which improves turbine efficiency and increases power output for the same coal consumption. Consequently, enhancing overall thermal performance.

The Cooling Tower System is a critical auxiliary component of the thermal power plant, responsible for dissipating heat absorbed not only by the condenser but also by generator air coolers, turbine oil coolers, and other auxiliary heat exchangers.

For Units #2 and #3 (each of 120 MW capacity), the Cooling Tower System consists of a 12-cell Induced Draft Counter Flow Tower (IDCT), designed and commissioned by M/s Balkadur in 2000. The system has a total circulating water capacity of 36,000 m^3/hr and is designed for Hot Water Temperature: 43°C, Cold Water Temperature: 33°C & Wet Bulb Temperature (WBT): 28.8°C

A 2. NECESSITY OF THE PROJECT

Units -2 and 3, each of 120 MW capacity, at Jojobera Power Plant are served by a common Cooling Tower System consisting of 12 Induced Draft Cooling Tower (IDCT) cells with a common forebay. The cooling water recirculation flow rate for each cooling tower is approximately 36,000 m^3/hr. Over time, the performance of the cooling tower fans, and internal components has deteriorated, resulting in a noticeable increase in cooling water outlet temperature. This degradation has had a

direct adverse impact on condenser vacuum and overall unit efficiency. It has been observed that for Units #2 and #3, the cooling water outlet temperature now reaches 37–38.5°C, compared to the design value of 33°C. This deviation indicates a significant reduction in cooling tower heat exchange efficiency.

The primary cause of cooling tower performance deterioration is the degradation and choking of PVC fills, which are the main medium for heat exchange between hot circulating water and ambient air. Due to prolonged operation and continuous circulation of clarified water, the fills have become fouled with Suspended solids, biological growth (algae, slime, etc.) Non-soluble salts and scaling, Airborne dust and silt

These deposits obstruct the flute passages within the PVC fills, thereby reducing effective heat transfer surface area and airflow. The consequent drop in heat transfer efficiency leads to Poor condenser vacuum, Elevated cooling water temperature, Reduced turbine efficiency & decrease in plant generation output

The cooling water is also used for generator winding cooling. Elevated cooling water temperatures cause higher generator winding temperatures, leading to operational constraints in reactive power (MVAR) generation, particularly during peak summer conditions.

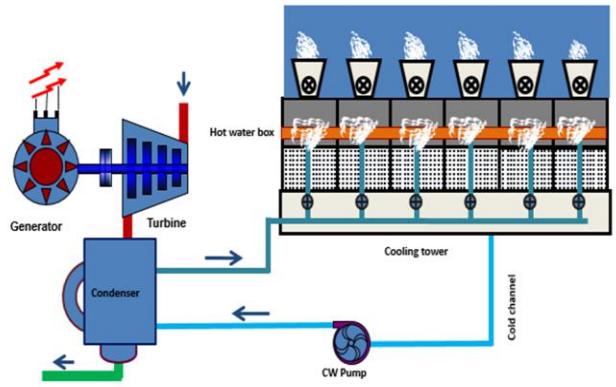
During the summer of 2024, the ambient conditions caused cooling water temperatures to rise as high as 40°C, far exceeding the design limit. This necessitated reduction in unit generation to prevent overheating of critical equipment, directly impacting plant generation and end-consumers.

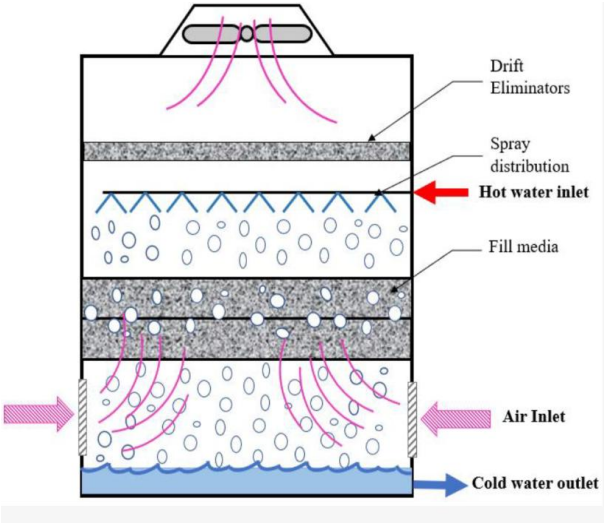
Poor performance of the CT tower leads to lower the outgoing water temperature from the CT tower. This higher water temperature of water is fed to the condenser. So the vacuum of the condenser goes down and the loss due to the vacuum is more. Hence, it increases the coal consumption for the same power output.

Proposed Corrective Action

To restore and enhance the performance of the cooling towers, it is proposed to undertake a phase-wise replacement of the choked and degraded PVC fills in Units #2 and #3. This initiative aims to Achieve optimal condenser vacuum conditions Ensure effective generator cooling, Improve plant reliability and generation capacity during peak demand periods.

Process Flow Drawing





Damaged & Clogged PVC Fill

New PVC Fill

A3. PROJECT DESCRIPTION, EXECUTION & TESTING

The proposed refurbishment of the Cooling Towers for Units #2 and #3 will be carried out in a phase-wise manner to maintain plant operation continuity and avoid a complete shutdown of both units. The scope of work shall include the following activities:

- Dismantling and safe disposal of the existing deteriorated PVC fills in compliance with environmental and safety standards.

- Cleaning and inspection of fill support structures, drift eliminators, and water distribution components to remove deposits, scaling, and biological growth.
- Supply and installation of new PVC fills with improved fouling resistance and enhanced thermal performance.
- Testing and commissioning of each cooling tower cell after replacement to verify thermal performance.
- Phase wise execution plan to ensure that at least one unit remains operational during the refurbishment work.

A4. Project Benefits

The replacement of degraded PVC fills with new high-efficiency fills provides multiple benefits to the power plant. These improvements directly contribute to better performance and enhanced reliability.

1. Improved Cooling Tower Efficiency

- New PVC fills restore the designed heat transfer surface area, ensuring effective contact between air and water.
- New PVC fills improve heat and mass transfer efficiency, resulting in lower cold-water temperatures.

2. Reduction in Cooling Water Temperature

- Restored cooling tower performance leads to a lower outlet (cold) water temperature, typically approaching the better.
- Reduced circulating water temperature enhances condenser performance and increases the vacuum level.

3. Improved Condenser Vacuum and Turbine Efficiency

- A lower cooling water temperature improves condenser vacuum, reducing the turbine exhaust pressure & Temperature.

4. Enhanced Generator Cooling

- Cooler circulating water maintains safe generator winding temperatures, preventing overheating.

- This allows the generator to operate within design limits and ensures unrestricted reactive power (MVAR) capability, even during peak summer conditions.

5. Extended Equipment Life and Reliability

- Clean and efficient fills minimize fouling, scaling, and biological growth, reducing maintenance needs.
- Better cooling performance reduces thermal stress on turbines, condensers, and auxiliaries, enhancing equipment reliability and lifespan.

7. Environmental and Compliance Advantages

- Efficient heat rejection minimizes thermal pollution in circulating water systems.
- Improved energy efficiency supports sustainability and emission reduction targets.

A5. Financial Details (Project Cost)

The proposed scheme is for Unit 2 and Unit 3; hence, proposed project cost is to be allocated equally among these units. The project cost is estimated at Rs. 800.00 Lakh. The total project is planned in phased manner, and the expenditure will be as per the table below.

Projected Cost including capitalization phasing is shown below:

Total Project Cost with Capitalization Phasing						
Particulars	**UoM**	**FY 27**	**FY 28**	**FY 29**	**FY 30**	**FY 31**
Project Cost allocated to Unit 2	Rs Lakh	200.00	200.00			
Project Cost allocated to Unit 3	Rs Lakh	200.00	200.00			
Total For Unit 2 & 3	**Rs Lakh**	**400.00**	**400.00**			

A6. Enclosure

AUG. 2024

MANDATORY ENERGY AUDIT REPORT OF TATA THERMAL POWER PLANT JOJOBERA, TATA NAGAR DISTRICT JHARKHAND

Submitted by

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Solutions for Sustainable Tomorrow

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TATA POWER

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6.4 Operating Performance of Cooling Tower

TATA power has installed one cooling tower each for each unit where return water from condenser is being cooled before sending it to turbine condenser. Each of the cooling tower is of capacity 120 MW (Unit 2,3 & 4) having six cells each and one fan in each cell respectively. Cooling tower of unit#1 is consisting 4 cells with one fan for each cell. The performance measurement of cooling towers was performed and parameters like temperature of Inlet & outlet water in each cell from both side (side A& B) was measured with ambient dry bulb and wet bulb. Temperature was measured and performance of cooling tower was calculated and the result is shown below:

Table 62 : Performance Analysis of Cooling Towers for unit-1, 2, 3 & 4

Unit 1					
Rated Parameters		**Data**			
Cell #		1	2	3	4
Operating Condition		√	√	√	√
Measured Parameters					
Cooling water inlet Temp – T1	° C	46.00	46.00	47.00	45.80
Cooling water Outlet Temp – T2	° C	37.00	37.50	37.40	37.00
Air inlet DBT	° C	30	30	30	30.5
Air inlet WBT T3	° C	28	28	27.5	28.2
Performance Evaluation					
Range = T1 - T2	° C	9.00	8.50	9.60	8.80
Approach = T2 - T3	° C	9.00	9.5	9.9	8.8
Effectiveness = Range/(Range + Approach)	%	50%	47%	49%	50%

OBSERVATIONS:

U # 1 : Average Cooling Tower effectiveness is worked out at 50%.

Unit 2							
Cell #		1	2	3	4	5	6
Operating Condition		√	√	√	√	√	√
Measured Parameters							
Riser V/v open	%	100	100	100	100	100	100
Cooling water inlet Temp – T1	° C	49.00	49.00	49.00	49.00	49.00	49.00
Cooling water Outlet Temp – T2	° C	40.00	40.00	40.00	40.00	40.00	40.00
Air inlet DBT	° C	31.5	31.5	31.5	31.5	31.5	31.5
Air inlet WBT T3	° C	29	29	29	29	29	29
Performance Evaluation							
Range = T1 - T2	° C	9.00	9.00	9.00	9.00	9.00	9.00
Approach = T2 - T3	° C	11.00	11	11	11	11	11
Effectiveness = Range/(Range + Approach)	%	45%	45%	45%	45%	45%	45%

OBSERVATIONS:

U # 2 : Average Cooling Tower effectiveness is worked out at 45%.

Unit 3							
Cell #		1	2	3	4	5	6
Operating Condition		√	√	√	√	√	√
Measured Parameters							
Riser V/v open	%	100	100	100	100	100	100
Cooling water inlet Temp – T1	° C	49.00	49.00	49.00	49.00	49.00	49.00
Cooling water Outlet Temp – T2	° C	41.00	41.00	41.00	41.00	41.00	41.00
Air inlet DBT	° C	31.5	31.8	31.5	31.8	31.5	31.8
Air inlet WBT T3	° C	29	28.8	29	28.8	29	28.8
Performance Evaluation							
Range = T1 - T2	° C	8.00	8.00	8.00	8.00	8.00	8.00
Approach = T2 - T3	° C	12.00	12.2	12	12.2	12	12.2
Effectiveness = Range/(Range + Approach)	%	40%	40%	40%	40%	40%	40%

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OBSERVATIONS:

U # 3 : Average Cooling Tower effectiveness is worked out at 40.0%.

Unit 4							
Cell #		1	2	3	4	5	6
Operating Condition		√	√	√	√	√	√
Measured Parameters							
Riser V/v open	%	100	100	100	100	100	100
Cooling water inlet Temp – T1	° C	44.00	44.50	43.80	44.00	44.00	43.80
Cooling water Outlet Temp – T2	° C	35.50	36.00	36.50	36.00	35.00	36.50
Air inlet DBT	° C	32.5	33	33	32.8	33	33
Air inlet WBT T3	° C	28.5	29	29	28.5	29	29
Performance Evaluation							
Range = T1 - T2	° C	8.50	8.50	7.30	8.00	9.00	7.30
Approach = T2 - T3	° C	7.00	7	7.5	7.5	6	7.5
Effectiveness = Range/(Range + Approach)	%	55%	55%	49%	52%	60%	49%

OBSERVATIONS:

U # 4 : Average Cooling Tower effectiveness is worked out at close to 55%

Recommendations -

- With reference to Turbine cylinder survey summery Unit 1&4 the Condenser vacuum difference is 0.03 & 0.04 kg/cm2 respectively. Also, the effectiveness is 50 % and 55 %.
- Unit 2&3 the Condenser vacuum difference is 0.05 & 0.05 kg/cm2 respectively. Also, the effectiveness is 45 % and 40 %.

The overall lower condenser vacuum and CT Fan effectiveness indicates deterioration of cooling tower fills and internals more prominently in Unit 2&3 which needs to be replaced on priority.

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TATA POWER

MITCON Solutions for Sustainable Tomorrow

Detailed Project Report

Ash conveying Pipe & Bends

Unit 2 & Unit 3,

Tata Power, Jojobera Power Plant

FY 2027-31

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A1. BACKGROUND

Unit–2 and Unit–3 of Jojobera Power Plant was commissioned on 1st February 2001 and 1st February 2002, respectively. The units are coal-based thermal power generating units, wherein coal is utilized as the primary fuel for power generation. Combustion of coal results in the generation of ash in the form of fly ash and bottom ash, which is required to be handled and disposed of in an environmentally safe and technically sound manner in compliance with the applicable guidelines and statutory provisions.

The ash handling and disposal system at Jojobera Power Plant has been designed with dual modes of ash evacuation to ensure operational flexibility and reliability. Ash disposal is carried out through wet and dry ash handling systems, depending upon system availability and operating conditions.

Fly ash generated in the boiler is collected in the Electrostatic Precipitators (ESPs) and conveyed in dry form to the fly ash silos through pressurized pneumatic conveying pipelines. The dry fly ash system facilitates efficient collection, storage, and subsequent utilization or disposal of fly ash in accordance with prevailing fly ash utilization norms.

Further evacuation of fly ash from the silos is carried out in the form of lean slurry and conveyed to the slurry sump. Bottom ash/clinker generated at the boiler is crushed in the clinker grinder and converted into lean slurry. The bottom ash slurry is then transported to the slurry sump by means of hydro-jet pumps through deashing discharge pipes.

The combined ash slurry collected in the slurry sump is finally disposed of to the ash ponds located at an approximate distance of 3.5 km from the power plant through dedicated ash slurry discharge pipelines.

Along the route of the ash slurry pipeline from the power plant to the ash pond, the pipeline passes through multiple locations where it needs to be made underground to maintain access pathways for nearby facilities and community establishments. At eight such locations, the pipelines are routed underground and encased in concrete.

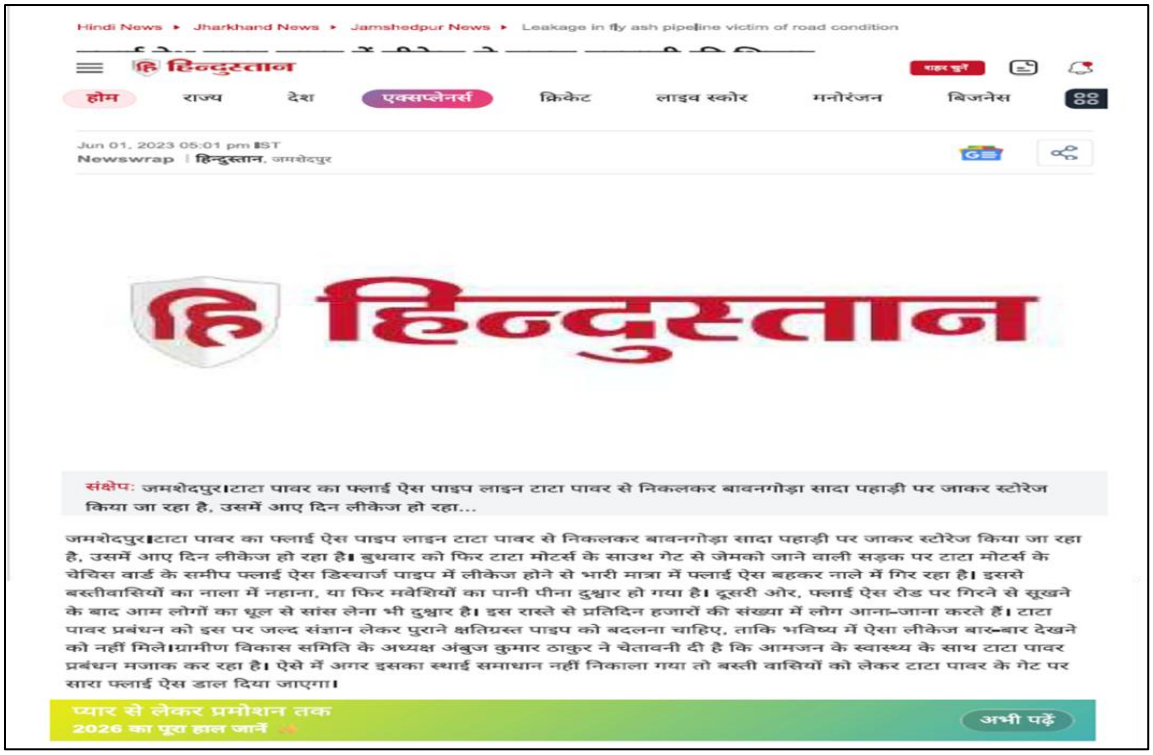
A2. NECESSITY OF THE PROJECT

A thickness test was conducted to assess Ash Slurry Pipe. In the thickness test report, conducted for Ash Slurry Pipe, it was observed that at several locations bottom thickness value has fallen below the allowable thickness limit (5MM) (refer Pg. No. 4-15 of thickness Test Report).

The existing ash conveying pipelines and ash slurry discharge pipes, including associated bends and reducers, have undergone significant deterioration due to prolonged service life, continuous handling of highly abrasive ash, and exposure to corrosive operating conditions (Thickness test report of Ash Slurry Pipe enclosed – refer Pg. No. 15). This progressive degradation has resulted in an increased incidence of leakages at multiple locations, including underground crossings (observation of leakage by Jharkhand Pollution Control Bord is enclosed).

At present, most of the underground pipelines have been eroded and multiple leakages have been observed. Consequently, the ash evacuation system is operating without redundancy at critical underground crossings. Any defect or failure at these locations would severely impair ash evacuation capability for extended durations, as repair or replacement of underground pipelines is complex, time-consuming, and operationally disruptive may necessitate partial or complete deration or shutdown of generating units, thereby impacting plant reliability and power generation.

Additionally, recurring ash leakages have resulted in fugitive dust emissions and ash slurry spillage, leading to contamination of air, soil, and surface water in and around the plant premises. Such environmental impacts pose a serious risk of non-compliance with prevailing regulations. Further, ash leakage incidents have caused disturbance in nearby habitations due to dust dispersion, sludge accumulation, and contamination of local pathways and drainage systems, leading to public grievances, health concerns, and reputational risk for the utility.
In view of the above, replacement of the deteriorated ash conveying pipelines, ash slurry discharge pipes, and associated bends and reducers is essential to restore system integrity, re-establish redundancy at critical locations, and ensure safe, reliable, and environmentally compliant ash handling. The proposed investment is necessary to mitigate operational and environmental risks, minimize community impact, ensure adherence to statutory requirements, and support sustainable, long-term operation of the power plant. The expenditure is capital in nature, unavoidable, and beyond the scope of routine operation and maintenance activities.



Hindi News ▸ Jharkhand News ▸ Jamshedpur News ▸ Leakage in fly ash pipeline victim of road condition

हिन्दुस्तान

होम राज्य देश एक्सप्लेनर्स क्रिकेट लाइव स्कोर मनोरंजन बिजनेस

Jun 01, 2023 05:01 pm IST

Newswrap | हिन्दुस्तान, जमशेदपुर

हिन्दुस्तान

संक्षेप: जमशेदपुर।टाटा पावर का फ्लाई ऐस पाइप लाइन टाटा पावर से निकलकर बावनगोड़ा सादा पहाड़ी पर जाकर स्टोरेज किया जा रहा है, उसमें आए दिन लीकेज हो रहा...

जमशेदपुर।टाटा पावर का फ्लाई ऐस पाइप लाइन टाटा पावर से निकलकर बावनगोड़ा सादा पहाड़ी पर जाकर स्टोरेज किया जा रहा है, उसमें आए दिन लीकेज हो रहा है। बुधवार को फिर टाटा मोटर्स के साउथ गेट से जेमको जाने वाली सड़क पर टाटा मोटर्स के चेचिस वार्ड के समीप फ्लाई ऐस डिस्चार्ज पाइप में लीकेज होने से भारी मात्रा में फ्लाई ऐस बहकर नाले में गिर रहा है। इससे बस्तीवासियों का नाला में नहाना, या फिर मवेशियों का पानी पीना दुश्वार हो गया है। दूसरी ओर, फ्लाई ऐस रोड पर गिरने से सूखने के बाद आम लोगों का धूल से सांस लेना भी दुश्वार है। इस रास्ते से प्रतिदिन हजारों की संख्या में लोग आना-जाना करते हैं। टाटा पावर प्रबंधन को इस पर जल्द संज्ञान लेकर पुराने क्षतिग्रस्त पाइप को बदलना चाहिए, ताकि भविष्य में ऐसा लीकेज बार-बार देखने को नहीं मिले।ग्रामीण विकास समिति के अध्यक्ष अंबुज कुमार ठाकुर ने चेतावनी दी है कि आमजन के स्वास्थ्य के साथ टाटा पावर प्रबंधन मजाक कर रहा है। ऐसे में अगर इसका स्थाई समाधान नहीं निकाला गया तो बस्ती वासियों को लेकर टाटा पावर के गेट पर सारा फ्लाई ऐस डाल दिया जाएगा।

प्यार से लेकर प्रमोशन तक 2026 का पूरा हाल जानें अभी पढ़ें

Community Concerns & Photographs

A3. PROJECT DESCRIPTION, EXECUTION & TESTING

- **Process/Project Description:**

The average ash generation from Unit–2 and Unit–3 of Jojobera Power Plant at full load operation is approximately 75 TPH, based on the prevailing coal quality fired in the boilers. The ash conveying and disposal pipelines form a critical and indispensable component of the ash handling system, as uninterrupted evacuation of the entire quantity of ash generated is essential for sustained power generation and continued compliance with applicable environmental norms and statutory requirements.

Fly ash generated from the boilers is evacuated through pneumatic conveying systems operating under pressurized conditions using compressed air, while bottom ash and wet ash slurry are transported through pipelines using high-capacity slurry pumps. As a result, the ash conveying and disposal pipelines are continuously subjected to severe abrasive and erosive

service conditions due to the high-velocity movement of ash particles under pressure. Over prolonged years of operation, these conditions have resulted in progressive internal erosion, localized thinning of pipe walls, and degradation of the inner surfaces of the existing pipelines. This has led to frequent maintenance interventions, an increased incidence of leakages, and replacement of pipeline sections at progressively shorter intervals, thereby adversely impacting system reliability, availability, and overall sustenance of plant.

Along the route of the ash slurry pipeline from the power plant to the ash pond, the pipeline traverses multiple locations where it passes underground to maintain access pathways for nearby facilities and community establishments. At eight such locations, the pipelines are routed underground and encased in concrete. However, with the passage of time and repeated usage necessitated by failures in the pipelines, most of the underground standby pipelines have been consumed or are presently in active service, resulting in the absence of redundancy at critical crossings.

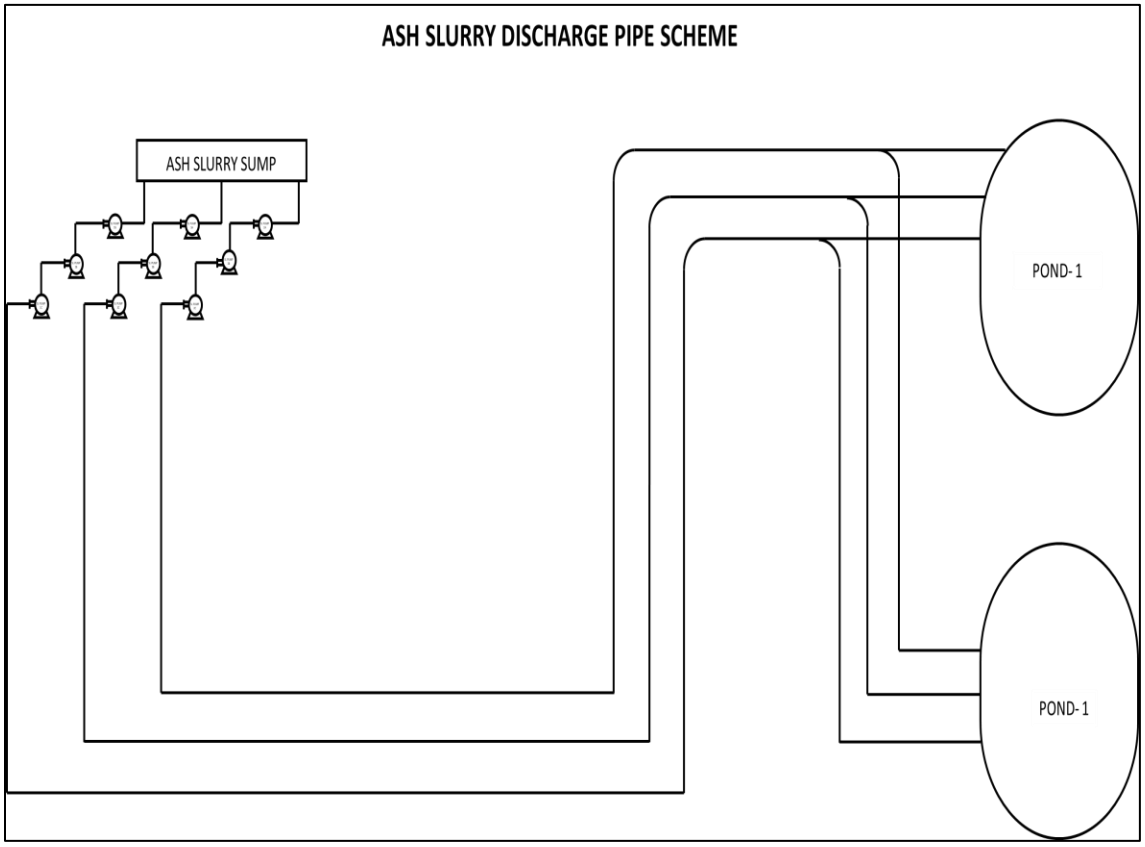
The loss of redundancy at underground locations significantly increases the operational risk associated with pipeline failure, as repair or replacement in such sections is complex, time-consuming, and disruptive. Any failure at these underground crossings can lead to prolonged ash evacuation interruption, non-compliance with environmental norms, and potential forced reduction or shutdown of unit operations.

In view of the above, the proposed project aims to strengthen the ash conveying and disposal infrastructure by addressing the critical weaknesses in the existing pipeline system, restoring reliability and redundancy at vulnerable locations, and ensuring sustained and safe ash evacuation. The project is essential to enhance system availability, reduce environmental and operational risk, and support long-term, reliable, and compliant operation of Unit–2 and Unit–3 of Jojobera Power Plant.

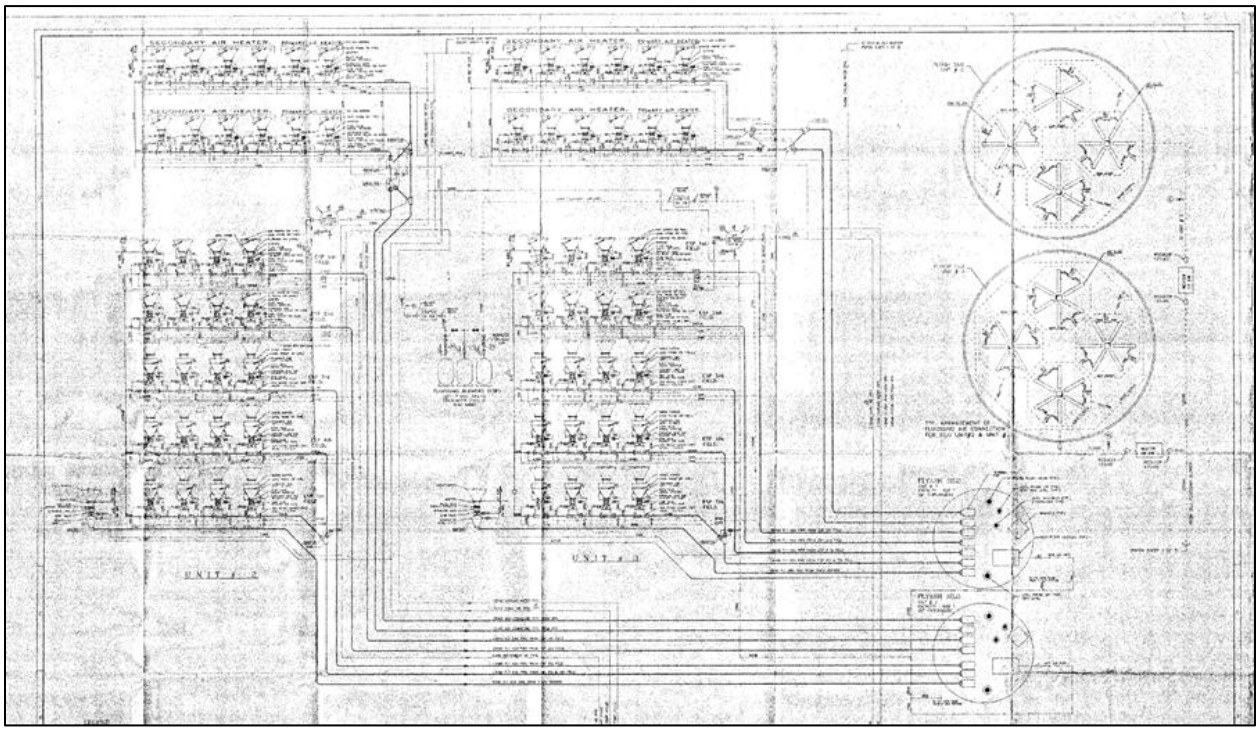
Under the proposed project, Tata Power proposes to replace the identified ash conveying and disposal pipelines with new pipes. The scope includes the installation of new heavy grade pipes, higher-hardness wear-resistant pipes for fly ash pneumatic conveying, densveyors ceramic-lined and cast basalt–lined pipes and bends, valves at critical locations for both fly ash and wet ash slurry transportation. In addition to this repairing of support structures for ash conveying pipelines will also be done. The scope will also include rerouting of underground pipes either underground or overground as per the space availability.

The proposed scheme will ensure sustained ash evacuation capacity, improved operational safety, reduced environmental and social risk, and continued compliance with prevailing statutory requirements. Overall, the project is intended to strengthen the ash handling

infrastructure of Unit–2 and Unit–3, enabling long-term, safe, reliable, and environmentally compliant operation of the Jojobera Power Plant.



FLOW DIAGRAM-FLY ASH CONVEYING SYSTEM



- **Project Execution:**

The proposed project will be executed through a competent and experienced external agency, selected in accordance with Tata Power's established procurement procedures. The execution activities shall be carried out under the overall supervision and control of the Tata Power Mechanical Maintenance Department, with close coordination among Operations, Safety, and Planning teams to ensure safe and uninterrupted plant operation.

Prior to commencement of the project, a detailed Project Execution Schedule along with a comprehensive Contingency and Risk Mitigation Plan will be prepared by engineers of the Mechanical Maintenance Department in coordination with the Operations Department. The execution plan will be finalized in such a manner that normal plant operations are maintained by utilizing alternate ash evacuation modes during the shutdown of the identified ash conveying pipeline. All statutory approvals, work permits, safety clearances, and isolation protocols will be obtained before commencement of site activities.

Replacement activities will be carried out in a phased manner to minimize operational risk and execution duration. Each phase shall cover a pre-identified pipeline stretch of appropriate length, based on accessibility, criticality, and execution feasibility.

In each phase, the existing pipeline section shall be isolated. The old pipeline sections shall be dismantled and removed from the pipe rack in a controlled manner. New pipeline sections shall then be lifted using suitable lifting equipment and positioned on the existing pipe rack, ensuring proper alignment with the adjoining pipeline sections.

Subsequently, edge preparation of the new pipes shall be carried out as per approved welding procedures and applicable codes and standards. Welding shall be executed by qualified welders following approved Welding Procedure Specifications (WPS). Post-weld inspection and quality checks, including visual inspection and non-destructive testing as applicable, shall be carried out to ensure joint integrity and compliance with quality requirements. Upon completion of welding and inspection, continuity of the pipeline shall be restored.

The phased execution approach will enable progressive restoration of the ash conveying system while minimizing downtime, ensuring safety, and maintaining operational reliability.

- **Project Testing:**

Upon completion of the installation works in phased manner, the newly laid ash conveying and ash slurry discharge pipelines shall be subjected to systematic testing and commissioning as per approved procedures and applicable standards. Prior to commissioning, the pipelines shall be thoroughly inspected to ensure mechanical completeness, proper alignment, adequacy of supports, integrity of weld joints, and removal of construction scraps.

The pipelines shall then be progressively charged and put into operation under controlled conditions, with gradual build-up of operating pressure up to the designated design pressure. Hydrostatic and/or operational pressure testing shall be carried out, as applicable, to verify the structural integrity and leak-tightness of the system. All joints, bends, reducers, and critical locations, including underground crossings, shall be closely monitored during testing.

A comprehensive inspection shall be conducted along the entire length of the newly installed pipelines to assess system performance, identify any abnormalities such as leakage or pressure drop, and confirm stable operation under normal load conditions.

Upon successful completion of testing and satisfactory performance of the pipelines, the system shall be formally commissioned and handed over to the Operations Department for regular service. The testing and commissioning process will ensure that the upgraded ash

handling pipelines are safe, reliable, and fully fit for sustained operation in accordance with statutory, environmental, and operational requirements.

A4. Benefits Of The Project

- Elimination of ash slurry and dry ash leakages, reducing fugitive dust emissions and environmental pollution
- Improved environmental compliance in wet ash, lean slurry, and dry ash handling systems as per guidelines
- Prevention of soil and water contamination due to slurry spillage
- Reduction in community disturbance and public complaints arising from ash dispersion
- Improved reliability and availability of ash handling systems, avoiding forced outages
- Enhanced safety for operating and maintenance personnel
- Sustained, safe, and compliant operation of ash handling systems in line industry regulation

A5. Financial Details

The proposed scheme is for Unit 2 and Unit 3; hence, proposed project cost is to be allocated equally among these units. The project cost is estimated at Rs. 2100.00 Lakh based on tentative rates received from supplier. The total project is planned in phased manner, and the expenditure will be as per the table below.

Projected Cost including capitalization phasing is shown below:

Total Project Cost with Capitalization Phasing						
Particulars	**UoM**	**FY27**	**FY28**	**FY29**	**FY30**	**FY31**
Project Cost allocated to Unit 2	Rs Lakh	210.00	210.00	210.00	210.00	210.00
Project Cost allocated to Unit 3	Rs Lakh	210.00	210.00	210.00	210.00	210.00
Total For Unit 2 & 3	**Rs Lakh**	**420.00**	**420.00**	**420.00**	**420.00**	**420.00**

A6. Conclusion

With the Procurement and replacement of the identified pipeline would be very useful and help us to mitigate potential risk of major failure, reduction in environmental pollution and equipment downtime. Hence, it is requested to Hon'ble Commission to kindly consider this scheme and approve the proposed Capex and Capitalization for the Control Period (FY 2026-27 to FY 2030-31).

A7. Enclosure

Annexure- 5A: Ash Slurry Pipe thickness test report

GOOD WILL NDT GROUP

Non Destructive Testing (NDT) Work With Equipment & Technician

Date .....

Project Name: Ash Slurry Pipe Thickness Measurement

Client: M/s Tata Power Company Ltd.

Inspection Agency: GOODWILL NDT GROUP

Report No.: THK/11/2026

Duration of Inspection: 06.01.2026 to 30.01.2026

Location: Alongside Slurry Pipeline from Tata Power plant to Ash Pond

Inspection Method: UT Thickness Measurement

EquipmentUsed: MODSONIC EDISON-1 Sr. No-9853-5280

Calibration Valid Upto : 10/11/2026

Inspector Name & Qualification: Sourav Ghosh (ASNT Level – 2 Ultra Sonic Testing)

Sl. No.	Pipe ID / Line No.	Nominal Diameter	Nominal Thickness	Material Grade	Allowable Thickness
1	Slurry Line-1	250 MM	9.5 MM	MS ERW Grade FE 410	5 MM
2	Slurry Line-2	250 MM	9.5 MM	MS ERW Grade FE 410	5 MM
3	Slurry Line-3	250 MM	9.5 MM	MS ERW Grade FE 410	5 MM
4	Recovery Line-1	250 MM	9.5 MM	MS ERW Grade FE 410	5 MM

GOODWILL N.D.T. GROUP W.B.

Mailing & Regd. Office Address:
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Netajinagar, Guma Chotobamunia
P.o- Guma,Dist- 24 Pgs.(N)
Kolkata-743704
munna0505pandit@gmail.com
8609443239

GOOD WILL NDT GROUP

Non Destructive Testing (NDT) Work With Equipment & Technician

Date .....

510	6.5	4.1	8.8	7.7	6.7	4.2	6.5	5.4	
511	5.4	4.2	5.4	5.4	6.2	4.1	5.4	5.8	
512	6.7	4.7	8.8	6.8	5.4	4.2	6.7	5.3	
513	6.5	4.1	8.7	6.9	6.5	4.7	6.5	5.4	
514	5.4	4.2	8.7	7.0	5.4	4.1	5.4	5.4	
515	6.5	4.1	8.6	7.1	6.7	4.2	6.5	5.8	
516	5.4	4.2	8.6	7.1	6.2	4.1	5.4	5.3	
517	6.7	4.7	8.8	7.3	5.4	4.2	6.7	5.4	
518	6.5	4.1	8.8	7.2	6.5	4.7	6.5	5.4	
519	5.4	4.2	8.7	7.0	5.4	4.1	5.4	5.8	
520	6.5	4.1	6.5	4.1	6.7	4.2	6.5	5.3	
521	5.4	4.2	5.4	4.2	6.2	4.1	5.4	5.4	
522	6.7	4.7	9.1	7.1	9.4	7.1	6.7	5.4	
523	6.5	4.1	9.3	7.6	9.1	7.2	6.5	5.8	
524	8.7	7.1	9.2	7.5	9.3	8.3	5.4	5.3	
525	8.5	6.9	9.1	7.7	9.3	8.2	6.5	5.4	
526	8.4	7.0	9.1	7.7	9.0	8.1	5.4	5.4	
527	8.5	6.8	9.0	7.7	9.1	8.5	6.7	5.8	
528	8.5	6.8	9.0	7.8	8.9	8.0	6.5	5.3	
529	8.6	7.0	9.3	7.5	8.9	8.3	5.4	4.9	
530	6.5	4.1	6.5	4.1	8.9	7.8	6.5	6.5	
531	5.4	4.2	5.4	4.2	6.2	4.1	5.4	5.4	
532	6.7	4.7	6.7	4.7	5.4	4.2	6.7	6.7	
533	6.5	4.1	6.5	4.1	6.5	4.7	6.5	6.5	
534	5.4	4.2	5.4	4.2	5.4	4.2	5.4	5.4	
535	6.5	4.1	6.5	4.1	6.7	4.2	6.5	6.5	
536	5.4	4.2	5.4	4.2	5.4	4.2	5.4	5.4	

Observation:

Thickness measurements were successfully completed on four (4) pipes using ultrasonic testing, covering the full length of each pipeline to ensure comprehensive assessment of wall thickness condition. At every measurement location, readings were taken at the top and bottom positions (180° apart) to evaluate circumferential thickness variation.

It was observed that, particularly in the slurry lines, the **bottom (6 o'clock) position exhibits noticeable thickness reduction**. At several locations, the measured bottom thickness values have fallen below the allowable thickness limit (5MM). These locations have been clearly identified and marked in red for reference and further evaluation.

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Annexure- 5B: Letter from Jharkhand Pollution Control Bord to clean Fly Ash deposited on road

JHARKHAND STATE POLLUTION CONTROL BOARD
REGIONAL OFFICE-CUM-LABORATORY, MB/15 NEW HOUSING COLONY
ADITYAPUR, JAMSHEDPUR.

Ref. No: ...344 Dated-06/5/2022

From,

Regional Officer
Jamshedpur.

To,

Environment Head
M/s Tata Power Company Limited
Jojobera Power Plant
At-Jojobera, Jamshedpur
Dist- E. Singhbhum

Sub :- Regarding- Cleaning of Fly Ash deposited at JEMCO DVC Road.

In light of complain letter received from the District Magistrate vide memo no- 105, dated- 25.04.2022, Site inspection was carried out by Mrs. Amrita Mishra (C.E.) and Sri Satyaprakash (A.S.O) on date 02.05.2022. Unit Representatives from M/s Tata Power were also present during inspection of site from Govindpur more via Jojobera to JEMCO DVC more. Some fly ash deposition was seen at the side of road. Unit representative stated that the fly ash got leaked from the pipeline above.

Hence, In light of above you are hereby directed to clean the fly ash from road and shall take necessary action to stop incidents of fly ash leakage. Submit the action taken report in this regard within 5 days.

Treat it as most urgent.

Yours faithfully

06.05.2022
(J.P. Singh)
Regional Officer.

Detailed Project Report

Ash Slurry and Recovery pumps system

Unit 2 & Unit 3,

Tata Power, Jojobera Power Plant

FY 2027-31

Table of Contents

A1. BACKGROUND

Unit 2 & Unit 3 at Jojobera were commissioned on 1st February 2001 & 1st February 2002 respectively. These units are coal-based thermal power generating units, wherein coal is utilized as the primary fuel for electricity generation. Combustion of coal results in the generation of ash in the form of fly ash and bottom ash, which is required to be handled, transported, and disposed of in an environmentally safe, reliable, and technically sound manner in accordance with the applicable statutory provisions.

At Jojobera Power Plant, fly ash generated in the boiler is continuously collected in the Electrostatic Precipitators (ESPs) and conveyed to fly ash silos for interim storage. Subsequent evacuation of fly ash from the silos is carried out in the form of lean slurry, which is conveyed to a common slurry sump through dedicated slurry conveying systems. Bottom ash and clinker generated at the boiler furnace are crushed in clinker grinders and converted into lean slurry. The bottom ash slurry is then transported to the slurry sump by means of hydro-jet pumps through de-ashing discharge pipelines. The combined fly ash and bottom ash slurry collected in the slurry sump is ultimately disposed of to the ash ponds located at an approximate distance of 3.5 km from the power plant through dedicated ash slurry discharge pipelines. Supernatant water collected at the ash pond is recovered and pumped back to the plant for reuse, thereby minimizing freshwater intake and supporting sustainable water management practices.

The slurry and recovery pumping system constitutes a vital component of the plant's ash handling and water management infrastructure and has a direct bearing on plant availability, operational reliability, environmental compliance, and long-term sustainability. The existing system comprises three slurry pump streams arranged in series, with each stream consisting of three pumps to generate the requisite discharge head for continuous long-distance conveyance of highly abrasive ash slurry. The system is further supported by three recovery water pumps for reclamation and reuse of decanted water from the ash pond, thereby contributing to water conservation and reduced environmental footprint. In addition, three high-pressure (HP) water pumps are provided to meet process, flushing, and auxiliary water requirements associated with ash handling operations. Two dedicated seal water pumps ensure reliable sealing and cooling of slurry pump glands.

A2. NECESSITY OF THE PROJECT

The Slurry and Recovery System plays a critical role in transferring ash slurry from the plant and recycling recovered slurry water from the ash pond back to the plant for further use. This

system is essential for preventing the overflow of slurry water from the slurry tank and ash pond into surrounding areas, thereby protecting nearby communities and avoiding environmental impact.

These systems have been in continuous service for more than 20 years under extremely abrasive conditions, and its critical components have now reached a point where further operation without intervention is no longer sustainable. As the efficiency of pumps have reduced significantly over the years and they are no longer able to transfer the entire volume of recovered water back to the plant. This often results in overflow conditions, causing slurry water to enter the surrounding community and leading to environmental and legal challenges.

In such situations, ash disposal to the Jemco Pond is halted to prevent further overflow, which is a direct threat to continuous power generation. To mitigate these operational and environmental risks, and to ensure uninterrupted ash handling and disposal, it is urgently necessary to replace the existing ash slurry and recovery pump system.

The existing ash-slurry pumps suffer from a sharp rise in defects and forced outages because of severe erosion and wear of hydraulic passages, impellers, casings, shafts and sealing arrangements; even regular overhauls and replacement of wear parts have failed to curb these recurring failures, which directly impair the reliability and availability of ash evacuation and jeopardise uninterrupted plant operation and safe ash disposal. Similarly, the recovery-water pumps, constantly exposed to ash-laden water containing fine suspended solids, exhibit progressive wear that manifests as frequent leakages, high vibration levels and repeated maintenance interventions, making it difficult to maintain ash-pond water levels within permissible limits. Their frequent unavailability has already caused overflow of ash-pond water, leading to operational difficulties, spillage, water-logging and heightened environmental and safety concerns for nearby communities, which in turn attract public complaints and intensified regulatory scrutiny. Because these pump-related breakdowns affect the plant's ability to evacuate ash and manage water reliably, they pose a critical risk not only to plant safety and equipment integrity but also to the reliability of power supply for end-consumers. The long lead-times associated with procuring and installing new, abrasion- and erosion-resistant pumps, together with the need to avoid prolonged outages, make an immediate, comprehensive revamping of the ash-slurry, recovery-water, high-pressure and seal-water pumping systems essential. Implementing the project will replace the deteriorated pumps with robust, newly-designed units that incorporate improved sealing, resistant materials and adequate design margins, thereby ensuring continuous,

reliable ash evacuation, effective water recovery and recirculation, prevention of pipeline choking and overflows, and safe, uninterrupted plant operation—ultimately safeguarding equipment, enhancing plant safety and maintaining a stable power supply for consumers while meeting environmental and community safety requirements. Frequent unavailability of recovery water pumps has resulted in overflow of ash pond water, creating operational difficulties and posing environmental and safety concerns.

In addition, revamping of the Bottom Ash Handling System has become equally essential, as the existing bottom ash handling equipment has also been in long-term operation under severe abrasive and thermal conditions, leading to progressive wear in hopper plates and refractory lining, requiring frequent maintenance. Unreliable bottom ash evacuation can result in accumulation of ash in boiler hoppers, operational constraints, increased safety hazards, and heightened environmental risk. Therefore, integrated revamping of the bottom ash handling system, along with the slurry ash and water recovery systems, is necessary to ensure complete, safe, and environmentally compliant ash management for sustained and trouble-free operation of the plant.

अनदेखी • टाटा पॉवर, न्यूवोको विस्टास व टाटा मोटर्स प्रबंधन नागरिक सुविधाओं का नहीं रखते ध्यान

गोविंदपुर अन्ना चौक से साउथ गेट तक सड़क पर बलुई मिट्टी जमी, लोग हो रहे दुर्घटना के शिकार

सिटी रिपोर्टर | जमशेदपुर

गोविंदपुर अन्ना चौक से लेकर टाटा मोटर्स के साउथ गेट के बीच पक्की सड़क पर बलुई मिट्टी की मोटा परत जमा हो गई है। इस कारण राहगीरों को काफी परेशानियों का सामना करना पड़ रहा है। बलुई मिट्टी के कारण दोपहिया वाहनों के फिसलने की कई घटना हो चुकी है। इसमें तीन लोगों की जान भी जा चुकी है। इस मार्ग से टाटा पॉवर, न्यूवोको विस्टास व टाटा मोटर्स के कर्मचारियों का प्रतिदिन आना-जाना होता है। इसके अलावा बड़े वाहनों के माध्यम से कंपनी के सामानों की आवाजाही होती है। इस सड़क पर जमी मिट्टी की सफाई को लेकर बड़ी कंपनियां एक-दूसरे पर जिम्मेदारी फेंक रही है, जिस कारण समस्या जस की तस बनी हुई है। इस कारण इस मार्ग से गुजरने वाले लोग डर के माहौल में सफर करने को मजबूर हैं। मालूम हो कि टाटा पॉवर के अन्ना चौक से न्यूवोको गेट तक की सफाई की जिम्मेदारी टाटा पॉवर की है। न्यूवोको कॉम्प्लेक्स गेट से टाटा मोटर्स साउथ गेट तक की सफाई और रखरखाव की जिम्मेदारी न्यूवोको कंपनी और टाटा मोटर्स के साउथ गेट से आगे तक की सफाई और रखरखाव की जिम्मेदारी टाटा मोटर्स की है।

अन्ना चौक से दो नम्बर गेट के बीच टाटा पॉवर, न्यूवोको व टाटा मोटर्स जैसी कंपनियां स्थित हैं, लेकिन नागरिक सुविधा के नाम पर कुछ नहीं कर रही हैं। सड़क के बगल से गुजरने वाली नाली बजबजाती रहती है। सड़क पर लाइट तक नहीं है। कंपनियां जल्द इन समस्याओं के समाधान के लिए पहल नहीं करती है तो आर्थिक नाकेबंदी करेंगे। -डॉ परितोष सिंह, जिप सदस्य

टाटा मोटर्स से रिटायर्ड हूं। इस रोड से स्टेशन जाने के क्रम में रोड की चौड़ाई आधी हो जाती है। आधी सड़क पर मिट्टी की मोटी परत है तो आधी सड़क पर छोटी-बड़ी गाड़ियां खड़ी रहती है। इससे लोगों को आवागमन में काफी परेशानी होती है। मिट्टी के कारण फिसलन से सड़क दुर्घटना में कई लोगों की मौत हो चुकी है। -बीवी राजू, स्थानीय निवासी

आप जिस सड़क की बात कर रहे हैं, वहां की समस्या को टीम भेजकर दिखवाया जाएगा। इस समस्या को देखा जाएगा, सफाई कराई जाएगी। -प्रातिक चक्रवर्ती, जीएम्एम, कॉरपोरेट कम्युनिकेशन, टाटा मोटर्स

Community Concern (Failure of Ash Slurry and Recovery pumps system)

A3. PROJECT DESCRIPTION, EXECUTION & TESTING

- **Process/Project Description:**

Unit 2 and 3 of Jojobera Power Plant are coal-based thermal generating units, with an average ash generation of approximately 75 TPH at full load operation, based on the prevailing coal quality fired in the boilers. The ash handling and water recovery system is a critical and indispensable component of the plant, as uninterrupted evacuation and safe disposal of the entire quantity of ash generated is essential for sustained power generation and continued compliance with applicable environmental regulations, statutory provisions, and operating guidelines.

The ash handling and water recovery system of the plant has been in continuous operation for over two decades under severe and highly abrasive service conditions. During this prolonged period of operation, the system has undergone progressive deterioration of critical pumping equipment, including ash slurry pumps, recovery water pumps, high-pressure (HP) water pumps, and seal water pumps. The aging and worn condition of these pumps has resulted in frequent breakdowns, increased forced outages, and reduced operational reliability. The present condition of the system poses significant risks to uninterrupted plant operation, safe ash disposal, and sustained compliance with environmental and safety norms.

Continuous handling of highly abrasive ash slurry over prolonged periods has resulted in extensive erosion and wear of critical hydraulic and mechanical components of the pumping equipment, including hydraulic passages, impellers, casings, shafts, and sealing arrangements. In addition to internal components, the prolonged exposure to corrosive ash-laden environments has led to severe deterioration and structural damage of pump housings, base frames, and foundation structures. As a result, even with regular overhauling and periodic replacement of wear parts, the pumping system continues to experience recurring failures, forced outages, and unplanned shutdowns, thereby significantly impairing overall system availability and operational reliability. Such failures increase the likelihood of interruptions in ash evacuation, leading to unsafe accumulation of ash within the system, operational bottlenecks, heightened risk of pipeline choking and spillage, and persistent challenges in maintaining continuous, safe, and environmentally compliant ash disposal.

The unreliability of ash slurry pumps and HP water pumps has adversely affected ash discharge and pipeline flushing capabilities, resulting in frequent ash slurry pipeline choking. Such conditions have contributed to waterlogging and spillage beyond designated areas, creating operational, safety, and environmental concerns. In parallel, inadequate performance and frequent unavailability of recovery water pumps have resulted in insufficient evacuation of

decanted water from ash ponds, leading to overflows, operational constraints, and heightened environmental risk. Instances of ash pond overflow and spillage have impacted nearby inhabited localities, leading to public grievances, increased regulatory scrutiny, and potential non-compliance with environmental clearance conditions.

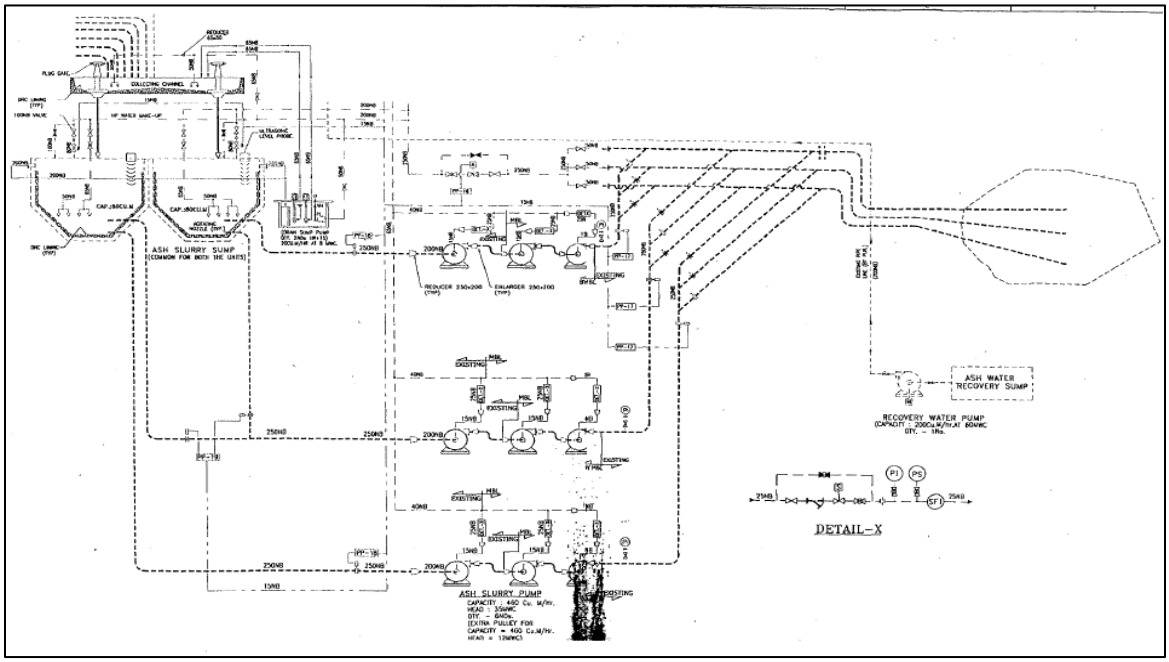
Continued operation of the existing ash handling and water recovery system under the present conditions is therefore unsustainable from the perspectives of plant reliability, environmental compliance, and community safety. In view of the deteriorated condition of the ash slurry, recovery water, HP water, and seal water pumping systems, a comprehensive revamping of the entire pumping infrastructure is urgently required.

The proposed project aims to enhance the overall robustness and reliability of the ash handling system and to ensure uninterrupted ash evacuation and safe disposal. The objectives of the project also include improving the recovery and recirculation of ash pond water, preventing ash pipeline choking and ash pond overflows, minimizing environmental hazards, and ensuring continued compliance with applicable statutory requirements and utility operational standards.

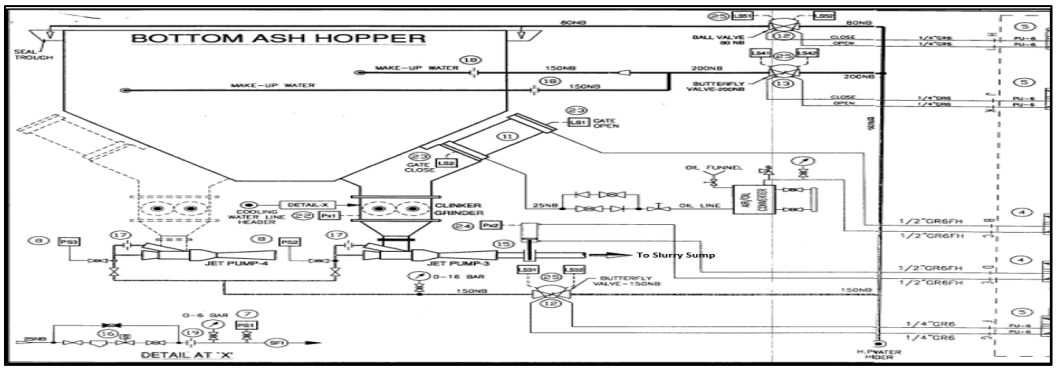
The project proposes replacement of the existing ash slurry pumps, recovery water pumps, HP water pumps, and seal water pumps along with associated piping, fittings, and valves, with new pumps of proven and robust design. The proposed equipment shall incorporate abrasion- and erosion-resistant materials suitable for severe ash handling service, improved sealing arrangements to minimize leakages and premature failures, and adequate design margins to withstand long-term operation under harsh conditions. The scope of project also includes revamping of bottom ash handling system comprising Hopper, refractories, grinders, and jet pumps. Enhanced reliability features will be incorporated to reduce forced outages, maintenance frequency, and operational risks.

Implementation of the proposed revamping scheme will ensure sustained ash evacuation capacity, improved operational safety, reduced environmental and social risks, and reliable recovery and reuse of ash pond water. Overall, the project is intended to strengthen the ash handling infrastructure of Unit–2 and Unit–3, thereby enabling long-term, safe, reliable, and environmentally compliant operation of the Jojobera Power Plant in line with prevailing statutory and regulatory requirements.

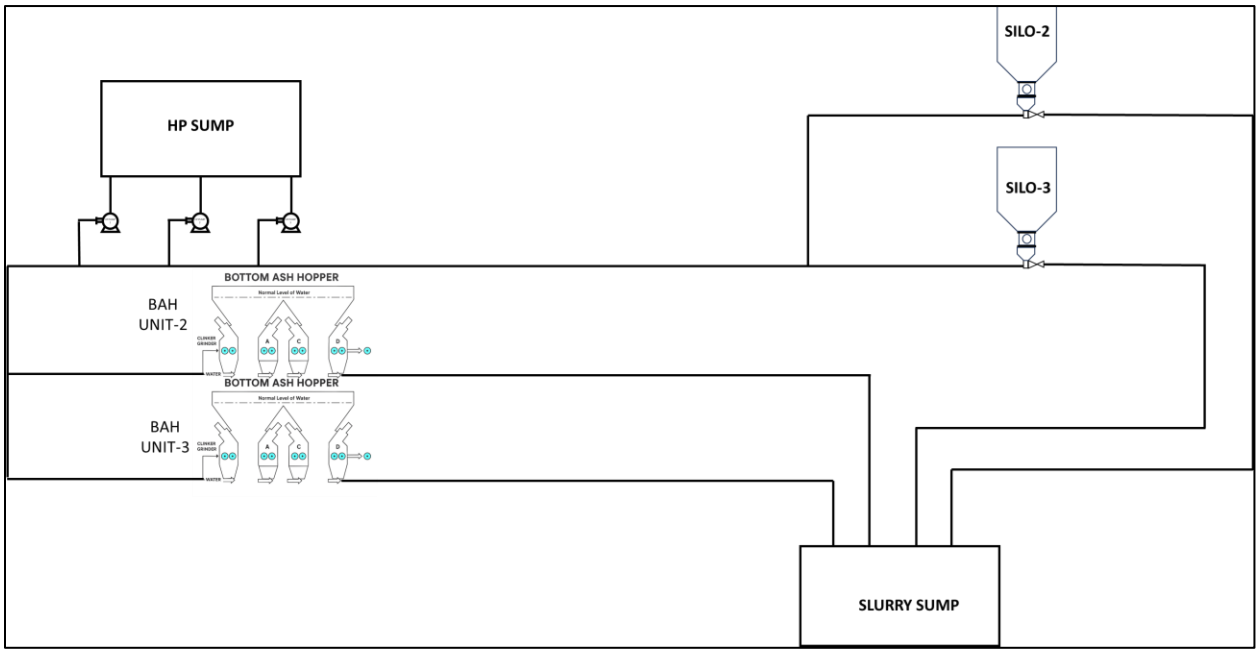
ASH SLURRY DISPOSAL SYSTEM



Bottom Ash Handling System with HP Water Network



HP Water Distribution Network



- **Project Execution:**

The proposed revamping of the ash handling pumping system will be executed in a phased manner over two financial years to ensure continuity of ash evacuation and uninterrupted plant operation. The scope of work includes replacement of nine (09) ash slurry pumps, three (03) recovery water pumps, three (03) high-pressure (HP) water pumps, and two (02) seal water pumps, with standby pumps and capital spares along with associated piping, fittings, valves, civil works, electrical and instrumentation integration, and testing and commissioning activities. The project shall be implemented through a competent and experienced external agency, selected in accordance with Tata Power's established procurement procedures, and executed under the overall supervision and control of the Tata Power Mechanical Maintenance Department, with close coordination among Operations, Safety, and Planning teams.

Prior to commencement of site activities, a detailed Project Execution Schedule, along with a comprehensive contingency and risk mitigation plan, shall be prepared by the Mechanical Maintenance Department in coordination with the Operations Department. The execution plan shall be finalized to ensure that normal plant operations are maintained by adopting alternate ash evacuation arrangements during shutdown of the identified pumps. All statutory

approvals, work permits, safety clearances, and system isolation protocols shall be obtained and complied with before initiation of the works.

Replacement activities shall be carried out in three well-defined phases, each aligned with the respective financial year, to minimize operational risk and execution duration. Each phase shall cover a pre-identified set of pumps based on criticality, accessibility, and execution feasibility. For each pump, the relevant pipeline sections shall be safely isolated, and the existing pumps along with associated piping, fittings, and valves shall be dismantled and removed in a controlled manner. This shall be followed by repair and strengthening of foundations, installation of new base frames and pump housings, and precise positioning using suitable lifting and handling equipment.

Subsequently, pump internals shall be assembled and installed as per approved drawings, manufacturer recommendations, and applicable codes and standards. Post-erection inspections, alignment checks, quality assurance inspections, and statutory and safety protocols shall be carried out to ensure mechanical integrity and compliance with quality requirements. Testing and commissioning of each pump shall be undertaken in coordination with plant operations prior to handing over for regular service.

The phased execution approach will enable progressive restoration and stabilization of the ash slurry and water recovery systems while minimizing downtime, ensuring safety, maintaining operational reliability, and achieving timely completion of the project within the planned financial years.

- **Project Testing:**

Testing and commissioning of the revamped ash handling pumping system shall be carried out in a systematic and phased manner in line with the overall project execution plan spread over three financial years. Each of the nine (09) ash slurry pumps, three (03) recovery water pumps, three (03) high-pressure (HP) water pumps, and two (02) seal water pumps shall be tested individually as well as in integrated system operation upon completion of installation in the respective phase. Pre-commissioning activities shall include inspection of foundations and base frames, verification of mechanical alignment, checking of piping supports and restraints, flushing and cleaning of pipelines, verification of lubrication and sealing systems, electrical and instrumentation checks, and validation of interlocks and protections. Performance testing shall be conducted to confirm satisfactory operation under no-load and load conditions, including monitoring of vibration, temperature, pressure, flow stability, seal performance, and noise levels in accordance with applicable standards and manufacturer recommendations. System-level testing shall also be carried out to verify coordinated operation of slurry,

recovery water, HP water, and seal water pumps under actual ash handling conditions, ensuring reliable ash evacuation, effective water recovery, and adequate flushing and sealing arrangements. Any deficiencies observed during testing shall be rectified prior to final acceptance. Successful completion of testing and commissioning for each phase shall enable progressive integration of the revamped system into regular plant operation, ensuring safe, reliable, and environmentally compliant performance throughout the project duration.

A4. BENEFITS OF THE PROJECT

The proposed revamping of the ash handling pumping system will provide the following key benefits to Unit 2 and 3 of Jojobera Power Plant:

- **Environmental Protection**
  Ensures uninterrupted ash evacuation, preventing ash accumulation, slurry spillages, and ash pond overflows, thereby protecting soil, surface water, and groundwater.
- **Pollution Prevention and Clean Housekeeping**
  Reduces pipeline choking, leakages, and waterlogging, leading to improved housekeeping and minimization of fugitive ash and slurry discharge.
- **Sustainable Water Management**
  Enhances recovery and reuse of decanted ash pond water, reducing freshwater consumption and supporting sustainable and responsible water use.
- **Public Safety and Community Well-Being**
  Minimizes the risk of ash slurry overflows and uncontrolled discharges, reducing adverse impacts on nearby inhabited areas and addressing public and community concerns.
- **Regulatory and Environmental Compliance**
  Supports continued compliance with environmental regulations and guidelines by controlling ash disposal and preventing environmental incidents.
- **Reduced Environmental and Social Risk**
  Lowers environmental liabilities, public complaints, and regulatory scrutiny, contributing to improved stakeholder confidence and social acceptance.
- **Improved Occupational Safety**
  Decreases equipment failures, leakages, and emergency situations, enhancing safety for plant personnel and contractors.

- **Improved Plant Reliability**
  Strengthens the ash handling and water recovery systems, indirectly supporting sustained and reliable operation of Unit 2 and 3.

A5. Financial Details

The proposed scheme is for Unit 2 and Unit 3; hence, proposed project cost is to be allocated equally among these units. The project cost is estimated at Rs. 500.00 Lakh. The total project is planned in phased manner, and the expenditure will be as per the table below.

Projected Cost including capitalization phasing is shown below:

Total Project Cost with Capitalization Phasing						
Particulars	**UoM**	**FY 27**	**FY 28**	**FY 29**	**FY 30**	**FY 31**
Project Cost allocated to Unit 2	Rs Lakh	75.00	100.00	75.00	0.00	0.00
Project Cost allocated to Unit 3	Rs Lakh	75.00	100.00	75.00	0.00	0.00
Total For Unit 2 & 3	**Rs Lakh**	**150.00**	**200.00**	**150.00**	**0.00**	**0.00**

A6. Conclusion

The Procurement and replacement of the identified pumps would be very useful and help us to mitigate potential risk of major failure, reduction in environmental pollution and equipment downtime.

A7. ENCLOSURE

Annexure- 6: Letter from Jharkhand Pollution Control Bord to clean Fly Ash deposited on road

JHARKHAND STATE POLLUTION CONTROL BOARD
REGIONAL OFFICE-CUM-LABORATORY, MB/15 NEW HOUSING COLONY
ADITYAPUR, JAMSHEDPUR.

Ref. No: 344 Dated- 06/5/2022

From,

Regional Officer
Jamshedpur.

To,

Environment Head
M/s Tata Power Company Limited
Jojobera Power Plant
At-Jojobera, Jamshedpur
Dist- E. Singhbhum

Sub :- Regarding- Cleaning of Fly Ash deposited at JEMCO DVC Road.

In light of complain letter received from the District Magistrate vide memo no- 105, dated- 25.04.2022, Site inspection was carried out by Mrs. Amrita Mishra (C.E.) and Sri Satyaprakash (A.S.O) on date 02.05.2022. Unit Representatives from M/s Tata Power were also present during inspection of site from Govindpur more via Jojobera to JEMCO DVC more. Some fly ash deposition was seen at the side of road. Unit representative stated that the fly ash got leaked from the pipeline above.

Hence, In light of above you are hereby directed to clean the fly ash from road and shall take necessary action to stop incidents of fly ash leakage. Submit the action taken report in this regard within 5 days.

Treat it as most urgent.

Yours faithfully

06.05.2022
(J.P. Singh)
Regional Officer.

Detailed Project Report

Main Plant Structure Refurbishment (Boiler, Coal Mill, Ash Plant & Aux. System)

Unit 2 & Unit 3

Tata Power

Jojobera Power Plant

FY 2027-2031

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A1. Background

Unit 2 & Unit 3 at Jojobera were commissioned on 1st February 2001 & 1st February 2002 respectively. The existing structure has been in service for 24-25 years and has been subjected to operational loads, environmental exposure, aging, and cyclic stresses that have contributed to its progressive deterioration. Recent inspections—both visual and instrument-aided—have identified multiple instances of structural distress such as corrosion of steel members, cracking of concrete sections, deformation of critical load-bearing elements, and local failures affecting structural integrity and safety.

Over time, ageing factors such as weathering, inadequate drainage, vibration, overloading in specific zones, and natural material degradation have accelerated the rate of structural wear. In certain components, the extent of deterioration has crossed permissible limits as per safety standards. These components have been assessed as beyond feasible repair and require complete replacement to restore full functional capability.

For other sections of the structure, although deterioration is evident, it remains within levels where strengthening, rehabilitation, or retrofitting can effectively extend service life while ensuring structural reliability. Strengthening may include jacketing, plating, epoxy grouting, FRP wrapping, stiffener addition, corrosion protection systems, or load-path corrections depending on the type of members involved.

The primary objectives of the proposed intervention are as follows:

- Restoration of structural safety by replacing severely damaged members.
- Enhancement of load-carrying capacity in partially degraded areas through strengthening.
- Prevention of future deterioration by using improved materials, protective coatings, and upgraded detailing provisions.
- Ensuring compliance with current design and safety standards including relevant norms.
- Extending the service life of the asset to meet future operational requirements.

The proposed work is critical to safeguarding personnel, equipment, and for operational continuity. Delayed intervention may escalate risks, increase repair costs, and potentially lead to functional downtime or structural failures. Therefore, preparation of this Detailed Project Report (DPR) is undertaken to present technical justification, methodology, cost estimation, timelines, and implementation strategy for the structural replacement and strengthening works.

A2. Necessity of the Project

The proposed project is essential in view of the condition of the main plant structures of the Boiler, Coal Mill, ESP, Silo, and Auxiliary Plant areas, which have been in continuous service for over 20 years and due to findings of the recent strength test report carried out by a third-party consultant, which identified progressive structural deterioration during detailed inspections and technical assessment. Over years of continuous operation, the structure has been subjected to environmental exposure, dynamic loading, corrosion, material aging, and operational stresses that have collectively led to a

significant wear, distress and loss of structural resilience. Critical load-bearing components have exhibited corrosion, cracking, deformation, loss of sectional properties, and other symptoms that compromise structural safety, reliability, and performance.

The site evaluation further confirmed that several structural members have deteriorated beyond permissible limits prescribed in relevant standards and no longer possess sufficient load-carrying capacity or serviceability. These components require immediate replacement to prevent potential failures and ensure the safe functioning of the facility. Other structural elements, though not critically damaged, require strengthening and rehabilitation to restore their designed performance and prevent accelerated future deterioration.

Undertaking this project is necessary for the following key reasons:

1. **Safety Assurance:** The condition of some structural elements poses an increasing risk to personnel, equipment, and operations. Timely replacement and strengthening are critical to eliminate safety hazards.
2. **Compliance with Standards:** Current structural conditions do not fully meet the requirements of applicable safety guidelines. Upgrading works are needed to comply with industry norms.
3. **Protection of Asset:** Without intervention, deterioration will continue, leading to higher repair costs, reduced reliability, and possible structural failure in the long term.
4. **Operational Continuity:** The structure supports vital processes. Its continued degradation could lead to unplanned shutdowns, production loss, and operational bottlenecks.
5. **Extension of Service Life:** Strengthening and rehabilitation will enhance the durability of the structure and ensure it continues to meet future load and service demands.

   Given the strategic importance of the facility and the risks associated with delayed action, the project is necessary to maintain structural integrity, ensure safe operations, and secure long-term asset performance. The DPR has thus been prepared to detail the technical justification, methodology, cost estimates, and implementation plan for the proposed works.

A3. BENEFITS OF THE PROJECT

The proposed project will deliver several critical technical, operational, and safety-related advantages. By replacing severely deteriorated components and strengthening the remaining structure, the project will enhance long-term reliability, extend structural life, and mitigate operational risks. The major benefits include:

1. **<u>Enhanced Safety of Personnel and Equipment</u>**

   Restoring structural integrity eliminates risks associated with weakened members, thereby providing a safe working environment. Preventing failures in load-bearing structures significantly reduces the likelihood of accidents, injuries, or damage to plant machinery.

2. **Improved Structural Stability and Reliability**

   Replacement of damaged parts and strengthening of partially degraded sections improves load distribution and overall stability. This ensures the structure can reliably sustain operational load, environmental stress, and future service demands without distress.

3. **Compliance with Current Safety Standards**

   The upgraded structure will align with the latest industry codes, improving safety margins and ensuring mandated structural performance requirements are met. This also enhances audit readiness and regulatory compliance.

4. **Increased Service Life of the Assets**

   By rehabilitating and strengthening the existing structural framework, the service life of the asset is significantly extended, delaying the need for major reconstruction or complete replacement in near future.

5. **Continuity of Unit / Plant Operations**

   A reliable structure supports sustained production and avoids disruptions due to unexpected failures or breakdowns.

6. **Improved Structural Performance Under Future Loads**

   Strengthening works enhance the structure's ability to withstand dynamic loads, vibrations, and stress variations that may increase due to future upgrades or higher throughput requirements.

7. **Prevention of Further Deterioration**

   Using better-quality materials, corrosion-resistant components, protective coatings, and modern strengthening techniques stops or slows down ongoing degradation, protecting the asset from future damage.

8. **Cost-Effective and Sustainable Solution**

   Strengthening the existing structure instead of undertaking total reconstruction leverages the current asset value, reduces material wastage, and contributes to sustainable practices by minimizing demolition and rebuilding activities.

A4. FINANCIAL DETAILS (PROJECT COST)

The proposed scheme is for Unit 2 and Unit 3; hence, proposed project cost is to be allocated equally among these units. The project cost is estimated at Rs. 900.00 Lakh. The total project expenditure will be as per the table below.

Projected Cost including capitalization phasing is shown below:

Particulars	UoM	FY 27	FY 28	FY 29	FY 30	FY 31
Project Cost allocated to Unit 2	Rs Lakh	90.00	90.00	90.00	90.00	90.00
Project Cost allocated to Unit 3	Rs Lakh	90.00	90.00	90.00	90.00	90.00
Total For Unit 2 & 3	**Rs Lakh**	**180.00**	**180.00**	**180.00**	**180.00**	**180.00**

A5. ENCLOSURE

Annexure- 7_A: Stability Test Report Unit-2

STABILITY TEST CERTIFICATE

OF

M/s. THE TATA POWER COMPANY LIMITED
Jojobera Power Plant, Jojobera,
(License under Factory Act)
License No. FCA1635700006401
P.O. + P.S. – Govindpur
Dist. – Purbi Singhbhum, Pin- 831016, Jharkhand

Part : 02 of 06
Pages : 88 to 156 excluding Cover Page.

Report Submitted by:

DUTTCON CONSULTANT & ENGINEERS PVT. LTD.
AN ISO 9001 : 2015 CERTIFIED COMPANY
Corporate Office : 90, B.K.Paul Avenue, 1st&2nd Floor, Kolkata – 700 005
Regd. Office : 115, B.K.Paul Avenue, Kolkata – 700 005 • Phone : (033) 2555 2210
E-mail: duttcon2004@rediffmail.com, info@duttcon.com • Website : www.duttcon.com
Lab : Howrah & Barrackpore • Branch Office : Jaipur • Bhubaneswar • Chandigarh • Ranchi • Jamshedpur

Remarks:

Strength of Concrete:

Tests conducted are fairly indicative of the quality of concrete, The **Rebound Hammer Test** results indicate that the approximate compressive strength of concrete for the inspected structure ranges from **33.6N/mm²** to **50.4N/mm²**.

Integrity of Concrete:

As per IS-516(Part- 5/Sec-1):2018 Integrity results of concrete shown by UPV test, ranges from **3.582Km/sec5.193Km/sec**.

Depth of Carbonation:

The depth of carbonation is determined as defined in **BSEN14630:2006(E)**, this is the most widely used method of measuring carbonation depth.
The depth of carbonation ranges from 2.0mm to 11.0mm.

Half Cell Potential Test:

The Half Cell Potential readings vary from **-151 to -185** mV.As per **ASTM C-876** Code:

- 0 to-200mV (no corrosion)
- -200 to -350mV (Suspected corrosion)
- Above -350 mV (Severe corrosion)

Portable Hardness Testing:

The hardness & tensile reading as per the data sheet are with in the limit. (Minimum Tensile strength should be **410**N/mm²).

Ultrasonic Thickness Gauging:

On thickness gauging, the test data show the degradation or reduction of thickness is Noticeable.

Coating Thickness:

On coating thickness, the test data show the reduction of coating thickness is Noticeable.

Conclusion:

- The health of the structures both RCC and Steel in Boiler Unit 2 needs repairing & strengthening to overcome further degradation.

Refer to Certificate No. DCEPL/JH/11/052/2021-22

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Remarks:

Strength of Concrete:

Tests conducted are fairly indicative of the quality of concrete, The **Rebound Hammer Test** results indicate that the approximate compressive strength of concrete for the inspected structure ranges from **33.6N/mm²to50.4N/mm²**.

Integrity of Concrete:

As per IS-516(Part- 5/Sec-1):2018 Integrity results of concrete shown by UPV test, ranges from **4.104Km/sec4.890Km/sec**.

From above it is concluded that there is no loss of integrity in the region where UPV test have been carried out.

Depth of Carbonation:

The depth of carbonation is determined as defined in **BSEN14630:2006(E)**,this is the most widely used method of measuring carbonation depth.

The depth of carbonation ranges from 5.0mm to 9.0mm.

Half Cell Potential Test:

The Half Cell Potential readings vary from **-161 to -189 mV**.

As per **ASTM C-876** Code:

- 0 to-200mV (no corrosion)
- -200 to-350mV(Suspected corrosion)
- Above-350 mV(Severe corrosion)

Portable Hardness Testing:

The hardness & tensile reading as per the data sheet are within the limit.(Minimum Tensile strength should be **410**N/mm²).

Ultrasonic Thickness Gauging:

On thickness gauging, the test data show the degradation or reduction of thickness is Noticeable.

Coating Thickness:

On coating thickness, the test data show the reduction of coating thickness is Noticeable.

Conclusion :

- The health of the structures both RCC and Steel in Mill Bunker Unit 2 needs repairing & strengthening to overcome further degradation.
- According to visual inspection multiple surface cracks were observed at multiple locations which requires repairing.

Refer to Certificate No. DCEPL/JH/11/052/2021-22

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Remarks:

Strength of Concrete:

Tests conducted as per IS – 516 (Part-5/ Sec-4):2020) and are fairly indicative of the quality of concrete ,The **Rebound Hammer Test** results indicate that the approximate compressive strength of concrete for the inspected structure ranges from **24.9N/mm²** to **35.5N/mm²**.Considering the structure is of M-35 grade and most of the structure shows less surface compressive strength.

Integrity of Concrete:

As per IS-516(Part- 5/Sec-1):2018 Integrity results of concrete shown by UPV test, ranges from **3.825Km/sec4.775Km/sec**.

From above it is concluded that there is no loss of integrity in the region where UPV test have been carried out.

Depth of Carbonation:

The depth of carbonation is determined as defined in **BS EN 14630:2006(E)**, this is the most widely used method of measuring carbonation depth.

Half Cell Potential Test:

The Half Cell Potential readings vary from **-150 to -187 mV**.

As per **ASTM C-876** Code:

- 0 to-200mV (no corrosion)
- -200 to-350mV(Suspected corrosion)
- Above-350 mV(Severe corrosion)

Portable Hardness Testing:

The hardness & tensile reading as per the data sheet are within the limit. (Minimum Tensile strength should be **410**N/mm²).

Ultrasonic Thickness Gauging:

On thickness gauging, the test data show the degradation or reduction of thickness is Noticeable.

Coating Thickness:

On coating thickness, the test data show the reduction of coating thickness is Noticeable.

Conclusion :

- The overall health of the structures both RCC and Steel in ESP Unit 2 needs repairing & strengthening to overcome further degradation.
- Surface repairing of all those pedestals are required.

Refer to Certificate No. DCEPL/JH/11/052/2021-22

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Annexure- 7_B: Stability Test Report Unit -3

Remarks:

Strength of Concrete:

Tests conducted are fairly indicative of the quality of concrete, The **Rebound Hammer Test** results indicate that the approximate compressive strength of concrete for the inspected structure ranges from **39.5N/mm²**to**45.9N/mm²**.

Integrity of Concrete:

As per IS-516(Part- 5/Sec-1):2018 Integrity results of concrete shown by UPV test, ranges from **3.809Km/sec4.460Km/sec**.

Depth of Carbonation:

The depth of carbonation is determined as defined in **BS EN 14630:2006(E)**, this is the most widely used method of measuring carbonation depth.

HalfCell Potential Test:

The Half Cell Potential readings vary from **-151 to -177 mV**.As per**ASTM C-876**Code:

- 0 to -200mV (no corrosion)
- -200 to- 350mV(Suspected corrosion)
- Above-350 mV(Severe corrosion)

Ultrasonic Thickness Gauging:

On thickness gauging, the test data show the degradation or reduction of thickness is Noticeable.

Portable Hardness Testing:

The hardness & tensile reading as per the data sheet are within the limit. (Minimum Tensile strength should be **410**N/mm²).

Coating Thickness:

On coating thickness, the test data show the reduction of coating thickness is Noticeable.

Conclusion :

- The health of the structures both RCC and Steel in Mill Bunker Unit 3 needs repairing & strengthening to overcome further degradation.
- According to visual inspection multiple surface cracks were observed at multiple locations which requires repairing.

Refer to Certificate No. DCEPL/JH/11/052/2021-22

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Remarks:

Strength of Concrete:

Tests conducted are fairly indicative of the quality of concrete, The Rebound Hammer Test results indicate that the approximate compressive strength of concrete for the inspected structure ranges from
37.5N/mm²to43.7N/mm².

Integrity of Concrete:

As per IS-516(Part- 5/Sec-1):2018 Integrity results of concrete shown by UPV test, ranges from 3.826Km/sec4.686 Km/sec.

Depth of Carbonation:

The depth of carbonation is determined as defined in BSEN14630:2006(E), this is the most widely used method of measuring carbonation depth.

Half Cell Potential Test:

The Half Cell Potential readings vary from -144 to -176 mV.Asper ASTM C-876Code:

- 0 to -200mV(no corrosion)
- -200to -350mV(Suspected corrosion)
- Above-350mV(Severe corrosion)

Portable Hardness Testing:

The hardness & tensile reading as per the data sheet are within the limit. (Minimum Tensile strength should be 410N/mm²).

Ultrasonic Thickness Gauging:

On thickness gauging, the test data show the degradation or reduction of thickness is Noticeable.

Coating Thickness:

On coating thickness, the test data show the reduction of coating thickness is Noticeable.

Conclusion :

- The health of the structures both RCC and Steel in Mill Bunker Unit 3 needs repairing & strengthening to overcome further degradation.
- According to visual inspection multiple surface cracks were observed at multiple locations which requires repairing.

Refer to Certificate No. DCEPL/JH/11/052/2021-22
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Remarks:

Strength of Concrete:

Tests conducted are fairly indicative of the quality of concrete, The Rebound Hammer Test results indicate that the approximate compressive strength of concrete for the inspected structure ranges from 37.5N/mm²to48.1N/mm².

Integrity of Concrete:

As per IS-516(Part- 5/Sec-1):2018 Integrity results of concrete shown by UPV test, ranges from 3.805Km/sec4.778 Km/sec.

Depth of Carbonation:

The depth of carbonation is determined as defined in BSEN14630:2006(E), this is the most widely used method of measuring carbonation depth.
The depth of carbonation ranges from 5.0mm to 10.0mm.

HalfCell Potential Test:

The Half Cell Potential readings vary from -151 to -177 mV.Asper ASTMC-876Code:

- 0 to-200mV(no corrosion)
- -200to -350mV(Suspected corrosion)
- Above-350mV(Severe corrosion)

Ultrasonic Thickness Gauging:

On thickness gauging, the test data show the degradation or reduction of thickness is Noticeable.

Portable Hardness Testing:

The hardness & tensile reading as per the data sheet are within the limit. (Minimum Tensile strength should be 410N/mm²).

Coating Thickness:

On coating thickness, the test data show the reduction of coating thickness is Noticeable.

Conclusion :

- The overall health of the structures both RCC and Steel in ESP Unit 3 needs repairing & strengthening to overcome further degradation.
- Surface repairing of all those pedestals are required.

Refer to Certificate No. DCEPL/JH/11/052/2021-22

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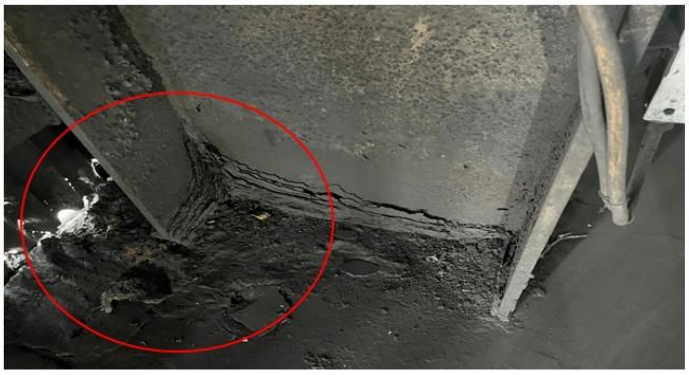
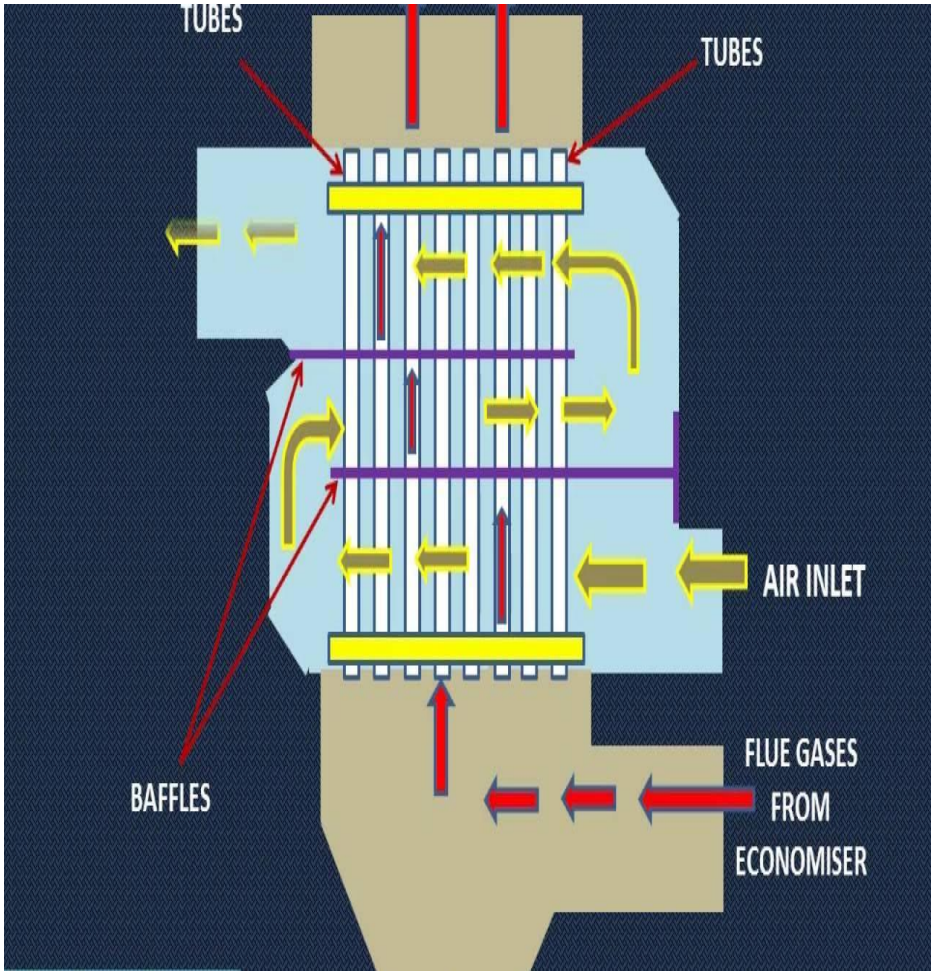


Detailed Project Report

BOILER APH Tube replacement



Unit 2 & Unit 3,

Tata Power, Jojobera Power Plant

FY 2027-31

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A1. BACKGROUND

Unit 2 & Unit 3 at Jojobera were commissioned on 1st February 2001 & 1st February 2002 respectively. In both the units, **Tubular Air Pre-heater** is an essential part of the Boiler. This Tubular APH works on the principle of Recuperative Air preheater where air and flue gases flow in a crossflow manner.

Hot flue gas enters the pre-heater through tubes and air flows outside the tube surface thereby heat transfer takes place from flue gas to incoming combustion air. In simpler word, Air preheater is a heat recovery system used in the last stage of boiler in Flue Gas path to increase the Boiler efficiency. In our system, Air Pre-heater has two parts, 1st part is Secondary air preheater which pre-heats the Secondary Air delivered by FD fan, used for combustion of fuel in furnace while the 2nd part, the Primary air preheater pre-heats Primary air delivered by PA Fan, used for removal of moisture from coal & conveying of pulverized fuel to furnace for combustion.

This Tubular APH has vertical tubes made of steel, operating at low to medium temperatures.

Tubular Air Preheaters Significance:

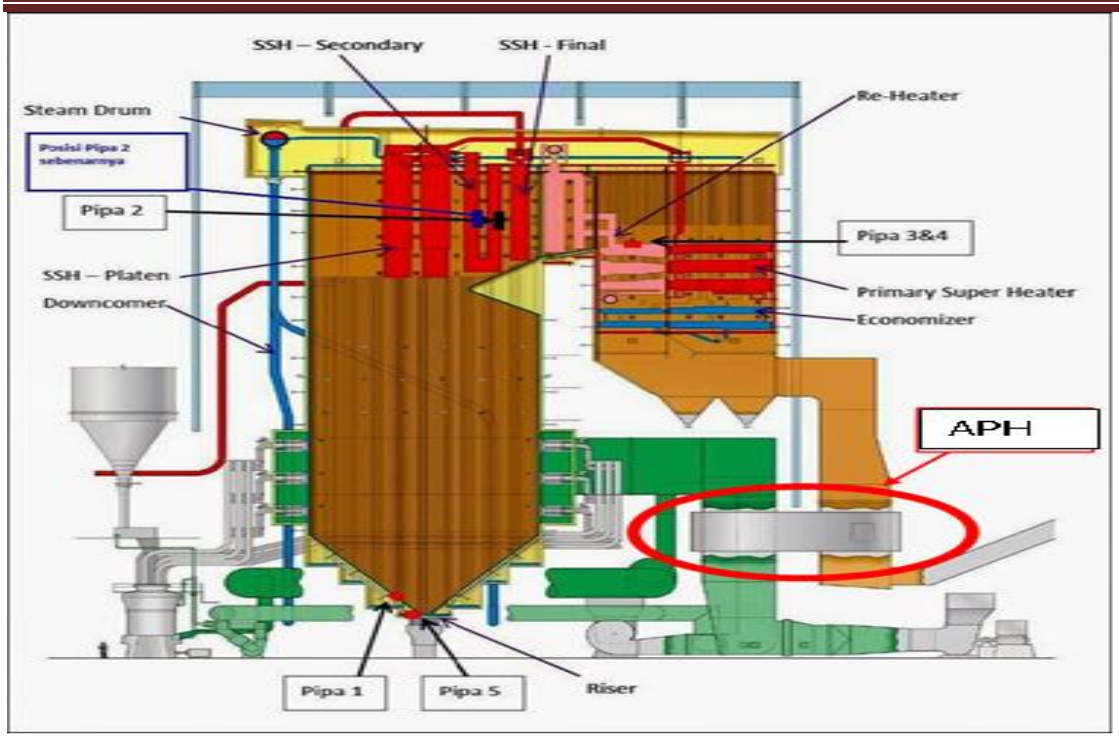
Improved Combustion Stability: Using preheated air enhances combustion stability.

Increased Efficiency: They elevate the efficiency of steam boilers by reducing excess air and increasing steam-generating capacities.

Energy Conservation: By extracting surplus heat from flue gases, they help conserve energy.

Complete Combustion: They reduce unburnt fuel particles in the flue gas, achieving more complete combustion.

Hence, Tubular Air Preheaters are essential part of the Boiler system for maintaining the efficiency and performance of boiler and hence the power plant cycle.



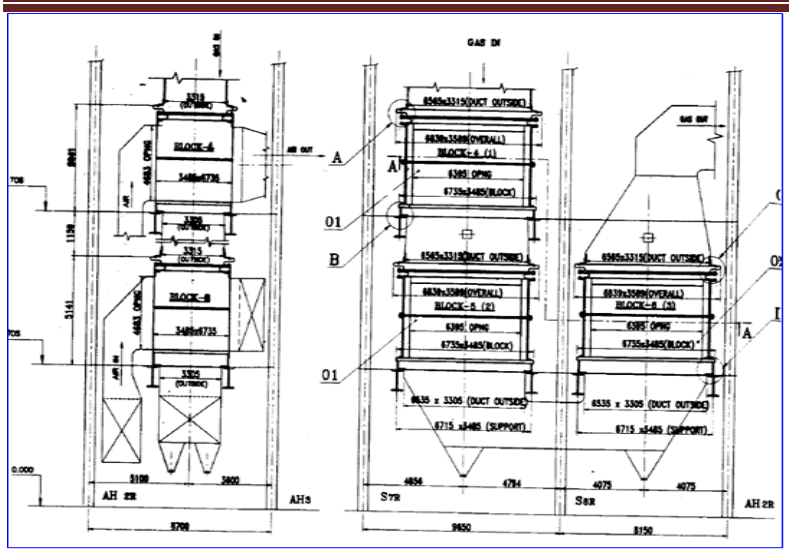
GENERAL ARRANGEMENT OF APH IN BOILER

In our system, **Secondary Air Pre-heater** consist of 06 Blocks divided into 02 passes. Each pass consists of 03 blocks (Inlet Block, Intermediate Block & Outlet block) which pre-heats combustion air from FD Fan in three stages**.** Each Block having approx. 5,000 nos. of tubes totalling 30,000 tubes covering both the passes.

On the other hand, **Primary Air Pre-heater** consisting of single pass with overall 03 blocks, Inlet Block, Intermediate & Outlet Block which pre-heats primary air from PA Fan**.** Each Block having approx. 5,300 nos. of tubes totalling 15,900 in overall nos.

Hence total number of tubes in **Secondary** as well as **Primary Blocks** are approx. 45,000 nunbers in each unit.

Tube dimension is 50.8mm Dia, 2.08 mm Thick and 5015mm long Corrosion resistance Steel tube.



ARRANGEMENT OF TUBE BLOCKS IN APH

A2. NECESSITY OF THE PROJECT

APH Tube transfers heat from flue gas to Primary and secondary air required for Combustion and coal conveying process. The flue gas while passing through the tube causes erosion because of the impeachment of high velocity ash content. Over the period of being in service tube wall thinning at considerable high level have occurred causing leakages. Many tubes have been plugged and due to leakages, which is hampering Unit performance effecting boiler combustion and high current drawl by draught fan. The draught fan current has risen to higher value with continuous rising trend reaching Full load current of Fan. For reliable and safe operation of Unit APH tube-replacement to be carried out in phase manner.

The project is driven first and foremost by a series of serious risk factors that will intensify if the Air-Preheater (APH) tube blocks are not replaced in a phased manner. Excessive cold-air ingress through leaky tubes will lower the flue-gas temperature at the ESP inlet, causing severe cold-end corrosion of the ESP, higher ESP-maintenance costs, reduced dust-collection efficiency and the potential breach of statutory emission limits. A reduced flue-gas exit temperature (FGET) at the APH outlet will aggravate corrosion of both the ducting downstream of the APH and the chimney structure. Moreover, the loss of heat pick-up at the APH will diminish boiler combustion efficiency, increase coal consumption, raise the plant's heat-rate and consequently drive-up generation costs. The higher auxiliary power demand of the ID, FD and PA fans required to overcome the cold-air leakage further erodes overall plant efficiency.

These risks underscore why immediate action is essential. After more than 24–25 years of service, continuous exposure to ash-laden flue gas has severely eroded the tubes at the flue-gas entrance end, while the outlet block, exposed to lower temperatures, suffers pronounced

cold-end corrosion in addition to normal erosion. Temporary sleeves installed during the last overhauling have now failed; the leakage has progressed toward the center of the tubes, a condition that cannot be remedied by further stop-gap repairs. The resulting air leakage degrades APH performance, raises auxiliary fan power consumption and adversely affects the plant's heat rate. Because the replacement involves a very large number of tubes (approximately 45 000 per unit) and requires extensive procurement, shutdown planning, dismantling, installation and commissioning activities, it cannot be completed in a single year; a phased implementation aligned with unit shutdown schedules is the only practical approach.

If unaddressed, these technical degradations will translate into higher electricity tariffs for end consumers, compromise plant safety, and increase the likelihood of equipment failures. Replacing the tube blocks therefore safeguards the longevity of critical equipment, ensures compliance with environmental emission norms, maintains boiler efficiency, and secures a reliable, cost-effective power supply for consumers.

Design data vis a vis present data in tabulated form for ID, FD, PA Fan of U#2 & 3 for Aux Power Consumption (APC).

FAN Power (Amps)	**PG Test (Amps) 100% TGMCR**	**Current Status (Amps) 100% TGMCR**
ID Fan A& B	100	149.9
FD Fan A& B	58	70.1
PA Fan A & B	58	56.2
Total	**216**	**276.2**

Risk factors:

Following are the risks associated in case the Tubes are not replaced in phased manner and situation worsens,

1. Excessive cold air ingress into Flue gas due to leaky tubes will result in decrease in flue gas temperature at ESP inlet which will result in severe Cold End corrosion in ESP and will lead to higher maintenance cost of ESP.
2. Further, in consequent to ESP internal damage, it will result in lower ESP performance and adversely impact dust collection efficiency which will finally result in higher emissions level. This may cause statutory issues in terms of environmental norms of emission.
3. Lower FGET at APH outlet will result in aggravated corrosion in the following systems:
   i) Entire ducting system from APH outlet till chimney and
   ii) Structural part of Chimney

4. Due to cold air leakage, air side heat pick-up at APH will drastically reduce and following losses to be incurred
   i) Reduced Combustion efficiency of Boiler which will result in Loss in Heat Rate
   ii) Increased Coal consumption which will ultimately increase cost of generation
5. Higher Auxiliary consumption in ID Fan, FD Fan & PA Fan on same power generation due to cold air leaking into flue gas.

To regain the performance of APH, tube blocks of both **Primary** & **Secondary** (both passes) need to be replaced in phased manner as per the respective unit shutdown plan.

Photographs of APH Tube condition attached below

FEW PHOTOGRAPHS OF APH TUBE CONDITION CAPTURED DURING LAST OVERHAULING

As per the current scenario and expecting further years of operation, condition of the tubes in different blocks will further deteriorate which would necessitate for replacement of entire tube Blocks**.**

In order to safeguard the capital equipment from the above-mentioned risk factors, we need to take up early plan for phase-wise replacement of the tube blocks looking at the huge number of tube replacement activity involved which cannot be done in a single year.

A3. Project Description, Execution & Testing

The Boiler Air Preheater (APH) is a critical heat recovery component used in thermal power plants to improve boiler efficiency by recovering heat from flue gases. The recovered heat is transferred to incoming combustion air, reducing fuel consumption and enhancing overall plant performance. The project involves inspection, Dismantling of Tube, Insertion of New Tube, alignment, and commissioning of the APH system to ensure safe and efficient operation.

Execution begins with shutdown planning, procurement of APH tube, Processing order for installation (Erection & Commissioning activity) with all supporting activity like dismantling of insulation and duct.

A4. Benefits of the Project

- Improvement in APH performance
- Reduce chance of deterioration of ESP performance
- Maintain the environmental emission obligation as per the norms
- Reduce chances of corrosion in APH outlet ducting & structural corrosion in Chimney
- Overall cost of maintenance of Ducting, ESP & Chimney will be under control
- Overall life of Boiler APH system will increase

A5. Financial Details

The proposed scheme is for Unit 2 and Unit 3; hence, proposed project cost is to be allocated equally among these units. The project cost is estimated at Rs. 2200.00 Lakh based on tentative quotations from the vendor. The total project is planned in phased manner, and the expenditure will be as per the table below.

Projected Cost including capitalization phasing is shown below:

Total Project Cost with Capitalization Phasing						
Particulars	**UoM**	**FY 27**	**FY 28**	**FY 29**	**FY 30**	**FY 31**
Project Cost allocated to Unit 2	Rs Lakh	500.00		500.00		100.00
Project Cost allocated to Unit 3	Rs Lakh		500.00		500.00	100.00
Total For Unit 2 & 3	**Rs Lakh**	**500.00**	**500.00**	**500.00**	**500.00**	**200.00**

A6. Conclusion

Procurement and replacement of the APH Tube would be very useful and help us to mitigate potential risk of major force outage of units, reduction in environmental pollution and equipment downtime. Hence, it is requested to Hon'ble Commission to kindly consider this scheme and approve the proposed Capex and Capitalization for the Control Period (FY 2026-27 to FY 2030-31).

A7. ENCLOSURE

Annexure 8

AUG. 2024

MANDATORY ENERGY AUDIT REPORT OF TATA THERMAL POWER PLANT JOJOBERA, TATA NAGAR DISTRICT JHARKHAND

Submitted by

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- **Feed Water temperature** at U#2, is 229.09°C as compared to 233.6°C design. Same needs to be improved. This will increase TG heat rate by 6.16 kcal/kWh.
- **The SAH** of Unit 2, Air Outlet temperature was close to inlet temperature. This indicates complete choking and excessive erosion of the APH. The APH needs replacement of the tubes. This is impacting approx. 2.77% of Boiler Efficiency by increasing the dry flue gas temperature.
- The air ingress is higher in SAH and PAH of APH. The % Air Leakage is 16.26% for SAH and 34.78% for PAH. This will lead to increase the ID fan power consumption and reduce Boiler efficiency. The Boiler efficiency is reduced by 1.60%, considering an optimum leakage as 7%. The Aux power increased by approx. 192 kWh due to leakages.
- **The % LOI in Bottom Ash and Fly Ash** is very high at 14.66% and 3.37%. This will reduce the boiler efficiency by 3.69% considering an optimum LOI as 1%.

Unit-3

- Flue gas exit temperature is also comparatively higher at U#3 PAH i.e. 173°C resp. It is impacting 0.48% on Boiler efficiency.
- There is approx. 21 °C temperature Drop from APH outlet to ID Fan inlet. This indicates a duct and APH leakages. There is approx. 8.34% leakage across the system.
- Hourly data during full load is collected and noted during the course of the study. Normal Turbine cycle heat rate for U#3 is **2152.77 as compare to design turbine heat rate 2021 Kcal/KWh.**
- **The Boiler efficiency is calculated as 85.22%**
- Main steam inlet pressure and temperature is near design values and maintained satisfactory.
- Main Steam attemperation is 1 to 5 TPH and is satisfactory.
- HRH attemperation is also low and between 'nil' to 5 TPH and is maintained satisfactory.
- **HPT efficiency:** U#3 HPT efficiency is lower because of higher CRH steam temperature 358.85°C as against design value 342.2°C. This will increase TG heat rate by 15.46 kcal/kWh
- **Feed Water temperature** at U#3, is 231.38°C as compared to 233.6°C design and is satisfactory. Same needs to be improved. Lower feedwater temperature increases TG heat rate by 2.73 kcal/kWh.

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Observations / Comments on Indirect Boiler Efficiency Values

- **Unit # 1:** Overall Indirect Boiler Efficiency is **86.20%** and is well maintained. Average corrected exit flue gas temperature for Unit # 1 Boiler is 16 °C. Air ingress at APH needs to be monitored for sustaining and avoiding increase in ID Fan, FD Fan, and PA Fan power consumption.
- **Unit # 2:** Overall Indirect Boiler Efficiency is **80.77%** and is much lower than expected value. Average corrected exit flue gas temperature for Unit # 2 Boiler is 251 °C. The APH (Primary and Secondary) tubes seems to be having excessive erosion. It needs to be checked and replaced on priority.
- **Unit # 3:** Overall Indirect Boiler Efficiency is **85.22%** and is ok. Average corrected exit flue gas temperature for Unit # 3 Boiler is 158 °C. Losses across APH (Primary and Secondary) observed. Need to check and replace on the next opportunity.
- **Unit # 4:** Overall Indirect Boiler Efficiency is **84.30%** and is lower than expected. Average corrected exit flue gas temperature for Unit # 4 Boiler is 177 °C. Air ingress at APH needs to be monitored for sustaining and avoiding increase in ID Fan, FD Fan, and PA Fan power consumption.

6.2.4 Performance Assessment for APH

- The design of APH is different for all the units. Unit 1 has 1 PAPH and 1 SAPH, Unit 2 and Unit 3 has rotary APH, Unit 4 has regenerating bisector APH. The APH data was collected along with the unit data.

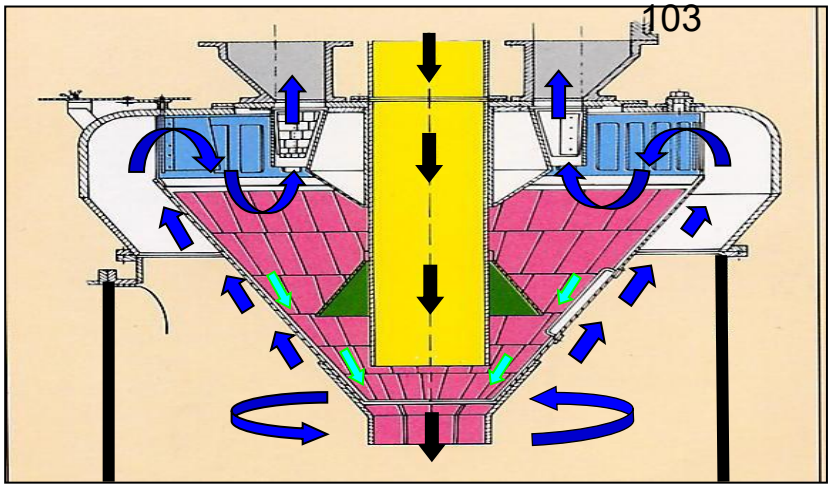
- Flue gas sampling and composition analysis were undertaken at respective flue gas ducts (at inlet & outlet of APH) as per grid points available. $\%O_2$ values measured at multiple points at each duct to minimize any error in readings. The flue gas measurement data for each unit is shown below

Table 19: Flue Gas Analysis at APH I/L/ O/L - U # 1

Unit-1						
	APH Inlet		Average	APH Outlet		Average
	Path-A	Path-B		Path-A	Path-B	
O2	3.79	4.27	4.03	3.92	6.61	5.265
CO	10	7	8.5	3	3	3
CO2	15.08	14.66	14.87	14.96	12.61	13.785
FT	303	300	301.5	149	154	151.5

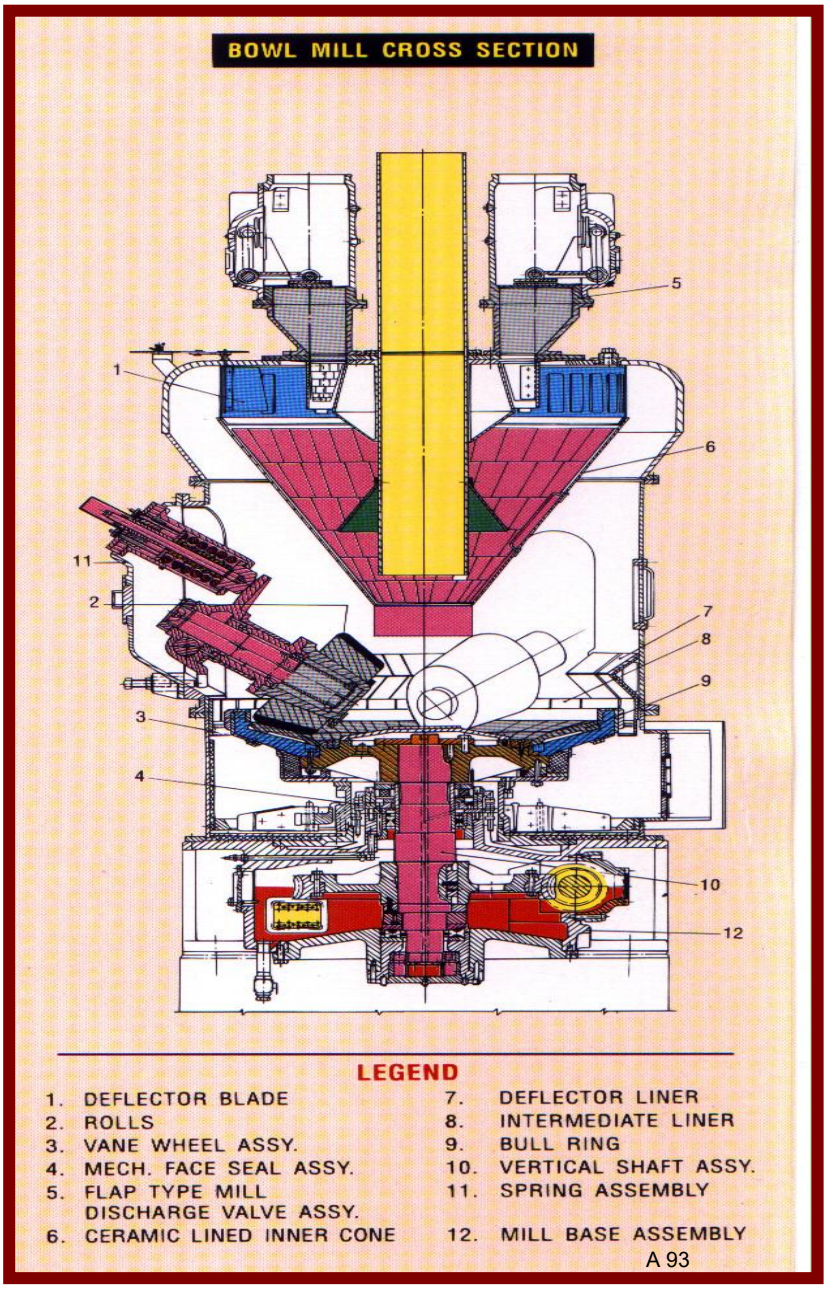
Table 20: Flue Gas Analysis at APH I/L/ O/L - U # 2

Unit-2



Detailed Project Report

COAL MILL INTERNALS, COAL PIPES, MDV, MPO & COAL BENDS



Unit 2 & Unit 3

Tata Power

Jojobera Power Plant

FY 2027-2031

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A1. Background

The Jojobera Thermal Power Plant comprises five units, of which Units 2 & 3 were commissioned in 2002 and 2003 respectively. Both units operate with Pulverized Fuel (PF) fired boilers equipped with corner-firing systems supported by a battery of Coal Pulverizers.

Across these two units, a total of 10 Coal Mills is in continuous operation to supply uniformly pulverized coal to the boiler furnaces. Each mill includes several critical subsystems located on both the pulverization side and the discharge side. After grinding, the pulverized coal is conveyed through a series of vital components, including:

A. Mill Internals (Pulverization Side): These parts are essential for achieving and maintaining the required fineness of coal:

a) Classifier Assembly Spares, including Classifier Cone, Outlet Venturi, Venturi Vanes, Feed Pipe and Other classifier wear parts

b) Journal Assembly & Spares, which include Journal Housing, Grinding Assembly shaft, Journal Head & Bearings, Associated seals and bushings

These internal components are directly exposed to raw coal and grinding forces and thus are crucial for efficient milling and maintaining uniform fineness of pulverized fuel.

B. Mill Discharge System Components: Once coal is pulverized, it is transported through the mill's discharge stream, which includes:

(a) MPOs (Multiport Outlets)

(b) Mill Discharge Valves (MDVs)

(c) Coal Pipes & Bends

(d) Reducers

Together, these components form the complete coal-flow path through which pulverized coal is transported and injected into the boiler furnace through burners for stable and efficient combustion.

<u>Need for Timely Replacement</u>

Due to continuous exposure to: High-velocity coal-air mixture, Abrasive & hard coal particles, and Sustained thermal and mechanical stresses, both mill internals (classifier and grinding components) and downstream discharge system parts undergo substantial erosive and abrasive wear. This results in:

a) Loss of material thickness

b) Change in component geometry

c) Reduced functionality and efficiency

d) Increased risk of mill choking or uneven coal distribution

e) Higher specific coal consumption due to deteriorated fineness

Regular inspection and timely replacement of these wearing components is essential to:

a) Maintain mill performance and reliability

b) Ensure proper coal fineness and uniform combustion

c) Avoid unplanned outages and mill tripping

d) Sustain uninterrupted generation cost

Components, Abbreviations, and Their Functions:

1. MPO – Multiple Port Outlet

Location: Installed at the mill outlet and is the first component to discharge PF from mill

Function: Serves as first outlet of PF from mill and acts as a connector ensuring smooth transition of coal flow from mill to MDV.

Construction: Cast-steel with ceramic lining for increased life and improved coal flow characteristics.

Impact of damage & failure: Any erosion or damage causes leakage of coal dust at the mill top, contributing to housekeeping issues and operational hazards and will lead to further fire hazard and reduction operational efficiency.

2. MDV – Mill Discharge Valve

Location: Positioned at the top of each mill, mounted above the MPO.

Function: Acts as a regulator of the flow of pulverized coal to the furnace and provides isolation between the mill and furnace to protect personnel during maintenance, especially when the furnace is under positive pressure.

Construction: Cast steel/Alloy Cast iron with ceramic lining as protection to resist erosion.

Impact of failure: Damage or erosion leads to coal leakage at the top of the mill, resulting in dust deposition, unsafe conditions, and unclean mill areas and will lead to further fire hazard and reduction operational efficiency.

3. PF (Coal) Pipes & elbows

Function: Transportation of pulverized coal from coal mill to the boiler furnace.

Characteristics: In Units 1–4, each coal pipe is approximately 624 meters in length. Sections are interconnected with Victalic/Johnson type pipe couplings.

Construction: Cast steel/Alloy Cast iron with ceramic lining as protection to resist erosion

Importance & impact of failure: Serve as the final path of transport reaches PF at the burners. Wear & tear, leakages can significantly affect combustion efficiency, safety, housekeeping, mill output with respect to demand at furnace & will lead to further fire hazard and reduction operational efficiency.

4. Reducers

Location: Fitted above the MDV, between the MDV and the coal discharge pipe.

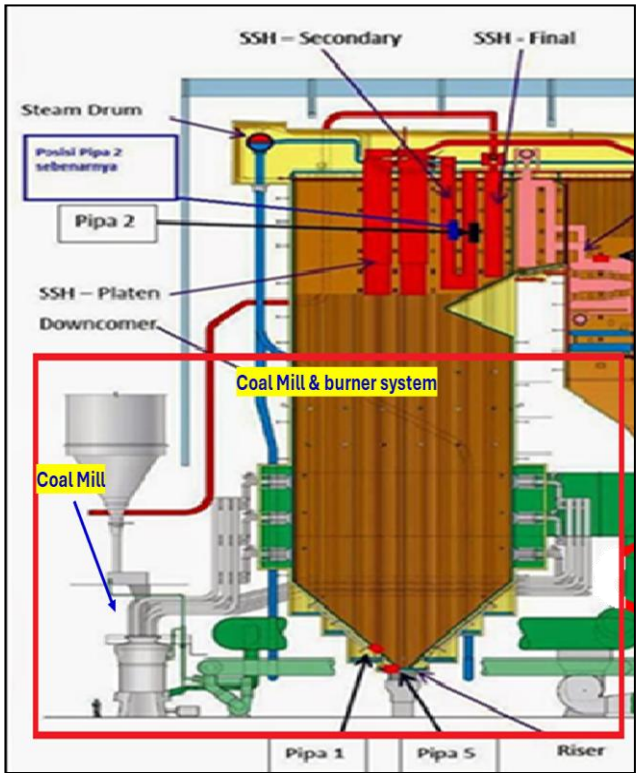
Function: Gradually reduces flow-path diameter to control and streamline the coal flow velocity toward the coal pipes ensuring laminar flow. Connected to coal pipes with Victalic/Johnson type pipe couplings.

Construction: Cast steel/Alloy Cast iron with ceramic lining as protection to resist erosion.

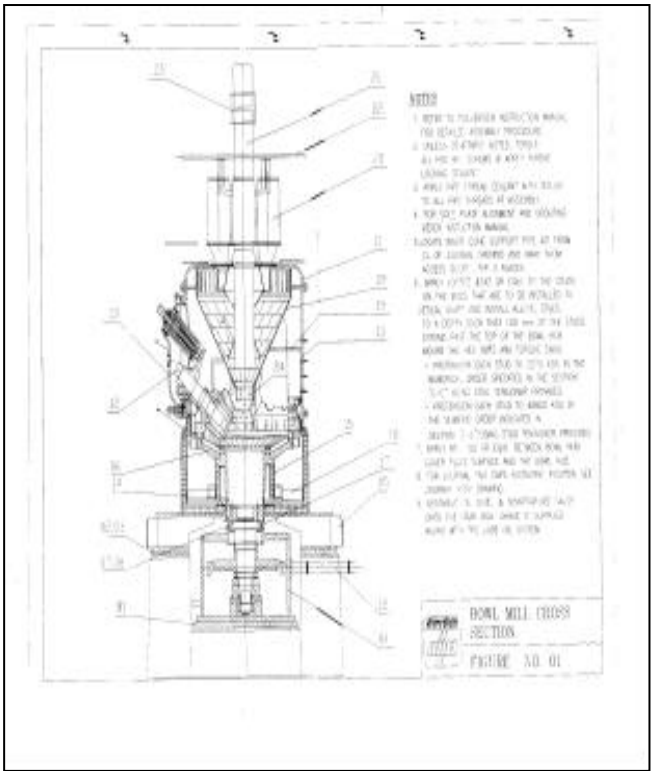
Impact of failure: Erosion/Wear & tear/leakages leads to flow disturbances, higher wear on downstream components, fire hazard and reduction in combustion/operational efficiency.

Illustrations:

General arrangement of Coal mill & burner system

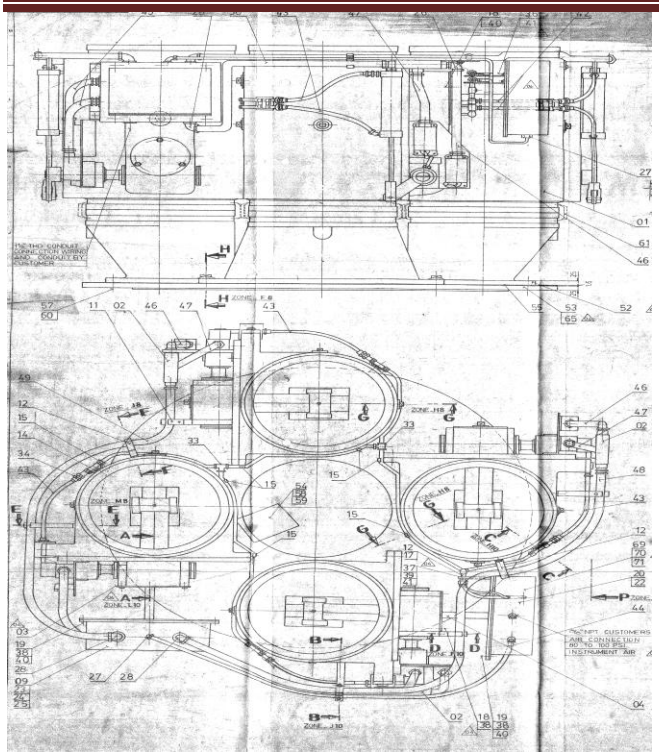


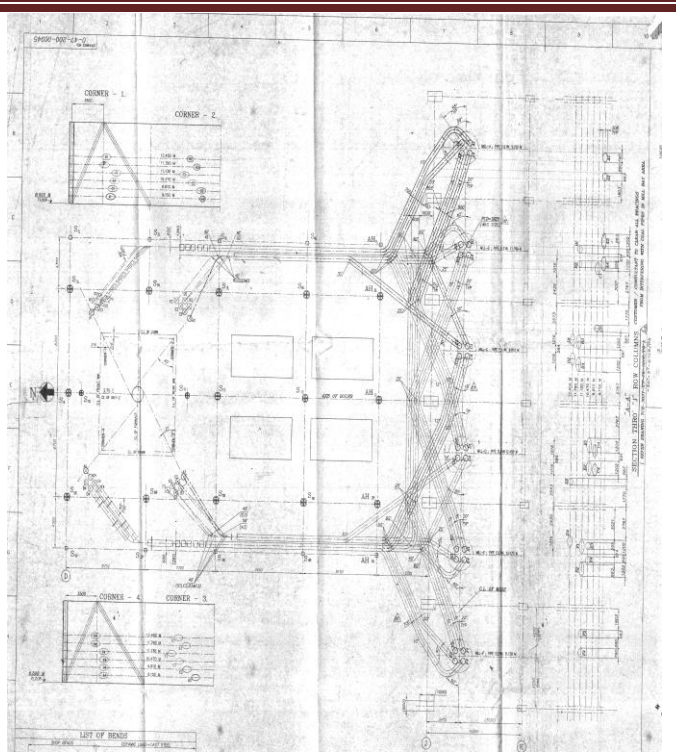
Coal Mill sectional view



General arrangement of MDV/MPO

General arrangement of coal piping





PF (Coal) Pipe details

Unit	Pipe Length per Corner in m	Nos. of Corners	Total Length in m
Unit#2	52	4	224
Unit#3	52	4	224
Total Length of pipe (Est.)			448

Unit	OD of Coal Pipe (mm)	ID of Coal Pipe (mm)
Unit#2	507	490
Unit#3	507	490

PF (Coal) elbows details

Unit	Nos. of elbows (45^o)	Nos. of elbows (90^o)	Nos. of elbows (35^o)
Unit#2	6	4	2
Unit#3	6	4	2
Total	12	8	4

A2. Necessity of the Project

The coal mills of Units 2 & 3 have been in continuous operation for over 15 years, during which critical mill internals such as Classifier assembly & Journal assembly and discharge-side components i.e. MDVs, MPOs, Coal Pipes, Bends, Reducers have undergone severe abrasive wear. These components are integral parts of coal pulverizing and conveying system, directly affecting boiler performance, combustion stability, and unit reliability. Their current deteriorated condition poses growing risks to plant safety, availability, and generation sustainability.

The worn-out condition of these internals has resulted in accelerated erosion and frequent failures, with clear adverse effects on mill throughput and coal fineness. Due to this deterioration, the mills require repeated outages for repair or refurbishment. Their current deteriorated condition poses growing risks to plant safety, availability, and generation sustainability. Replacement/ refurbishment of internals causes frequent outage of Coal Mill. During the outage of any mills for internal repair due to wear if breakdown of any Other Coal Mill in the same unit takes place than unit stability becomes a risk. Oil gun also has to be taken for stabilization of the unit. Many a times Unit trip also occurred because of poor performance of coal mill leading to flame instability / failure. For enhancement and stability of Coal Mill performance, better unit reliability / uninterrupted power generation coal mill internals have to be replaced.

1. Progressive Erosion of Critical Coal Mill Internals

a) Classifier Assembly Components (Cone, Outlet Venturi, Venturi Vanes, Feed Pipe, etc.)

The classifier is responsible for achieving the required fineness of pulverized coal. Over years of operation, classifier internals have experienced:

(a) Heavy erosion of classifier cone and venturi regions

(b) Loss of geometry of venturi vanes, leading to poor flow distribution

(c) Wear in the feed pipe and outlet zones

As these parts lose profile and thickness, the mill's ability to maintain consistent coal fineness is compromised, resulting in:

(a) Higher unburnt carbon in ash

(b) Increased coal consumption

(c) Reduced combustion efficiency

(d) Greater furnace instability

b) Journal Assembly & Grinding Components

(a) Continuous grinding of raw coal has caused:

(b) Material loss on grinding rolls and journal heads

(c) Wear on bearings, seals, housings, and structural surfaces

(d) Increased mill vibrations and reduced grinding pressure

This degradation directly impacts mill capacity, fineness, and operating reliability.

2. Severe Wear of Discharge-Side Components and Internal Ceramic Lining

The MDVs, MPOs, Coal Pipes, Bends, and Reducers were originally manufactured with ceramic-lined interiors to withstand abrasive pulverized coal. Over long-term service, the lining has progressively eroded, especially in regions with high turbulence and velocity changes such as:

(a) Pipes & bends

(b) Reducers

(c) Venturi and discharge transitions

Once ceramic protection is lost:

The base metal becomes exposed, leading to rapid wall thinning, **Structural integrity deteriorates**, creating high failure risk, **Frequent leakages occur**, sometimes simultaneously in multiple locations

This condition has reached a stage where components are unable to operate safely without immediate replacement.

3. Operational Impact of Frequent Coal Leakages

Coal leakages from any mill discharge component result in:

(a) Forced mill stoppages for emergency repair

(b) Reduction in available mills, limiting boiler load

(c) Higher LDO consumption due to repeated mill restarts and flame stabilization

(d) Combustion disturbance, affecting furnace temperature profile and burner performance **Environmental and safety concerns**, as airborne coal dust spreads into adjacent operating areas

These events have become increasingly frequent due to cumulative wear, leading to avoidable generation loss and operational stress.

4. Limitations of Temporary External Repairs

Temporary patch repairs are no longer effective because they cannot restore:

(a) The original ceramic lining

(b) The design thickness and erosion-resistant surface

(c) The required smooth internal flow profile

(d) The structural strength needed for long-term operation

As a result, patched components quickly fail again, causing repetitive leakages and increasing the maintenance burden. Continuing with such temporary measures poses growing operational risk.

5. Need for Comprehensive Renewal of Coal Mill Internals and Discharge Components

Given the condition of the mills, **complete refurbishment of the worn-out classifier parts, journal assembly spares, MDVs, MPOs, Coal Pipes, Bends, and Reducers is essential**. Installing new, properly lined and dimensionally accurate components will ensure:

(a) Reliable coal flow through the entire milled-coal circuit

(b) Proper classification and fineness of pulverized coal

(c) Stable grinding performance from the journal assembly

(d) Leak-free, safe operation of the discharge system

(e) Improved mill system availability and reduced forced outages

This renewal is essential to restore the designed mill output and enable smooth boiler operation.

6. Expected Benefits After Replacement

The project will deliver the following measurable improvements:

(a) Elimination of coal leakages, creating a safer and cleaner working environment

(b) Higher mill availability, avoiding unplanned mill trips

(c) Prevention of generation loss

(d) Enhanced combustion stability due to consistent coal fineness and flow

(e) Reduced maintenance interventions and improved equipment life

(f) Overall improvement plant reliability

Inference

Considering the extensive erosion of coal mill internals, the advanced wear of discharge-side components, repeated leakages, operational disruptions, and the diminishing effectiveness of temporary repairs, the comprehensive replacement of classifier spares, journal assembly items, MDVs, MPOs, Coal Pipes, Bends, and Reducers is **operationally critical**. This project is necessary to ensure **continuous, safe, reliable, and efficient generation** from Units 2 & 3.

Illustration of damaged parts

Damaged MDV **Damaged MPO**

A3. BENEFITS OF THE PROJECT

The replacement of worn-out Coal Mill internals (Classifier assembly parts, Journal assembly spares) and discharge-side components (MDVs, MPOs, Coal Pipes, Bends, Reducers) will provide significant operational, safety, reliability, and environmental benefits. The following measurable improvements are expected after implementation:

1. Improved Mill Availability and Operational Continuity

Replacement of severely eroded mill components will:

(a) Eliminate frequent mill stoppages currently required for leak patching

(b) Restore reliable grinding and classification function

(c) Ensure stable coal conveying without risk of sudden failures

(d) Enhance mill loading capability and reduce forced outages

This will directly improve **unit availability**, enabling sustained and uninterrupted power generation.

2. Prevention of Generation Loss and Improved Efficiency

Unplanned mill outages often lead to:

(a) Boiler load restrictions

(b) Unit derations

By preventing these outages, the project will:

(c) Enhance reliability of power supply to consumers

Overall, the plant can maintain higher and more predictable generation levels.

3. Elimination of Coal Leakages and Improved Environmental Performance

Newly installed, ceramic-lined components will ensure a completely sealed coal flow path, leading to:

(a) **Zero coal dust leakage** into the work environment

(b) **Reduced airborne particulate levels** in mill areas

(c) **No ground spillage** or contamination around mills

(d) Better compliance with **environmental standards** and safety guidelines

These improvements contribute to a cleaner and safer workplace, while strengthening audit performance in areas such as ISO, sustainability, and regulatory inspections.

4. Strengthened Reliability of the Fuel Feeding System

Refurbishing classifier internals, journal assemblies, and discharge piping ensures:

(a) Consistent and uniform coal flow to all burners

(b) Stable coal fineness, enhancing combustion efficiency

(c) Reduced furnace temperature fluctuations

(d) Lower risk of mill trips, coal pipe choking, or burner maldistribution

This results in a more **robust and dependable fuel feeding system**, supporting stable boiler performance across all load conditions.

5. Enhanced Safety for Plant Personnel

Eliminating coal leakages and repeated emergency repair work will significantly reduce safety risks. Benefits include:

(a) Less exposure to hot, dust-prone areas during patch work

(b) Fewer unplanned maintenance interventions at elevation

(c) Lower probability of slips, falls, and inhalation hazards

(d) Safer working environment for operations and maintenance personnel

This directly contributes to improved **industrial safety performance** and reduced risk potential.

6. Improved Workplace Conditions & environment

With leakages eliminated:

(a) Mill floors remain clean, clutter-free, and accessible

(b) Inspections and preventive maintenance activities become easier and safer

(c) Housekeeping standards improve dramatically

(d) Operational areas maintain better visibility and organization

This helps create a more **efficient, compliant, and audit-ready work environment**.

7. Positive Impact on Plant and Stakeholder Confidence

A leak-free, environmentally responsible, and reliably operating mill system enhances:

(a) Perception of operational excellence

(b) Confidence among auditors, statutory authorities, and corporate stakeholders

(c) Scores in safety, environmental, and performance audits

(d) Overall plant reputation and credibility

Such improvements support long-term sustainability, compliance, and organizational trust.

Summary

The project provides comprehensive benefits spanning reliability, efficiency, safety, environment, and operational excellence. By restoring mills to their designed performance levels, the plant will achieve sustained, clean, and stable power generation with minimal risk of unplanned outages.

A4. FINANCIAL DETAILS (PROJECT COST)

The proposed scheme is for Unit 2 and Unit 3; hence, proposed project cost is to be allocated equally among these units. The total project expenditure will be as per the table below.

Projected Cost including capitalization phasing is shown below:

Particulars	UoM	FY 27	FY 28	FY 29	FY 30
Project Cost allocated to Unit 2	Rs Lakh	50.00	50.00	75.00	75.00
Project Cost allocated to Unit 3	Rs Lakh	50.00	50.00	75.00	75.00
Total For Unit 2 & 3	**Rs Lakh**	**100.00**	**100.00**	**150.00**	**150.00**

A6. ENCLOSURE:

Annexure- 11: Observations on Coal Mill

AUG. 2024

MANDATORY ENERGY AUDIT REPORT OF TATA THERMAL POWER PLANT JOJOBERA, TATA NAGAR DISTRICT JHARKHAND

Submitted by

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Unit 4					
		Mill A	Mill B	Mill C	Mill D
Mill Bowl DP	mmwc	280.98	193.04	204.71	139.59
Average kW	kW	243.22	175.92	245.85	158.38
Mill Air /Coal Ratio	Ton/Ton	2.00	2.12	2.09	5.13
Mill specific energy consumption	kWh/MT	10.50	7.84	11.33	18.20

Observations:

- Overall performance of the Coal feeding system is given below

Table 34: Overall performance of Milling System

Parameter	UoM	Unit 1	Unit 2	Unit 3	Unit 4
Total Coal	TPH	43.88	83.29	77.17	76.02
total Air	TPH	106.69	140.82	136.00	183.89
Total Power	kW	482.60	782.57	699.46	823.37
Specific Energy Consumption	kWh/MT	11.00	9.40	9.06	10.83
Air/Coal Ratio	Ton/Ton	2.43	1.69	1.76	2.42
Average Mill Outlet Temp	ºC	84.59	93.65	93.56	91.19

- All Coal mills Air/Coal ratio is not monitored properly. For Unit 1 it varies from 2.19 Ton/Ton to2.85 Ton/ton. For Unit 2 it varies from 1.67 Ton/Ton to 1.72 Ton/ton. For Unit 3 it varies from1.61 Ton/Ton to 1.89 Ton/ton. For Unit 4 it varies from 2.00 Ton/Ton to 5.13 Ton/ton. The High airflow contributes to poor Coal fineness by increasing air velocities in the classifier and reducing overall retention time of Coal in the grinding zones. Increases in primary airflow correlate to an increase in velocities at the classifier outlet of the pulveriser.
- Mill Outlet temperature is not maintained properly. Some of the Coal mill temperature is below 90 Degree C. The Cold Air damper of some of the coal mills were open on continuous basis.
- Although the performance of the Unit No # 2 & 3 Coal Mill is monitored regularly however multiple leakages were observed in pulveriser discharge Pipe & Bend's, MPO, MDV which hamper the plant performance. This needs to be catered and replaced on priority.
- The observed operational deviations in Air/Coal ratio and mill outlet temperature across all four units strongly indicate degradation of the coal mill internals—particularly the classifier, venturi , drum , vanes and liners. Hence replacement of above-mentioned internals is recommended for coal mills of Unit 2 & 3 for optimal unit operation.

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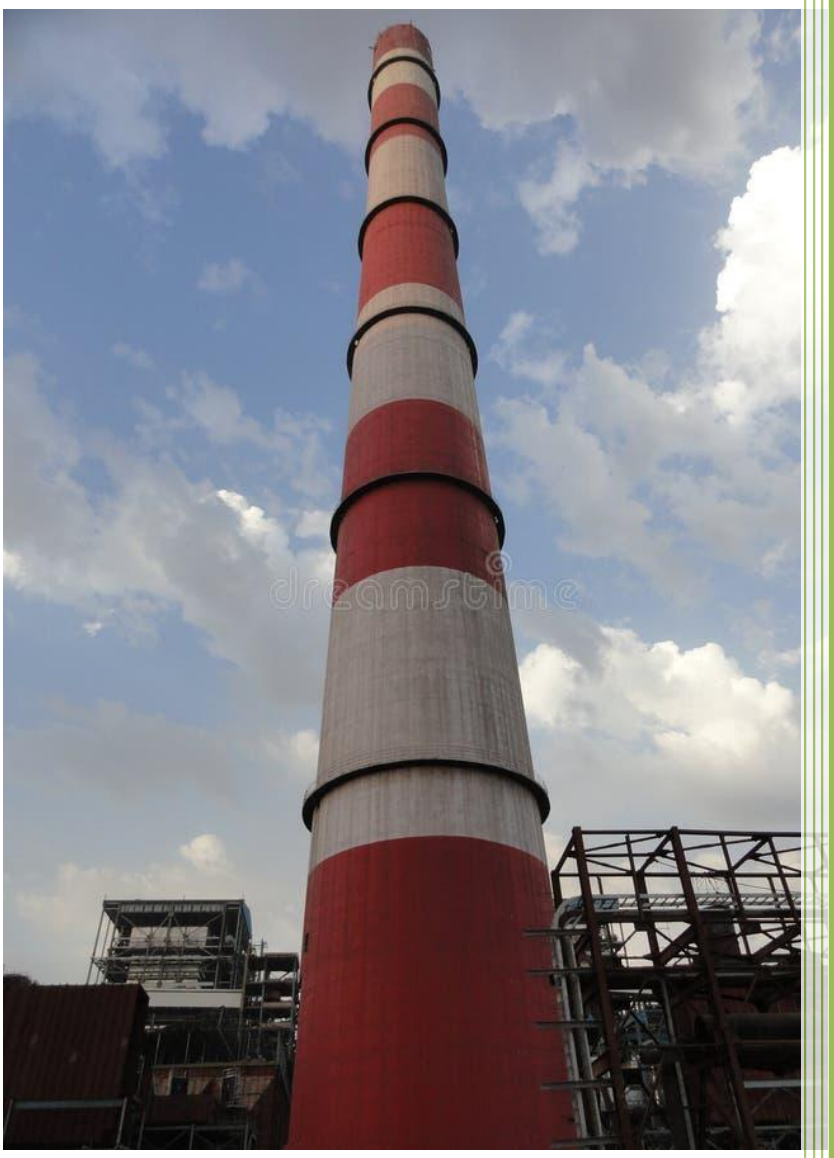
Detailed Project Report

Chimney Structure & landing Platform Refurbishment



Unit 2 & Unit 3

Tata Power

Jojobera Power Plant

FY 2027-2031

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A1. Background

Unit 2 & Unit 3 at Jojobera were commissioned on 1st February 2001 & 1st February 2002 respectively. The chimney is a vital structure for the safe discharge of flue gases and has been subjected to harsh operating and environmental conditions, including high temperatures, acidic gases, wind loads, and weathering. Over the years, these exposures have contributed to progressive deterioration of the chimney structure and its associated platforms.

A2. Necessity of The Project

The project has become urgent and necessary following a divisional directive issued after a near-miss safety incident in Units- 4 and Unit- 5, where elements of the chimney landing platform and structural components had fallen from height. In response, a comprehensive drone-based inspection of all chimneys was conducted in 2023 (inspection report enclosed in the Annexure). The inspection identified numerous structural and durability-related deficiencies that, if not addressed promptly, will significantly extend repair lead times, threaten uninterrupted power generation, and consequently impact electricity supply to end consumers.

Multiple critical defects were observed, including visible cracks along the chimney shell, deterioration and cracking of platforms, and extensive damage to platform handrails each indicating progressive loss of structural integrity. Honeycombing of concrete was also detected in several areas of the chimney wall and platform structures, signifying poor concrete integrity and potential exposure of reinforcement. Furthermore, the protective coating and paint systems have exceeded their intended service life, resulting in loss of corrosion protection and accelerated weathering.

These defects create safety-related risks, including the possibility of falling debris, corrosion-induced weakening of platforms and handrails, and unsafe access for inspection and maintenance personnel. Consequently, repair and painting of the chimney, together with strengthening and rehabilitation of platforms and handrails, are essential to restore structural integrity, improve durability, mitigate safety risks, and ensure the continued safe and reliable operation of the power plant for both its equipment and its personnel. Prompt execution will minimise downtime, protect plant assets, maintain compliance with safety and operational standards, and safeguard the uninterrupted supply of electricity to consumers.

The proposed works aim to arrest further deterioration, restore structural integrity, improve durability and corrosion resistance, and ensure safe access in compliance with applicable safety and operational standards. These measures are essential to extend the service life of the chimney and to ensure continued safe and reliable operation of the power plant.

A3. Project Description, Execution & Testing

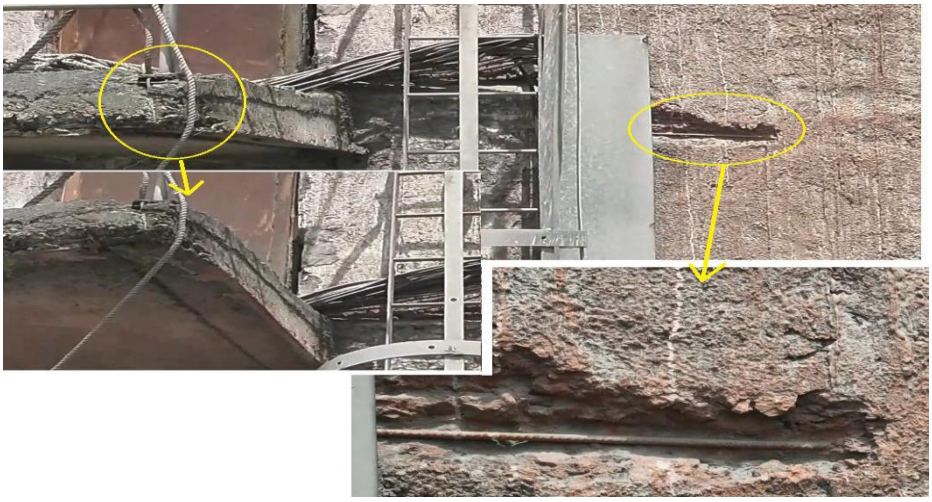
The project involves comprehensive repair, strengthening, and refurbishment of the chimney.

The scope of work includes:

- **Strengthening of all platforms and walkways:** A total of 16 platforms and 8 walkways will be reinforced by providing additional support using MS structures to restore load-carrying capacity.
- **Rehabilitation of handrails and ladders:** All handrails and ladders on platforms and walkways will be strengthened or replaced to ensure safe access.
- **Repair of chimney wall cracks:** Cracks and surface defects on the chimney shell will be repaired to restore concrete integrity and prevent further deterioration.
- **Full painting of the chimney:** The entire chimney will be cleaned, surface-prepared, and repainted with a durable protective coating to enhance corrosion resistance and extend service life.

These activities are aimed at improving the structural integrity, safety, and durability of the chimney and its access structures, ensuring reliable and safe operation of the power plant for the years to come.

CONDITION ASSESSMENT UNIT 2 – OBSERVED DEFICIENCIES:



Platform-2 (Elevation +27 m)

Ladder Side - Cracks and exposed rusted reinforcement found, efflorescence

Platform-4 (Elevation +63m)

Cracks, exposed reinforcements, efflorescence found

Platform 5 & 6 (Elevation + 87m & +99m)

Exposed reinforcements and Handrail damage have been found to be profound along this part. Repairing of the platform & Handrail is needed.

Walkway 3 (Elevation + 111m)

Exposed reinforcements and Handrail damage have been found to be profound along this part. Repairing of the platform & Handrail is needed.

Front and Right side of Walkway-4 with railing (Elev. +147 m)

Honeycomb concrete damaged and reinforcement exposed

Outer Wall Section

Cracks found & Painting faded

CONDITION ASSESSMENT UNIT 3 – OBSERVED DEFICIENCIES:

Platform 3&4 (Elevation + 51m & +63m)

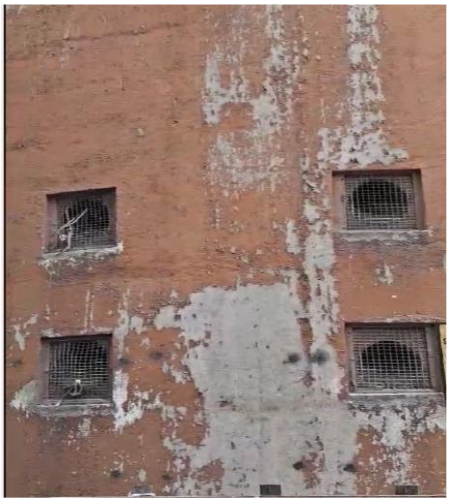
Exposed reinforcements and Handrail damage have been found to be profound along this part. Repairing of the platform & Handrail is needed.

Walkway-2 (Elevation +75 m)

Platform- Exposed reinforcement, efflorescence & Honeycomb
Railing- Railing is damaged inside, broken, rusted, railing pillars loosen from RCC

Platform-5 (Elevation +87 m)

Cracks & Concrete damage



Outer Wall Section

Cracks found & Painting faded

Walkway-3 (Elevation +111 m)

Platform- Exposed reinforcement, efflorescence & Honeycomb
Railing- Railing is damaged in side, broken, rusted, railing pillars loosen from RCC

Chimney Top and sides

Exposed Reinforcement, efflorescence Chimney top has damaged RCC. Distinctive concrete Damage all around chimney top sides have been found. Clear sightings of exposed reinforcements and even cracks are prominent.

A4. BENEFITS OF THE PROJECT:

1. Restores structural integrity of the chimney and its platforms by repairing cracks, honeycombing, and deteriorated components.
2. Enhances safety by reducing risks of falling debris, platform failure, and unsafe access for inspection and maintenance personnel.
3. Improves durability and corrosion resistance through application of new protective coatings and paint systems.
4. Extends the service life of the chimney and associated structures, delaying the need for major replacement.
5. Ensures compliance with applicable safety, operational, and maintenance standards.
6. Supports reliable and uninterrupted operation of the power plant by minimizing structural and safety-related failures.

A5. FINANCIAL DETAILS:

The proposed scheme is for Unit 2 and Unit 3; hence, proposed project cost is to be allocated equally among these units. The project cost is estimated at Rs. 400.00 Lakh. The total project is planned in phased manner, and the expenditure will be as per the below table.

Projected Cost including capitalization phasing is shown below:

Total Project Cost with Capitalization Phasing						
Particulars	**UoM**	**FY 27**	**FY 28**	**FY 29**	**FY 30**	**FY 31**
Project Cost allocated to Unit 2	Rs Lakh		200.00			
Project Cost allocated to Unit 3	Rs Lakh	200.00				
Total For Unit 2 & 3	**Rs Lakh**	**200.00**	**200.00**			

A6. ENCLOSURE:

Annexure- 10_A: Drone based inspection report Unit-2

TATA POWER

REPORT ON VISUAL INSPECTION OF CHIMNEY USING DRONE.

Tata Power – Jojobera Power Plant.

CHIMNEY NO. 2

Submitted on 25th OCT 2023

P.O. NO. – 6000065572 Dated – 14.03.2023

Submitted by

TECORFIN CONSULTANTS

E-mail: tecorfinconsultants@gmail.com

ABSTRACT

Chimney inspection comprises an evaluation of the chimney to assess its condition and determine its fitness. Chimney inspections are very often large operations, requiring sufficient manpower, scaffoldings or cables for technicians and any untreated damage can lead to costly repairs. Industrial chimneys are often subject to frost, wind, lightning and over-all deterioration over time. The top, interior liner, ladders and platforms/walkways are damage-prone and are advised to be surveyed annually. Visual Inspection of Chimney is the technical survey of the structure in order to check the defects on the surface, platforms, ladders, railings, etc. The primary purpose of this inspection is to investigate and highlight all the risk areas, critical areas and whether the building/structure needs immediate attention. It covers the complete videography of the chimney by using a drone without scaffolding or rope and while the chimney is in operation.

The inspection found in acceptable condition but some major damages were found in platforms, ladders and walkways in both the Chimneys. Water logging issues found in most of the platforms and walkways in both of the chimneys due to ageing. Rusting on metal railing and ladders found in both chimneys; however, percentage of damage varies across chimneys. Wall of the chimneys are almost intact structurally for Chimney 2 and 3 as per Class-I inspection, but some major repairs are needed for honeycomb in concrete, cracks and crazing and painting.

TATA POWER

Fig. 74: Chimney top Wall (Elev. +147 to +150 m)

Summary

The chimney being in service for more than 20 years have been exposed to various weather condition which has caused the damage of MS and RCC structures. All platforms are necessary to be cleaned and repaired to avoid water logging and further damage of RCC slab. Necessary measures are recommended to mend the exposed reinforcements and concrete honeycombs. Outer wall of Section-2 has particularly been affected by rusting/painting damage, so requires attention. Almost all railings and ladders are rusted in all the sections with different intensities and completely unsafe. The chimney top was found to be considerable good condition with observations of cracks and crazing. It is suggested to take up the intensive repair and painting for restoration of Chimney structure.

Annexure- 10_B: Drone based inspection report Unit-3

REPORT ON VISUAL INSPECTION OF CHIMNEY USING DRONE.

Tata Power – Jojobera Power Plant.

CHIMNEY NO. 3

Submitted on 25th OCT 2023

P.O. NO. – 6000065572 Dated – 14.03.2023

Submitted by

TECORFIN CONSULTANTS

E-mail: tecorfinconsultants@gmail.com

ABSTRACT

Chimney inspection comprises an evaluation of the chimney to assess its condition and determine its fitness. Chimney inspections are very often large operations, requiring sufficient manpower, scaffoldings or cables for technicians and any untreated damage can lead to costly repairs. Industrial chimneys are often subject to frost, wind, lightning and over-all deterioration over time. The top, interior liner, ladders and platforms/walkways are damage-prone and are advised to be surveyed annually. Visual Inspection of Chimney is the technical survey of the structure in order to check the defects on the surface, platforms, ladders, railings, etc. The primary purpose of this inspection is to investigate and highlight all the risk areas, critical areas and whether the building/structure needs immediate attention. It covers the complete videography of the chimney by using a drone without scaffolding or rope and while the chimney is in operation.

The inspection found in acceptable condition but some major damages were found in platforms, ladders and walkways in both the Chimneys. Water logging issues found in most of the platforms and walkways in both of the chimneys due to ageing. Rusting on metal railing and ladders found in both chimneys; however, percentage of damage varies across chimneys. Wall of the chimneys are almost intact structurally for Chimney 2 and 3 as per Class-I inspection, but some major repairs are needed for honeycomb in concrete, cracks and crazing and painting.

Fig. 154: Front side of chimney top along the Walkway-4 including railing (Elev. +147 to +150 m)

Fig. 155: Back side of chimney top (00:51:02) (Elev. +147 to +150 m)

Summary

The chimney being in service for more than 20 years have been exposed to various weather condition which has caused the damage of MS and RCC structures. All platforms are necessary to be cleaned and repaired to avoid water logging and further damage of RCC slab. Necessary measures are recommended to mend the exposed reinforcements and concrete honeycombs. Outer wall of Section-1 to 4 has particularly been affected by rusting/painting damage, so requires attention. Most of the railings and ladders are rusted in all the sections with different intensities and unsafe for uses. It is suggested to take up the intensive repair and painting for restoration of Chimney structure with utmost priority to avoid further damage.

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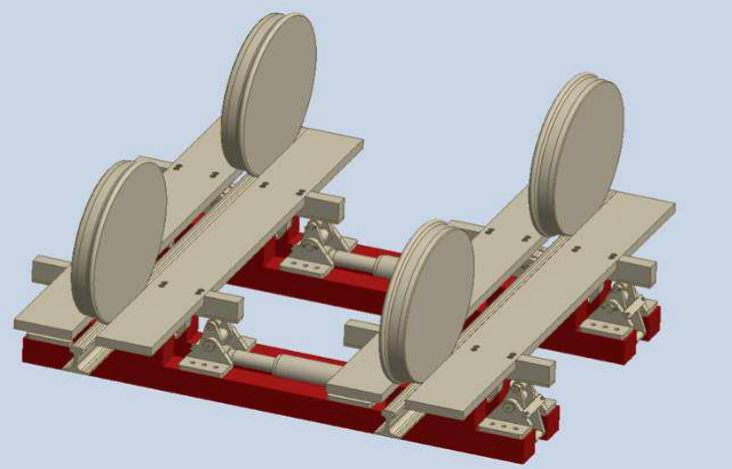
Detailed Project Report



WHEEL GRIPPER

Tata Power, Jojobera Power Plant

FY 2026-30

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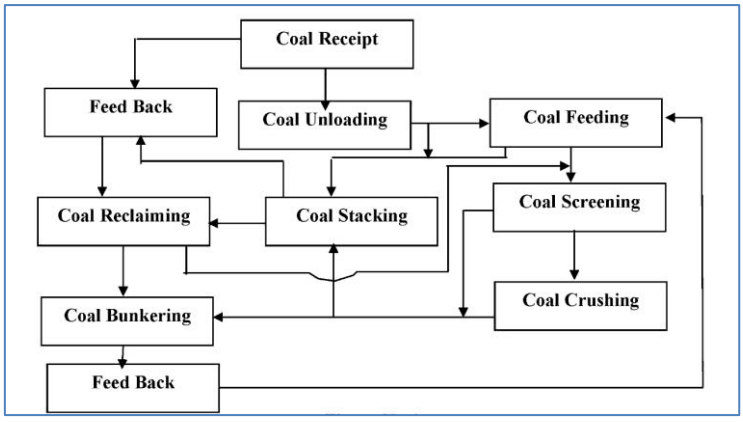
A1. BACKGROUND

Jojobera is a coal-based power plant and hence requires optimum handling of tons of Coal round the clock for continuous running of the Units. The Coal Handling Plant (**"CHP"**) at Jojobera facilitates the continuous process of unloading coal rake and feeding it to the boilers. Primarily, the work of CHP involves unloading, screening, crushing (if need be), stacking, reclaiming and bunkering of coal receipt from various systems through different transportation mediums. However, the process of coal unloading is one of the critical processes which enables the Generating Companies to receive the coal for generating power. Hence, it is of paramount importance to have safe unloading of coal rakes without any accident. Presently, the coal unloading is done without wheel gripper system at Jojobera Power Plant. Wheel gripper should be mandatory and located on tippler table to prevent inadvertent motion of the wagon during tippling operation and also prevent accidental rolling of the wagon on tippler table. If any derailment occurs, the restoration time is approximately 48 hours, which can result in significant railway demurrage charges and penalties from the railway.

A1.1 COAL HANDLING PROCESS

The coal is transported to Jojobera Power Plant mainly through railways. After this, Wagon Tippler carries the unloading of coal rake and then by means of Bulldozer they are stacked to desired location at crushed/uncrushed yard. The stacked coal is subsequently reclaimed as per requirement. The main aim of CHP is to maintain the level of coal in coal bunkers for smooth coal supply to the boilers for continuous running of the Power Plant. The requirement of Jojobera Power Plant is approximately 3500-4000 Tons of coal per day, and hence for continuous supply of it, optimum coal movement becomes necessary.
The following block diagram illustrates the various integrated processes at CHP.

FIG: -1 Block Diagram of Coal Handling Process



Wagon tippler: Wagon tippler which is use for unloading the wagon. A pair of end rings is moved by drive unit and clamping of wagon is operated by hydraulic energy. The tippler consists of the following components cradle, a pair of end rings, side supporting beam, top clamp assembly, drive unit. The cradle is a frame of table, comprising two main girders braced together. both the rails would be fitted on the main girders. When tippler is in the down position the cradle rests on two cup & cones. a pair of end rings with gear sectors mounted at the periphery will be driven by two pinions fixed on the line shaft driven through suitable drive unit. Each of the end rings is trunnion mounted for the purpose of rotation. Side beam box section girder is fixed at its ends on the face of the end rings. It carries the side bolster cushions against which the side of the wagon rests during tipping. Top clamp assembly is designed to support the wagon in the tipped position. Four numbers hydraulically operated arms in wagon tippler "B" & 02 1lumbers hydraulically operated arms in wagon tippler "A". Drive unit consists of an electric motor, fluid coupling, E.M brake, helical gear reduction unit, and a set of line shafts supported on Plummer blocks. On the line shaft two pinions are mounted for driving end rings. Besides it for clamping a hydraulic system is installed nearby .which can be sub divided into hydraulic power pack, clamp cylinder, hose loop assembly, piping & hoses. Hydraulic power pack consists of oil reservoir pumping unit consisting of two vane pump, central manifold block assembly, & wagon tippler clamping blocks are mounted on cylinder.

WAGON TIPPLER

COAL MOVEMENT:

The Coal movement starts with coal rakes are received at the PP Yard, with information provided by the Railway or B Cabin. Locomotives are sent to receive the coal rake, prioritized by the Railway and TPCL. The coal rake is picked up after obtaining line clearance in coordination with the Railway.

Upon receiving coal rakes each having 56 to 59 wagons with a carrying capacity of 59 tons to 67 tons per wagon, which in-turn implies approximately 3,953 tons per rake at the Wagon Tippler through LOCO, instructions are given to place the wagon at the available or preferred wagon tippler via telephone. The rake is placed at the preferred wagon tippler at the in-hole side for pre-wetting dry coal. Written information about the rake is provided to the Operations department, and the rake is placed at the defined wagon tippler in four parts as per the operational requirements.

After the rake arrives at the wagon in-hole side, one wagon is placed at the wagon tippler cradle using the side arm charger. The wagons are then sent to the tipplers where each wagon is weighed at weighbridge (tare weight subtracted to arrive at the weight of coal received) and then unloaded. At this stage, if wet coal or large size of coal are detected (both of which may block the free tipping into the hopper), it is resolved manually by breaking large chunks. If CIL coal is received, unloading begins with the crusher in service; if Midd. Coal is received, the coal is unloaded without crushing. Unloading is prioritized according to the defined coal yard—either crushed coal yard #1 or #2. Uncrushed coal first passes through a rotary breaker for primary crushing to -150MM, and then it is further crushed in the secondary crusher to achieve the desired product size of -25MM. Coal reject from primary crushing is deposited at the reject stockpile.

If the crushing circuit is unavailable, coal is unloaded at the uncrushed yard and later reclaimed using track hoppers. Crushed Middling Coal is unloaded at yard #1, and crushed CIL Coal is also unloaded there for reliability of the feeding circuit. Similarly, crushed Middling Coal and crushed CIL Coal are unloaded at yard #2 in the coal shed, with all coal stacked using bulldozers.

After unloading the complete rake, a handover memo is provided to the loco office. Preparations are made for the connectivity of all parts of the rake in the loop line, and a request for line clearance is made to the railway once the rake is ready. Finally, the empty coal rake is handed over to the PP Yard through LOCO with a written memo to the railway.

There are two Wagon Tipplers installed at Jojobera Power Plant with a handling capacity of 110 tons with associated side arm charger. Further, both the tipplers are discharged into a common

hopper. The two tipplers annually unload approximately 550-600 rakes of coal for continuous supply of coal to Jojobera Power Plant and maintain the reliability of the Units.

FREE LOADING / UN-LOADING TIME:

As per Rates Circular no. 74 of 2005 dated 19.12.2005 of the Railway Board, the free time allowed for unloading coal from BOXN wagons through mechanized system is 7 hours and as per revised Rates master Circular no. No.TC-I/2022/201 /efile/2(3394909) dated 13.09.2022 slab rates have been introduced while earlier fixed rate Rs.150/wagon/Hr. However, any delay beyond the stipulated time leads to demurrage charges is payable towards Indian Railways which is accounted as an additional burden to the Generating Companies. Moreover, as per direction of Indian Railways, the wagons cannot be interchanged across rake. This implies that the same 59 wagons that have come with a rake must go back with that particular rake. Thus, delay in even unloading one wagon would delay the release of the entire rake, causing Demurrage charges. Therefore, in order to complete the unloading of entire rake within the permissible time, the process of sampling, weighing and tippling is required to be completed in limited time period.

A2. NECESSITY OF THE PROJECT

In accordance with the revised railway guidelines for Wagon Tippler-G 33 (Rev-2) issued in December 2022, the railway authorities have advised the installation of wheel grippers and chockers in the Wagon Tipplers. This advice was communicated via letter No. MC/24/TIPPLER/19/146 dated January 16, 2024, and consecutively several follow-up communications were made by Indian Railways (Annexure-1). A wheel gripper should be mandatory and located on the tippler table to prevent inadvertent motion of the wagon during the tippling operation and accidental rolling of the wagon on the tippler table. During the unloading process, when the cradle starts moving to unload at a 35-degree angle, a clamp holds the wagon. As the cradle returns, the top clamp is released at the same position. There is a risk of the wagon rolling down if a jerk occurs. To avoid this situation, all modern wagon tipplers are designed with side clamps and wheel grippers. Since our tippler is very old, these features are not available. Therefore, we propose the addition of a wheel gripper to prevent such incidents and comply with RDSO guidelines for Requirement of Tippler Installation (G-33 Rev.01) (Annexure-2).

1. Wheel grippers are hydraulically actuated. clamp assemblies, situated in pits below the rails, that mount to the rails outside. They help to secure the string of cars immediately in front of and behind the rail cars
2. After a rail car positioner correctly positions and secures the rail cars inside the dumper cages for processing, hydraulic cylinders extend and clamp steel bars onto the wheels of the rail cars outside of the dumper cells.

3. The hydraulic cylinders are powered by hydraulic power units that are housed remotely, and a network of piping runs to the wheel gripper cylinders.
4. Grease hoses from the remotely located automatic lubrication system provide lubrication to the cylinders and pivot points

A3. Project Description, Execution & Testing

A3.1 Project Description:

A Wheel Gripper for a Wagon Tippler is a specialized mechanical device designed to securely grip and hold railway wagon wheels in place during the process of unloading bulk materials, such as coal, from the wagons. The wheel gripper is an essential safety and operational component within the wagon tippling system, ensuring that wagons remain stable and properly positioned while they are being tilted for unloading. Based on the subsequent compliances as mentioned in the letter dated 12.01.2024 from South Eastern railway, the project has become necessary to be undertaken.

A3.2 Project Objective:

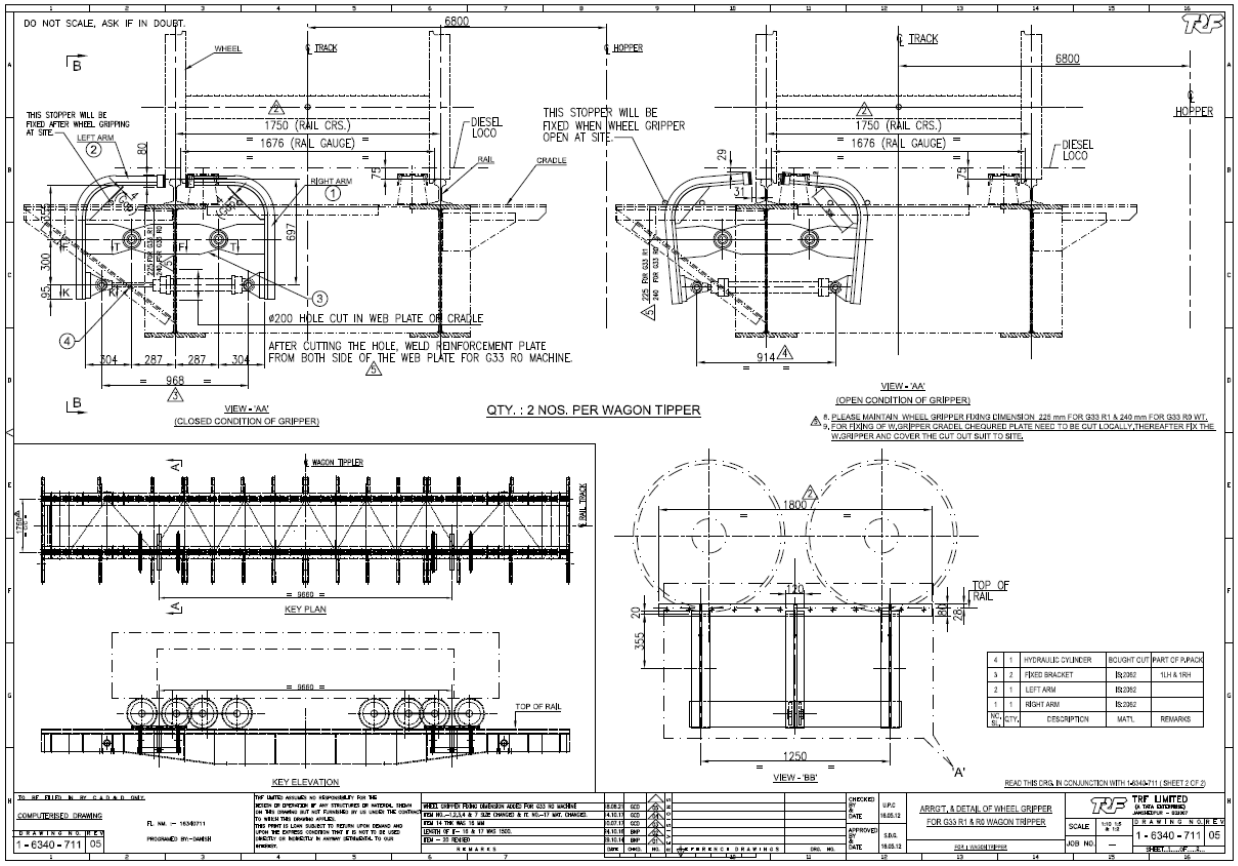
The objective of this project is to design, develop, and implement a robust and reliable wheel gripper mechanism for a wagon tippler system. The gripper will ensure the safe and effective holding of railway wagons in place during the unloading process, preventing any unwanted movement that could lead to operational inefficiencies or safety hazards.

Key Components:

1. **Gripper Mechanism:**
   - The gripper mechanism is designed to engage with the wheels of the railway wagons. It typically includes hydraulic or pneumatic actuators that apply a controlled force to grip the wheels securely.
   - The design must account for various wagon sizes and wheel types, ensuring compatibility with different rail vehicles.
2. **Control System:**
   - An automated control system will be developed to operate the gripper mechanism. This system will be integrated with the overall tippler operation, ensuring synchronized and smooth operation.
   - The control system will include sensors to monitor the position of the wagons and the engagement of the gripper, providing feedback to ensure proper functioning.
3. **Safety Features:**
   - The wheel gripper will include several safety features, such as emergency release mechanisms, overload protection, and fail-safe operation modes.

- The system will be designed to meet industry safety standards, minimizing the risk of accidents during the tippling process.

4. **Structural Design:**
   - The gripper will be constructed from high-strength materials capable of withstanding the forces involved in gripping the wagon wheels securely.
   - The structural design will also consider the environment in which it operates, ensuring durability and resistance to wear and corrosion.
   - After design finalization TRF submitted the drawing as per recent RDSO norms. (Annexure-2)



Annexure-3 PROPOSED DRAWING BY OEM M/S TRF AS PER RDSO NORMS

A3.3 PROJECT EXECUTION:

1. The project starts with the procurement of the Wheel gripper along with the associated equipment based on the requirement of Jojobera Power Plant in consultation with Tata Power Engineering department.

2. The installation of the Wheel Gripper shall be carried out by external vendor probably engaged by OEM and under the guidance of Tata Power personnel.
3. **Design and Engineering:**
    a. Detailed design of the gripper mechanism and control system.
    b. Simulation and analysis to ensure the design meets performance and safety requirements.
4. **Prototyping and Testing:**
    a. Fabrication of a prototype gripper for testing purposes.
    b. Rigorous testing under various conditions to validate the design and make necessary adjustments.
5. **Manufacturing and Installation:**
    a. Full-scale production of the wheel gripper system.
    b. Installation of the gripper mechanism within the existing wagon tippler system, followed by commissioning.
6. **Maintenance and Support:**
    a. Development of maintenance protocols to ensure long-term reliability of the wheel gripper.
    b. Provision of technical support and training for operational personnel.

A3.3 PROJECT TESTING:

The project executor / the agency who will be supplying the Wheel gripper has to guarantee the functioning and life of the Machine. The test will be carried out in presence of both the external vendor and Tata Power personnel.

A4. BENEFITS OF THE PROJECT

The benefits of the installation of wheel gripper are as listed below:

- Enhanced safety and stability during the wagon unloading process.
- Increased operational efficiency by minimizing the risk of wagon movement during tippling.
- Extended lifespan of the tippler system through the integration of a durable and reliable wheel gripper mechanism.
- Saving of demurrage charges if any derailment occurred during unloading of wagons.

This project is crucial for facilities handling bulk materials, ensuring safe and efficient operations in material unloading systems.

A5. Financial Details (Estimated Project Cost)

The proposed scheme is for Unit 2 and Unit 3; hence, proposed project cost is to be allocated equally among these units. The total project is planned in phased manner, and the expenditure will be as per the table below.

Projected Cost including capitalization phasing is shown below:

Name of Scheme	Total Proposed cost (Rs. Lakh)	Proposed cost (apportioned to Unit-2 & 3) (Rs. Lakh)	Capitalisation Phasing (Rs. Cr.)	
			FY27	FY28
Installation of Wheel gripper and other devices as per RDSO guideline (R33 rev.02) in wagon tippler	170	74.52	37.26	37.26

A.6 Enclosure

Annexure -11A: Railway directive for installation of wheel gripper

दक्षिण पूर्व रेलवे

South Eastern Railway

वरिष्ठ मंडल यांत्रिक अभियंता
का कार्यालय/चक्रधरपुर

Office of the Sr.DME/CKP

संख्या:- MC/24/TIPPLER/19//146 दिनांक/ Date:-16.01.2024.

सेवा में

Sri. Jagmit Singh Sindhu'
CEO,
TATA Power Company Ltd.,
Jojobera Power Plant,
Reahargoda,Jamshedpur,
Jharkhand -831016.

Sub: Regarding maintenance and performance of wagon Tippler -1 at PTJT/TATA.

Ref: Joint Inspection note between ADME/TATA and Sri Raju Bhadoria-PTJT representative.

In reference to the subject mentioned above, this is to inform you that joint inspections of tippler I was conducted vide reference mentioned above, in which numerous deficiencies were noticed.

Details of wagon Tippler-I

RDSO allotted no	**NOT AVAILABLE**
Date of Installation	**DEC-1996**
Make of tippler	**105 T GEAR DRIVEN ROTASIDE TIPPLER-TRF (Tata Robins Fraser LTD.**

Major Deficiencies noticed during joint inspection on 11.01.2024.

S.N.	Item	**Reference: - Revised guidelines for Wagon Tipplers- G 33 (Rev-2) issued in Dec. 2022**
1	Life of tippler is more than 20 years from date of commissioning.	Vide para 1.3, "The life of wagon tippler generally shall not exceed beyond 20 years from the date of commissioning. However, further Zonal Railway may allow wagon tippler operation after assessment of working condition of the wagon tippler".

2	Tippling capacity was found less than 20 tips per hour.	Vide para 3.6.3 (c) Tippling capacity should be at least 25 tips per hour, with suitable provisions so that the wagon is not damaged in the tippling process. If client desires lesser no of tips, concurrence of the concerned Railway shall be obtained.
3	Top mechanical clamp force should not exceed 1.5T per clamp	Vide para 3.6.3(d) "The forces exerted by top clamps of the tipplers on wagon coping shall not exceed 1.5t per clamp pad. However, Facility of measurement of clamp force is not available.
4	Capacity of tippler was recorded 105T instead of 120T minimum.	Vide para 3.6.3(h) "The tippler shall be capable of handling a single wagon up to 120tb (gross). For tippling two or more wagons at a time, the capacity will increase proportionately.
5	Device for spotting and centering of wagon on tippler table not available.	Vide para 3.6.3(j) The tippler shall have such parking/arrangement as would facilitate placement of wagon centrally on tippler table.

Moreover, RDSO inspection records and allocation no from RDSO for the aforesaid tippler is not available. Life of tippler also exceeded the prescribed 20 years of age which also need to be reviewed.

You are, Therefore, requested to kindly arrange to rectify the deficiencies mentioned above as well as mentioned in the joint inspection note referred above till replacement the tippler failing which necessary action shall be taken as per para 3.6.3 (l) of G-33 revision 2 for suspending the operation of the said tippler please.

Encl:
As referred above

लोकेश कैलाश मीना
मंडल यांत्रिक अभियंता
चक्रधरपुर
DME/CKP
For Sr.DME/CKP

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ADRM/CKP for kind information and neccessary action please.
Sr.DOM/CKP for kind information and necessary action please.
Sr.DCM/CKP for kind information and necessary action please.

South Eastern Railway

No: TATA/C-36/TATA Power-Tippler/Insp./23-24/718

Office of the
CDO/TATANAGAR
Date: 12.01.2024

To
Jagmit Singh Sidhu(CEO)
TATA Power company Ltd.
Jojobera Power Plant
Reahargoda,Jamshedpur
Jharkhand -831016

Sub: Performance and maintenance of wagon tippler -1 at PTJT (**TATA Power company Ltd**.

In reference to the above subject, the undersigned has inspected the Trippler no. 1 at TATA Power on date 26.12.2023. During the inspection following irregularities have been noticed.

ITEM	**TIPPLER – 1**
RDSO allotted no.	Not available
Date of Installation	December- 1996
Make of Tippler	105 T GEAR DRIVEN ROTASIDE TIPPLER-TRF (Tata Robins Fraser LTD.

Major deficiencies noticed during joint inspection with TATA Power Tippler representatives on date 21.12.2023.

SN	**ITEM as per RDSO:** - Revised guidelines for Wagon Tipplers- G 33 (Rev-2) issued in Dec. 2022	**OBSERVATIONS** **Tippler - 1**
1	"The life of wagon tippler generally shall not exceed beyond 20 years from the date of commissioning. However, further Zonal Railway may allow wagon tippler operation after assessment of working condition of the wagon tippler". **Ref: Para 1.3 of Wagon Tippler G-33 (Rev-2)**	Life of tippler is more than 20 years from date of commissioning.
2.	Tippling capacity should be at least 25 tips per hour, with suitable provisions so that the wagon is not damaged in the tippling process. If client desires lesser no of tips, concurrence of the concerned Railway shall be obtained. **Ref: Para 3.6.3 (c) of Wagon Tippler G-33 (Rev-2)**	Tippling capacity was found less than 20 tips per hour.
3.	"The forces exerted by top clamps of the tipplers on wagon coping shall not exceed 1.5t per clamp pad. This shall be ensured by providing some positive arrangement, other than rubber pads for absorbing the clamping force (permitting release of bogie spring). **Ref: Para 3.6.3 (d) of Wagon Tippler G-33 (Rev-2)**	Facility of measurement of clamp force is not available.
4.	"The tippler shall be capable of handling a single wagon up to 120tb (gross). For tippling two or more wagons at a time, the capacity will increase proportionately. **Ref: Para 3.6.3 (h) of Wagon Tippler G-33 (Rev- 2)**	Capacity of tippler was recorded 105T instead of 120T minimum
5.	The tippler shall have such parking/arrangement as would facilitate placement of wagon centrally on tippler table. **Ref: Para 3.6.3 (j) of Wagon Tippler G-33 (Rev – 2)**	Device for spotting and centring of wagon on tippler table not available.
6.	Wheel grippers should be mandatory and located on Tippler table to prevent inadvertent motion of the Wagon during tippling operation and also prevent accidental rolling of the wagon on Tippler Table. **Ref: Para 3.5.1 (a) of Wagon Tippler G-33 (Rev – 2)**	This safety feature is not available in Tippler.

7.	Retractable ,Wheel Chocks are mandatory and should be fitted at out-haul track to prevent accidental rolling of the wagon on Tippler table. **Ref: Para 3.5.2 (a) of Wagon Tippler G-33 (Rev – 2)**	This safety feature is not available in Tippler.
8.	Other irregularities	1. RDSO allotted No./Approval letter is not available. 2. Last inspection of RDSO Representative is not available.

Hence it is requested to kindly arrange to rectify the deficiencies & irregularities mentioned above and mentioned in joint inspection note (enclosed). Failing which necessary action shall be taken by the competent authority.

Please treat it as **"MOST URGENT"**.

12/01/2024

(U. S. Chandereya)
Asstt. Divnl. Mech. Engineer
TATANAGAR

Copy to: a) **Sr.DME/CKP** for kind information please.
b) **Dy.CME(Frt.)/SER/GRC** for kind information please.
c) **ARM/TATA** for information and necessary action please.
d) **SSE/C&W/TATA** for information and necessary action.

Annexure-11B: RDSO G-33 rev-01- Requirement for tippler installation – Refer page number 07

INDIAN RAILWAYS

ISSUED WITH REFERENCE TO
Your Letter No ....1116.....
dated .....7/6/11.....
& with Bill No ....4790.....
for DIRECTOR GENERAL (WAGON)
R.D.S.O. LUCKNOW-226011
7/6/11

G-33 (Rev. 1)

TECHNICAL PAMPHLET

FOR

REQUIREMENTS OF TIPPLER INSTALLATION FOR APPROVAL BY RDSO

S.No.	Month/Year of issue	Revision / Amendment	Page No.	Reason for Amendment
1.	May, 2010	Revision 1	-	First issue

ISSUED BY

RESEARCH DESIGNS AND STANDARDS ORGANISATION
MINISTRY OF RAILWAYS
LUCKNOW-226 011

May, 2010

29/06/10

Page 1 of 13

j. Sharp edges and corners in all working spaces shall be avoided.
k. The parts projecting into working spaces shall be as small as possible.
l. All the frequently used lubrication points shall be accessible without it being necessary to remove the guards.
m. It is recommended that equipment shall be so designed that maintenance and cleaning is facilitated.
n. Fully integrated controls should be provided for wagon positioning system, wagon holding devices and wagon tippler. The controls should be interlocked so that there is no chance of accident due to error in sequence of operation.

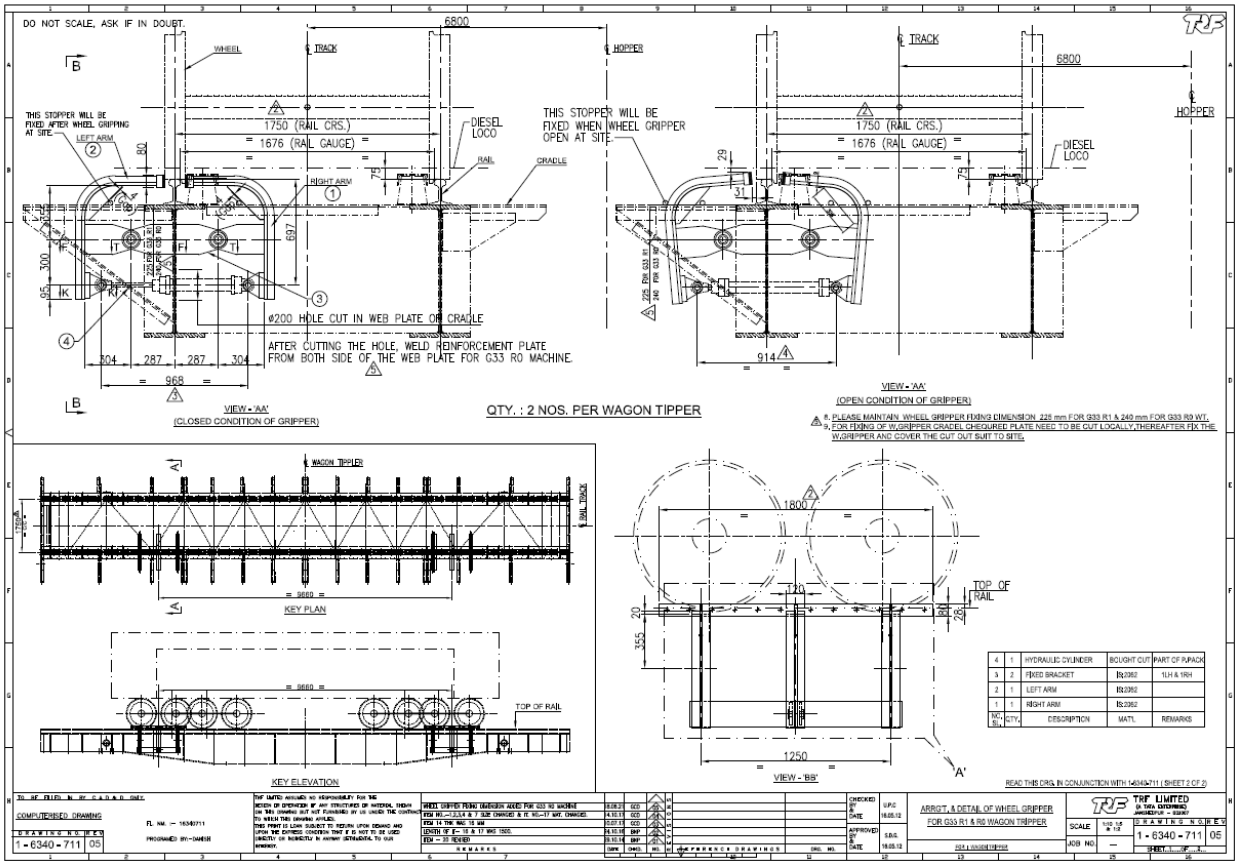
5.2 Installation stage

a. All tippler installations shall be marked permanently and legibly in a clearly visible place, with the following information:

i) Maximum capacity of the wagons & the type of wagons to be tippled.
ii) If locomotives are required to run over the tippler, the maximum permissible mass, maximum permissible axle loading and speed.
iii) Maximum speed of the wagon passing through the tippler and
iv) An instruction forbidding the tippler to be operated as long as the wagon is not held on the platform in its tippling position. This instruction shall also state that the tippler shall be held in appropriate position before an attempt is made to remove the empty wagon.

b. The emergency stop controls shall be provided adjacent to the wagon tipplers in the readily accessible positions.
c. Frequently used lubrication points shall be accessible without being necessary to remove guards and shall be painted to standard pattern.
d. All starting and stopping devices shall be clearly indicated and easily accessible and shall be painted or printed as a standard pattern.
e. Gangways, handrails, staircases, ladders, guards, etc. wherever provided shall be erected before installation is put into service.
f. **The outhaul side track should satisfy the following conditions**:
- The gradient of the outhaul track should not exceed "1 in 1200"
- The length of the outhaul track, with the specified gradient, is not less than 650 m for full rake tippling.
- For partial rake tippling (not less than the half rake), proportionate track length (equal to the half the rake length or more) with track gradient not exceeding "1 in 1200" will be permitted.
- In case of limitation of adequate track length on the outhaul side, as specified above, the user can consider use of transfer platform for shifting the empty wagons, on a parallel track. This parallel track shall satisfy the same conditions of gradient as listed out above.
- It should be certified that the length & the gradient of the outhaul track is within the limits, as per above, by the competent railway authority, under whose jurisdiction the tippler location lies. The same certificate should be submitted

Annexure- 11C: Approved drawing of Wheel Gripper on Cradle bed by M/s TRF Limited



Justifications: 12. Replacement of LTB-145 D1/B with BLK222 Breaker in 132 kV Switchyard

The existing 132 kV ABB BLK breaker (LTB-145 - BLK222) related to Jojobera Units 2&3 is more than 20 years old and is beyond reliable service life due to aging and unavailability of critical spares. This breaker plays a vital role in fault interruption, feeder isolation, and maintaining power flow between generating units and the external grid. With progressive mechanical wear, aging insulation components, and declining reliability, the risk of malfunction during fault conditions has significantly increased, raising concerns about safe and stable plant operation.

Essentially, these breaker plays a critical role in maintaining grid connectivity, enabling bus transfer operations, and protecting high-value equipment such as generator transformers and auxiliary transformers. Although the OEM declared these products to be in limited phase in 2016, Tata Power has been able to keep these breakers operational through good maintenance practices and interim arrangements. However, going forward, it is essential to replace these breakers as certain critical spares are no longer available and supported by OEM. The relevant communication from OEM declaring the unavailability of certain critical spare with their document declaring the said breaker in limited phase is attached hereto as Annexure for kind reference of the Hon'ble Commission. In terms of ABB Product life cycle Model "LTB-145 D1/B with BLK222" breaker are in limited phase and this product as whole is no longer can be ordered, the service and spare of limited item will be provided.

In view of equipment aging, increased failure risk, and absence of OEM-supported maintenance with supply of critical component like support pole and contact, replacement of the 132 kV ABB BLK breaker has been proposed for kind consideration of the Hon'ble Commission. Upgrading this breaker will enhance grid interfacing reliability, reduce forced outage risks, and safeguard major electrical assets. This proactive intervention will strengthen long-term switchyard safety, operational stability.

A list of feeders needs to replace are shown in the table below:

Bay	**Breaker Make**	**Breaker Type**
GT-2	ABB	LTB-145 D1/B with BLK222
Line-3	ABB	LTB-145 D1/B with BLK222
Line-5	ABB	LTB-145 D1/B with BLK222
Line-6	ABB	LTB-145 D1/B with BLK222
BS-3	ABB	LTB-145 D1/B with BLK222
BS-4	ABB	LTB-145 D1/B with BLK222
ST-3	ABB	LTB-145 D1/B with BLK222

The tentative proposed cost for the Testing Kit is Rs. 50 Lakhs.

Enclosure:

Annexure-12 A: OEM Communication regarding unavailability of critical spares and product life cycle management document.

General Information

Service LTB (Live Tank Breaker)

Product Life Cycle Management

February 15, 2016

Dear Customer,

The aim of this document is to generally inform you about current and future ABB Service support on LTB (Live Tank Breaker) products ,for voltage levels >72.5 kV and up to 800 kV manufactured at ABB India factory.

As you might be aware, some of our products are on the market for more than 40 years. Sourcing the required parts is typically becoming more and more difficult due to the declining volume. Additionally the field service competence for installing and maintaining these products cannot always be kept at the required level.

In order to support and assist you in the maintenance of your existing High Voltage Circuit breakers, or assist you in planning for future maintenance and replacement actions, we initiated the Life Cycle Management policy. We have classified our products into 4 groups: ACTIVE, CLASSIC, LIMITED and OBSOLETE, as described in Appendix 1.

After product transitions from the ACTIVE to the CLASSIC phase, extensions are still available and will be handled by the Service department and manufacturing will be concentrated at one location.

When the product is no longer being manufactured (after "manufacturing end"), the product enters the LIMITED phase. This means the product will no longer be available as a whole; however, spare parts and full service support will be provided on the product since ABB has committed to provide service support for at least 20 years for all circuit breakers.

The quantity of produced spare parts will be reduced substantially in the LIMITED phase, hence delivery time and manufacturing costs are likely to increase. Finally the product will reach the OBSOLETE phase where service and the availability of any parts can no longer be guaranteed.

In order to have a first overview of the status of the products, please refer to the list in Appendix 2. Further announcements for individual parts, such as special types of circuit breakers or operating mechanisms, will follow.

Once this policy has been established, regular follow ups will be planned and a notice time of 12 or 18 months for step changes (i.e. change in classification of product) will be given.

If you have any questions, please do not hesitate to contact your Local Service Center or the Product Service Center in India directly. We are here to assist you.

Appendix 1

ABB's Life Cycle Model

We are committed to assisting our customers achieve their operational, reliability and availability targets at optimized cost. Product Life Cycle Management at ABB defines availability of Parts and Services during each of the life cycle phases described below, and includes our commitment to approach Customers with relevant and timely offerings that help support their asset management goals.

Product Life Cycle Management allows us to support Customers with professional service throughout your asset's life cycle. During the Active, Classic and Limited phases, we guarantee the availability of all maintenance and overhaul related spare parts and services. Towards the end of each of these phases we will provide you with timely notification, at least 12 months prior to the start of the next life cycle phase, to help with budgeting, recommended spares and better management of your assets. As a result, customers benefit from improved reliability, availability, maintainability, and safety of operations and assets.

Annexure-12 B: OEM Communication regarding unavailability of critical spares and product life cycle management document.

Kumar Prabhakar

From: Imran Ali
Sent: 14 February 2026 10:48
To: Kumar Prabhakar
Cc: Pandey Mohit; Kumar Rishav
Subject: FW: Life Cycle Management of Circuit Breaker
Attachments: Service LTB_Product Life Cycle Management_ABB India Feb 15 2016.pdf

fyip

From: Arup Kar <arup.kar@hitachienergy.com>
Sent: 14 February 2026 10:46
To: Imran Ali <imranali@tatapower.com>
Cc: Pandey Mohit <mohitpandey@tatapower.com>; Sourav Chakraborty <sourav.chakraborty@hitachienergy.com>; Pratik Patel <pratik.patel@hitachienergy.com>
Subject: RE: Life Cycle Management of Circuit Breaker

[EXTERNAL sender, Exercise caution..!]

Dear Sir,

We do not have any latest documents, only name changes have happened.
Yes, we can support with complete BLK drive along with its spares, electrical items like Relay, MCB etc., overhauling kit pole column. But we cannot support with support pole, contact etc. as a spare.

Regards,
ARUP KAR
Territory Sales Executive – Jharkhand & Bihar
Mobile: 9712942480

From: Imran Ali imranali@tatapower.com
Sent: 13 February 2026 13:05
To: Arup Kar arup.kar@hitachienergy.com
Cc: Pandey Mohit mohitpandey@tatapower.com
Subject: FW: Life Cycle Management of Circuit Breaker

Warning This email comes from outside of Hitachi Energy. Make sure you **verify the sender** before clicking any links or downloading/opening attachments.
If this email looks suspicious, **report it** by clicking 'Report Phishing' button in Outlook.
See the SecureWay group in Viva Engage for more security information.

Dear Arup,

This document of Feb 2016, please share the latest document in this regard and confirm that whether complete spares of BLK222 can be supplied .

From: Arup Kar <arup.kar@hitachienergy.com>
Sent: 23 December 2025 22:59
To: Imran Ali <imranali@tatapower.com>
Cc: Sourav Chakraborty <sourav.chakraborty@hitachienergy.com>
Subject: Life Cycle Management of Circuit Breaker

1

[EXTERNAL sender, Exercise caution..!]

Dear Sir,

Please find the attached life cycle management of circuit breaker.

Regards,
ARUP KAR
Territory Sales Executive – Jharkhand & Bihar
Mobile: 9712942480
E-mail: arup.kar@hitachienergy.com
www.hitachienergy.com

HITACHI

Always asking **what's next** inspires Hitachi to
find answers to the world's biggest challenges

Inspire the next

Disclaimer:- Information contained and transmitted by this email is confidential and proprietary to The Tata Power Company Ltd. and is included for use only by the addressee. If you are not the intended recipient, you are notified that any dissemination or copying of this email or contents therein is strictly prohibited. If this message is not intended for you, then you are requested to delete this email immediately and notify the originator.

Justifications: 13: Name of the Capex Scheme: Testing equipment need for reliable diagnostic/protection testing for primary equipment; supports outage prevention by condition assessment. Winding resistance kit, LCM kit and 3 phase injection kit.

To ensure continued reliability and safe operation of electrical systems at the Jojobera Power Plant, periodic condition monitoring of critical equipment is essential. Diagnostic activities such as leakage current measurement of lightning arresters, transformer winding resistance testing, and verification of protection relays through single-phase injection testing form a core part of predictive maintenance and for identifying early-stage deterioration. However, the existing testing infrastructure is inadequate to carry out these essential assessments. Therefore, the instant capex scheme has been proposed for the following works:

A. The plant currently does not have an LCM kit, making it impossible to evaluate the health of lightning arresters effectively.

B. The Winding Resistance Kit presently in use is 20 years old and is beyond reliable service life due to technological obsolescence. The original equipment manufacturer (OEM), M/s Scope has confirmed that key internal components, especially SMPS and power-supply modules/components of the kit are no longer available. Consequently, the kit can no longer be supported or repaired. The relevant communication from OEM regarding this is enclosed as Annexure for kind reference.

C. The Single Phase Injection Kit is 20 years old and encountering frequent component failures. The OEM of the SVERKER 760 has also officially declared the model obsolete, with limited availability of spare parts and no effective long-term repair solutions. They have recommended migration to the latest SVERKER 780 model for reliable performance and serviceability. The relevant communication from OEM regarding this is enclosed as Annexure for kind reference.

Therefore, procurement of a new LCM Kit, Winding Resistance Kit, and Single-Phase Injection Kit is necessary to restore robust diagnostic capability, strengthen system reliability, and support effective condition-based maintenance practices.

The proposed procurement qualifies as add cap as it involves replacement and augmentation of specialized diagnostic assets that are essential for long-term reliability of critical electrical infrastructure. These diagnostic kits are durable, non-consumable equipment with a long service life and form part of the permanent testing and protection ecosystem of the generating station. Their procurement is not a recurring maintenance activity but an investment to restore and upgrade essential testing capability that has deteriorated due to aging of existing equipment beyond its economic and technical life. Hence, considering their capital nature, long-term utility, and direct impact on plant availability and safety, the procurement of these testing kits is proposed through the present capex scheme.

Tentative proposed cost:

The tentative proposed cost for the Testing Kit is Rs. 50 Lakhs.

Enclosure:

Annexure-13_A: Confirmation by OEM (SCOPE) regarding obsolescence and non-repairability of resistance kit

From: SUNNIE A RAJAN <sunnie.rajan@scopetnm.com>
Sent: Friday, February 13, 2026 9:58:25 PM
To: Kumar Rishav <rishav.kumar@tatapower.com>
Cc: Imran Ali <imranali@tatapower.com>; Tushart Patil <tushart.patil@scopetnm.com>
Subject: Re: Issue in Winding Resistance Kit

[EXTERNAL sender, Exercise caution..!]

Dear Sir,

As discussed, we would like to inform you that we have supplied these instrument in year 2006-2007. Further you may note that the SMPS & power supply components used in subject instruments are getting obsolete and found very difficult for us to give service support. However in order to support our esteemed customer, we are modifying this TRM 25 and bringing it to our latest version with a very reasonable cost for reliable performance & serviceability.

We hope the above is in line with your requirement and look forward to receive your reply in this regard, so that we can take the necessary action at our end.

Thanking you and assuring you our best services for all the time, we remain.

1

With Thanks & Regards,

Sunnie A Rajan I Asst.Manager. - Customer Support

SCOPE

EL 31/11, 'J' Block | MIDC Bhosari | Pune 411 026 | INDIA
Ph +91 20 6733 3999 | Fax +91 20 6733 3900 | Mob +91 77100 99368
Email: sunnie.rajan@scopetnm.com | Website: http://www.scopetnm.com

Please don't print this e-mail unless you really need to

On Fri, 13 Feb 2026 at 19:35, Kumar Rishav <rishav.kumar@tatapower.com> wrote:

Dear Sunnie,
We are observing continuous failure of winding resistance kit (TRM-25), due to which our condition monitoring practice is getting hamper. So, kindly suggest the necessary corrective action.

Regards,
Rishav Kumar
Lead Engineer - Elect. Testing
The Tata Power Company Limited, Jojobera Power Plant, Jamshedpur 831 016 Jharkhand, India
Mobile: 8292781849

TATA
TATA POWER
Lighting up Lives!

Annexure -13_B: Confirmation by OEM (Megger) regarding obsolescence of SVERKER 760 model

From: Dipankar Dutta <Dipankar.Dutta@megger.com>
Sent: Friday, February 13, 2026 7:46:10 PM
To: Imran Ali <imranali@tatapower.com>
Cc: cecoaks@hotmail.com <cecoaks@hotmail.com>; Cc: vikas.singh@ceco.co.in <vikas.singh@ceco.co.in>; Yash Bhatia <Yash.Bhatia@megger.com>
Subject: RE: Issue related with severker 760 single phase injection kit

[EXTERNAL sender, Exercise caution..!]

Dear Sir,

Thank you for your email and for sharing the photographs of the Megger Programma SVERKER 760 Single Phase Injection Kit.

We understand the challenges you are currently facing due to multiple component failures. Please note that the SVERKER 760 model has been obsolete for a long time. As a result, availability of spare parts and effective repair solutions is extremely limited, which may be the reason for the recurring issues you are experiencing.

The recommended and current replacement model is the **SVERKER 780 (Datasheet attached)**, which offers enhanced functionality, improved reliability, and full manufacturer support. The **SVERKER 780** includes advanced features such as

variable frequency output, continuous phase-angle control, and better suitability for modern protection relay testing requirements.

In view of the age, obsolescence, and ongoing component failures of the SVERKER 760, upgrading to the **SVERKER 780** would be the most effective and long-term solution to ensure reliable operation and accurate testing.

Should you require any further assistance or clarifications, please do not hesitate to contact us directly.

Thanking You

Best Regards
Dipankar Dutta
Regional Manager – East India

Megger (India) Private Limited
CTS No. 431-A-1, Plot No. 22 EFGH, Govt. Industrial Area, Vajan Kata Lane, Behind Garuda Petrol Pump, Charkop, Kandivali (West), Mumbai – 400067
Tel (B): + 91 22 6859 0909 I Mob: +91 7686868669
Email: dipankar.dutta@megger.com I Website: www.megger.com/in

Click on the city for Megger office address / service contacts : Mumbai I Delhi I Service

From: Imran Ali <imranali@tatapower.com>
Sent: 13 February 2026 19:22
To: Dipankar Dutta <Dipankar.Dutta@megger.com>
Subject: Issue related with severker 760 single phase injection kit

Dear Dipankar,
We are using **Megger Programma SVERKER 760** single phase injection kit . Presently we are facing multiple issue related to component failures , kindly suggest any effective solution to over come the same.
Photographs of the kit attached for your reference.

Justifications: Battery Banks

A. Project Name: Replacement of Battery Bank

(a) 220 V Lead Acid Battery Banks of Unit- 2, Unit- 3 and Unit-2 & 3 Station Battery Bank

(b) UPS Battery Banks Bank-1 for Unit- 2 & Unit- 3

B. Necessity of the Project:

Battery banks are essential part for reliable operation of Unit 2 and Unit 3 due to the following reasons:

- They ensure uninterrupted DC power for control and protection system of plants.
- They enable safe operation during faults and blackouts, or even in case of any emergencies.
- They maintain the integrity of critical equipment i.e. breakers, relays, PLC/DCS, communication systems, and UPS.
- A weak or defective battery bank compromises plant safety and reliability of plants

(a) Lead Acid Battery Banks of Unit- 2, Unit- 3 and Unit-2 & 3 Station Battery Bank

It is submitted that the existing battery banks of Unit-2 and Unit-3 have reached the verge of completing their useful life, whereas the Station Battery Banks of Unit-2 & 3 have already crossed their useful life of 15 years in terms of the Original Equipment Manufacturer (OEM) (EXIDE) technical data sheet. The present installed batteries are Tubular Type Lead Acid Batteries that have been in continuous service for approximately 15 years, substantially exceeding the recommended life. As per the recommendations provided in the Tata Power Battery manual, Lead-Acid cells should be replaced after 12 years to avoid sudden failure of battery set.

During a recent blackout event, the Station Battery Banks of Units 2 & 3 experienced a deep discharge and took nearly 15 days to revive to normal operating condition. This prolonged recovery period placed the plant in a high-risk condition, since any further blackout during this period could have resulted in complete loss of auxiliary DC supply to critical drives, severely impacting the control and protection systems of the unit.

In view of the above and considering that the existing batteries have exceeded their recommended operational life, replacement of all Station Battery Banks has become a critical and urgent requirement. Timely replacement is essential to ensure reliable DC power supply to control, protection, and emergency systems, and to mitigate the risk of any major or catastrophic incident at the Jojobera plant.

(b) UPS Battery Banks Bank-1 for Unit- 2 and Unit- 3

The UPS Battery Banks play a critical role in ensuring safe, reliable, and uninterrupted operation of the plant by providing continuous DC power supply to Control & Instrumentation systems, IT infrastructure, and other essential auxiliaries. The existing installed UPS batteries are Ni-Cd and as per Tata Power Battery Manual, useful life for Ni-Cd battery is 8 years. But with better maintenance practice existing UPS Battery Banks have been in service for approximately 14 years, which is at the upper limit of their typical life.

Further, recently a load test was carried out by M/s HBL (OEM) and based on the discharge test results, the OEM recorded that during the load test of U-3 UPS Battery Bank-1, around 62 cells dropped below 1.0 V after 4 hours of discharge. Considering the large number of cells showing substandard performance and the severity of voltage drop, the OEM has recommended replacement of the complete battery bank. Hence, approval of the Hon'ble Commission is prayed for under Regulation 14.3(a) of the JSERC MYT Generation Regulations, 2025.

C. Cost estimate detail:

Particulars	Description	Cost (Rs. Cr.)
U#2/3 Station Battery Bank (220V DC)	Common for Unit- 2 and Unit-3	0.70
U#2 Unit Battery Bank-220V	Standalone Unit- 2	0.55
U#3 Unit Battery Bank-220V	Standalone Unit- 3	0.55
U-2 24v bank-1 (UPS Battery Bank)	Standalone Unit- 2	0.25
U-3 24v bank-1 & 2 (UPS Battery Bank)	Standalone Unit- 3	0.50
Total proposed cost		2.55

D. Enclosure:

Annexure- 14, 15,16_A_ Life of Lead Acid Battery as per OEM:

Nominal Voltage per cell	Volts	2
Manufacturer's Name		Exide Industries Ltd.
Standards to which battery is manufactured		IS 1651
IS Nomenclature		
Number of cells in the battery bank		n
Nominal Voltage of Battery	Volts	2 X n
Declared Capacity at 27 degree C upto 1.80 ecv		
Initial	AH	1000
Rated	AH	1000
End of Life	AH	800
Rated Capacity at mimimum ambient temperature	Ah	As per formula: Ct=C27{1+0.0043(t-27)}
Rated Capacity at maximum ambient temperature	Ah	As per formula: Ct=C27{1+0.0043(t-27)}
Capacity in AH at various end cell voltages and duration of discharge		
	E.C.V.	**Ah output**
1 hour	1.67	510.00
2 hour	1.70	642.00
3 hour	1.75	747.00
4 hour	1.76	792.00
5 hour	1.77	858.00
6 hour	1.77	896.00
7 hour	1.78	927.00
8 hour	1.78	950.00
9 hour	1.80	979.00
10 Hour	1.80	1000.00
Maximum momentary current for 1 min till 1.60 e.c.v		1800
Expected life of battery under normal operation & maintainence conditions	Years	15 years in stand-by float application
Internal Resistance of cell (IR)	milli ohms	0.27
Loss in capacity in 28 days due to self discharge	%	<8%
Recommended Charging rate for		
a) Float Charging		
i) Limit current	A	150
ii) Voltage	V	2.23 vpc
b) Boost charging		
i) Starting Current	A	120
ii) Finishing current	A	60
iii) Voltage	V	2.75
Trickle Charging Rate		
i) Minimum	mA	1000
ii) Maximum	mA	4000
Equalising charge		
a) Voltage	V	2.3
b) Current	A	50
c) Duration	Hrs.	6
d) Interval between succesive equalising charge	Months	3
Recommended Specific gravity at 27 deg C		
a) for first filling		1.220 +/- 0.005
b) at full charge		1.240 +/- 0.005
c) when Battery is discharged at 10 hours rate		1.160 - 1.130

Annexure-14, 15,16A_ Tata Power Batter Manual

Rev No: R0 Date: 1.10.02	TATA POWER BATTERY MANUAL	Section: 1 Page 1 of 8

Section 1 : KEY QUALITY PRACTICES

This section summarises in brief the recommendations made in this battery manual. Purpose of this section is to enlist the key recommendations for easy reference. Further in this manual "battery set" refers tubular type lead acid battery set, unless otherwise specified, as it is the most widely used one.

1.1 Battery set life

All types of batteries have a limited life after which sudden failure can not be ruled out. This life at the most can be enhanced by about 2 to 3 years by ensuring operation of battery within recommended voltage and temperature limits and by proper maintenance. Continuous operation of battery sets outside the specified voltage and temperature range can lead to premature end of battery set.

Quality Life of battery set after which they should be considered for replacement is as follows

Type of Battery Set	Years of service after which battery sets needs to be closely monitored for indications of near end of life	Tentative life of battery set (years) in Indian climate and temperature conditions	Years of service after which battery set should be replaced to avoid sudden failure of battery set.
Lead Acid Battery Set			
Tubular type	8	10	12
Plante type	16	18	20
SMF (VRLA)	4	6	8
Automobile batteries	2	3	4
Alkaline battery set			
Nickel Cadmium	4	6	8

Annexure-19, 20_Email from OEM (HBL) confirming need to replace UPS battery

Pandey Mohit

From: somnath Jana <cbosertel1@hbl.in>
Sent: 19 January 2026 21:03
To: kumari shruti
Cc: Pandey Mohit; Singh Chandrashekar
Subject: Re: [EXTERNAL] Share your recommendations against the battery bank test report
Attachments: U#3 UPS Battery bank-1 test report.docx; cbosertel1.vcf

[EXTERNAL sender, Exercise caution..!]
Dear Sir,

Regarding below mail we have gone through discharge test report.

As we understand after 04 Hrs of discharge found 62 no cell below 1.0 V

Considering cell voltage and no of cell below 1.0 V , we suggest to replace complete Battery Bank , not to replace 62 no cell as spare replacement.

Thanks & Regards,
Somnath Jana
Manager Sales
HBL ENGINEERING LIMITED
(formerly known as HBL Power Systems Limited)
Chatterjee International Centre,
A3/A4, 8th Floor,
33-A, Jawaharlal Nehru Road,
Kolkata 700071.
E-Mail : cbosertel1@hbl.in
Mob No : +91 9330323463
On 19-01-2026 16:22, kumari shruti wrote:

Dear sir,
As discussed, please find the attached test report of 210AH Nickle cadmium battery bank. Kindly share your recommendation based on it so that we can take further decisions.

1

Justification 17 and 18: CHP HT and LT Breaker Replacement

Coal Handling Plant (CHP) is the lifeline of a thermal power plant. An interruption in CHP will cause interruption in coal supply to boiler and eventually Units will get tripped. HT/LT breakers ensure that CHP and associated equipment receive reliable power for Continuous conveyor operation, Crusher running and Rapid coal evacuation from track hoppers. The breakers ensure protection of CHP in the event of overloading, short circuit, relay failure and failure of any other electrical system.

The LT and HT circuit breakers installed since inception have now reached a stage where OEM-recommended replacement due to obsolescence as explained in subsequent paragraphs. Over years of continuous operation, these breakers have undergone a natural wear, reducing their functional reliability. Further, owing to un-availability of critical spares limits the possibility of effective maintenance.

Aging LT and HT breakers in the CHP pose a significant risk of nuisance tripping, delayed response, or even catastrophic failure during high-load or fault conditions. With regards CHP where uninterrupted power supply is essential for conveyor operations, crusher mechanisms, stacker reclaimers, and dust suppression systems, any such failure can lead to cascading operational disruptions. Replacing these obsolete breakers minimizes the probability of unplanned outages, enhances electrical protection reliability, and mitigates the risk of equipment damage or coal flow interruption, which are critical to plant safety and performance.

This replacement initiative not only strengthens the reliability of CHP operations but also supports Jojobera Power Plant's broader commitment to ensuring availability and supply of power to Jamshedpur city.

CHP HT Beaker:

The existing ABB make 6.6 KV SF6 HT breaker installed at CHP has been in service since inception and now has become obsolete as per the OEM (ABB). To support long-term reliability, operational safety, and environmental compliance, SF_6 product range has now been upgraded by OEM to the latest Vacuum Circuit Breaker (VCB) technology. Vacuum-based breakers provide enhanced performance and eliminate greenhouse-gas emissions associated with SF_6.

Since, the models installed has been discontinued by OEM and is no longer supported for spares or technical servicing, it has been decided by the management to replace this breaker with new breaker in terms of OEM recommendations.

CHP LT Beaker:

The existing 415 v LT breaker is CNCS Range product by Lauritz Knudsen Electrical & Automation (A L&T Automation Division) and has been in service since inception. The OEM (Lauritz Knudsen Electrical & Automation (A L&T Automation Division)) has confirmed that

CNCS Range of ACBs has been upgraded to the C Power Range. Accordingly, OEM has stopped manufacturing of CNCS Range. This product was dropped from OEM's standard product offerings in 2008. This range has been superseded by Lauritz Knudsen Electrical & Automation's C Power range of products. Accordingly, OEM recommend t use 'Lauritz Knudsen Electrical & Automation Omega ACB'

Since, the models installed has been discontinued by OEM and is no longer supported for spares or technical servicing, it has been decided by the management to replace this breaker with new breaker.

Given its critical role in power distribution and protection, continued operation of this breaker poses significant operational and safety risks and concerns are depicted as follows:

1. Technical Concerns

1.1 Obsolescence

- The breaker model is discontinued.
- OEM-certified spare parts (trip unit, SF6 Poles, operating mechanism) are not available.
- OEM-certified spare parts (trip unit, arc chute, contact assembly, operating mechanism) are not available.
- No manufacturer-backed service support.

1.2 Reliability Degradation

- Mechanical wear due to prolonged service.
- Possible increase in contact resistance.
- Aging insulation and spring fatigue.
- Reduced breaking performance over time.

This increases the probability of:

- Failure to trip under fault
- Nuisance tripping
- Arc flash hazards

2. Risk Assessment

SL. No.	Risk Factor	Impact
1	Breaker failure during fault	Equipment damage & extended outage
2	Non-availability of spares	Prolonged downtime
3	Arc flash risk	Personnel safety hazard
4	Emergency replacement	High procurement cost & schedule disruption

Failure of this breaker may result in interruption of critical loads and cascading system impact.

The tentative cost proposed is Rs. 0.4 Cr. and Rs. 0.35 Cr. for CHP LT Breaker Replacement and CHP HT Breaker Replacement respectively.

Enclosures:

Annexure-17, 18_A_Obsolescence certificate from OEM (ABB) [for CHP HT Breaker]

ELDS PRODUCTS LIFE CYCLE SERVICES, ELDS/PM/2021/08-01 DATE: 30.08.2021

Obsolescence notice

Dear ABB Customer,

ABB hereby announces products that will move to Obsolete phase on 31st March 2022 according to the Product Life Cycle Policy for ABB Electrification, Distribution Solutions (ELDS).

Please, find the list of the concerned product versions and the corresponding replacements proposed:

Product family	Product name and version	New equivalent product name and version
HPA	HPA.12.12.40	VD4-HPA.12.12.40
HPA	HPA.12.16.40	VD4-HPA.12.16.40
HPA	HPA.12.20.40	VD4-HPA.12.20.40
HPA	HPA.12.25.40	VD4-HPA.12.25.40
HPA	HPA.12.31.40	VD4-HPA.12.31.40
HPA	HPA.36.12.31	VD4-HPA.36.12.31 with cradle retrofit solution
HPA	HPA.36.20.31	VD4-HPA.36.20.31 with cradle retrofit solution

Obsolete phase means:

- Equipment is not available
- Spare parts availability is not ensured

More details:

- No longer manufactured as a complete product
- Spare parts availability diminish over time with decreasing installed base
- Life extension solutions are granted

ABB INDIA LIMITED ABB NASHIK

ABB India Limited
Registered Office and Corporate Office
Plot No. 5 & 6, 2nd Stage,
Peenya Industrial Area IV, Peenya,
Bengaluru - 560 058 Karnataka

CIN : L32202KA1949PLC032923
GSTIN : 29AAACA3834B1Z4
Phone : +91 80 2294 9150 / 54
Fax : +91 80 2294 9148

Plot No. 79,
Street No. 17,
MIDC Industrial Area,
Satpur, Nashik - 422 007, India

Phone : +91 253 2200701
Fax : +91 253 2351260
abb.com/in

1/2

Annexure-17, 18_B_Mail from ABB confirming completion of service life of SF6 circuit breaker.

Paul Shantanu

From: Abhishek P. Kumar <abhishek.p.kumar@in.abb.com>
Sent: 11 February 2026 18:34
To: Paul Shantanu
Subject: Obsolescence notice for SF6 based HPA breaker _TATA POWER Jamshedpur
Attachments: ObsolescenceNotice_HPA.pdf

[EXTERNAL sender, Exercise caution..!]

Dear Sir ,

With reference to the attached obsolescence communication, we would like to formally confirm that the installed SF_6-based circuit breaker has completed its designed service life. In addition, in line with global environmental policies and the drive for sustainable technologies, SF_6-based breakers have been discontinued from active manufacturing.

To support long-term reliability, operational safety, and environmental compliance, the SF_6 product range has now been upgraded to the latest Vacuum Circuit Breaker (VCB) technology. Vacuum-based breakers provide enhanced performance, reduced maintenance requirements, and eliminate greenhouse-gas emissions associated with SF_6.

The recommended upgraded breaker model and technical replacement details have been clearly specified in the attached letter for your ready reference.

Please feel free to contact us for any additional information or to proceed with the upgrade planning.

ABB

Abhishek P. Kumar

ABB India Limited
Kashi Kunj, Road No.2 Contractors Area, Bistupur,
Jamshedpur
Mobile: +91 87929 25802
E-mail: abhishek.p.kumar@in.abb.com
abb.com

ENGINEERED
TO OUTRUN

Annexure-17,18_C_Obsolescence certificate from OEM (L&T) [for CPP LT Breaker]

Paul Shantanu

From: SHAKTI PANDA <shakti.panda@lk-ea.com>
Sent: 11 February 2026 18:59
To: Paul Shantanu
Cc: Parag Sanyal; Ranajit Ghosh
Subject: Required Obsoletion letter for CNCS ACBs

You don't often get email from shakti.panda@lk-ea.com. Learn why this is important

[EXTERNAL sender, Exercise caution..!]

Dear Customer,
Thank you for your continued support for the Lauritz Knudsen Electrical & Automation range of products. As a part of our continuous commitment to provide customers with the most current technology and best experience, we would like to inform that our CNCS Range of ACBs has been upgraded to the C Power Range. Accordingly, Lauritz Knudsen Electrical & Automation has stopped manufacturing of CNCS Range. This product was dropped from our standard product offerings in 2008. This range was superseded by Lauritz Knudsen Electrical & Automation's C Power range of products.

To avoid any inconvenience to our customers, we have provided spares support to our customers till 2018 for our CNCS ACBs. As per our site visit, now we recommend/offered you for using Lauritz Knudsen Electrical & Automation Omega ACB – our latest offering one to one replacement with retrofit kit in place of our CNCS Range.

For retrofitting of your existing installation of CNCS ACBs with the new Omega ACBs, please refer to the Catalogue attached herewith for your ready reference. Our team will also provide the necessary support for the smooth transition and retrofitting of your installations. Lauritz Knudsen Electrical & Automation appreciates and values our business relationship and looks forward to your continued interest in our products. We are eager to supply your future product requirement with our quality product lines. Please feel free to contact us in case of any further query regarding this or any further assistance.

SHAKTI PRASAD PANDA
Manager
Sales Service BD
Electrical Standard Products
Lauritz Knudsen Electrical & Automation

Mobile - 7304022761
Email - shakti.panda@LK-EA.com
Customer Support – CIC@LK-EA.com

Office Address - Ground Floor, GDR Siddha, N Road, Bistupur, Jamshedpur, 831001 Jharkand

General

Justification 21: Spare BTS 2000 relay procurement for Bus transfer scheme for U-2&3

- The generating unit auxiliary loads in Unit-2 and Unit-3 are normally fed from the Unit Auxiliary Transformer (UAT), which receives power directly from the generator.
- In the event of a generator trip, these critical auxiliary loads must be transferred instantaneously from the UAT to the Station Transformer to ensure continuity of supply. Failure of this transfer results in boiler trip, causing a sudden furnace pressure imbalance that can potentially damage major boiler equipment/Tripping of Boiler.
- To ensure a fast, secure, and smooth transfer, the Aartech-make Fast Bus Transfer (FBT) Controller (Model: BTS-2000) is installed. Currently we have four nos. of FBT controller installed in Unit-2 & 3 but there is **no spare FBT controller** available in the system.
- In case of a controller failure, the auxiliary load transfer from unit supply to station supply will fail, directly compromising boiler operation and overall unit safety. This poses a serious risk of extended forced outages and impacts generation availability.
- Additionally, maintaining a **one-to-one spare** is essential, as any attempt to use a non-identical controller would require modification of the existing FBT circuitry. Such modifications would significantly increase downtime, prolong restoration, and adversely affect generation reliability.
- Therefore, procurement of a spare Aartech BTS-2000 FBT controller is critical to ensure system reliability, prevent boiler-related process disturbances, and minimize downtime in case of controller failure. This CAPEX investment will enhance operational availability and safeguard vital equipment.
- Further, FBT controller functions as an integral part of the protection and control system of the generating unit, and its failure directly endangers plant safety, system stability, and generation continuity. As per the practice, replacement or procurement of critical protection and control system equipment, whose failure can lead to major outages, equipment damage, or operational derating, qualifies as capital expenditure rather than routine maintenance, since it enhances reliability, ensures sustained performance of the generating asset, and prevents catastrophic failure. The FBT controller is a specialized, high-value protection device with a long service life and forms part of the permanent electrical system architecture. Therefore, providing a dedicated one-to-one spare is a capitalizable investment eligible to claim under additional capitalization.

Cost estimate detail:

The tentative cost proposed is Rs. 30 Lakh.

Supporting document

Annexure- 21: Budgetary offer for BTS-2000

AARTECH SOLONICS LTD
NEAR HIM COLD STORAGE
SEC 1A, PARWANOO, DIST: SOLAN
HIMACHAL PRADESH
GSTIN: 02AACCA5369B1Z8
Website: www.aartechsolonics.com

SAL/F/04

QUOTATION FOR BTS 2000

Quotation No: ASL/2025-2026/1088
Quotation Date: 13/02/2026
Quotation validity: 13/03/2026

Sales Person: Debasis Barik

CUSTOMER:
M/s Tata Power
Tata Power Company Limited, Jojobera Power Plant,,
Jamshedpur,
Jharkhand, India,

Kind Attention: Mr. Imran Ali
Email Id: Imranali@tatapower.com
Contact No:

Project Details: TATA Jojobera TPS

Dear Sir,

We thank you very much for your above enquiry and have the pleasure of submitting our offer for Fast Bus Transfer System

S/N	Product Name	Price	Quantity	Total Amount
1	BTS 2000 RELAY MODULE 1. It's going to customize & test as per existing plant scheme. 2. Included(Online Test transfer PCB module, Communication cable). 3. Inspection as per site demand.	Rs. 11,40,000.00	1	Rs. 11,40,000.00
2	Service Work Fitment, Testing, commissioning Site service support. To-fro, Lodging-boarding, local conveyance etc inclusive	Rs. 80,000.00	1	Rs. 80,000.00

Sub Total	**Rs. 12,20,000.00**
Discount	Rs. 0.00
GST @ 18%	Rs. 2,19,600.00
Grand Total	**Rs. 14,39,600.00**

Terms & Conditions:	
Packing.& Forwarding	Included
Transit Insurance	Included
Payment Terms	Within 30 days of delivery
Warranty Terms	18 months form supply & 12 months from commissioning which ever is earlier
Delivery Terms	With in 45 days of approval

Special Terms:

BANK DETAILS :
Account Holder : AARTECH SOLONICS LTD
Bank Name: HDFC Bank
Branch: E1/57 Arera Colony Bhopal,MP

Justification: 22. JEMCO MCC and 415V breaker Retrofitting

The existing JEMCO L&T switchgear (recovery pump modules) have experienced multiple jaw (power contact) failures in recent months, resulting in overheating and flashover incidents within the panel compartments. These repeated failures are a serious concern from both safety and operational reliability perspectives.

The L&T make MCC in service is now obsolete as it has been in service since inception of Unit-2 and Unit-3 , and its design limitations are becoming increasingly evident. Due to aging of the equipment, deterioration of contact assemblies and thermal stress from prolonged operation. This leads to high contact resistance, excessive heating, insulation degradation, and ultimately flashover conditions.

Flashover incidents not only pose a significant risk to personnel safety but also threaten connected equipment, including breakers, busbars, and control wiring. Continued operation under such conditions increases the likelihood of major electrical faults, extended plant downtime, and potential fire hazards. Replacement of individual jaws may provide temporary relief; however, given the frequency of failures, a comprehensive retrofitting approach is technically more viable and sustainable.

Additionally, since the MCC and its 415V Breakers are obsolete, procurement of genuine spare parts has become difficult. Replacement components are either unavailable or sourced through limited channels, which increases maintenance time and reduces confidence in long-term reliability. Temporary repairs or part replacements are no longer a sustainable solution.

Technical and Safety Concerns

The present condition raises the following major concerns:

- **Flashover Risk:** Jaw failures have led to localized flashover incidents, posing significant arc flash hazards to operating personnel.
- **Fire Hazard:** Elevated contact resistance and overheating increase the probability of fire within the switchgear.
- **Equipment Damage and increased downtime:** The unavailability of recovery pump system due to flashover will pose serious threat as increase in recovery sump level and risk of sump overflow and may flood lots of raw water in surrounding areas.
- **Reduced Fault Withstand Capacity:** Aging insulation and mechanical wear compromise the MCC's breaker ability to safely withstand short-circuit levels.
- **Non-Compliance Risk:** The obsolete design does not fully align with current safety standards for arc containment, protection coordination, and operational safety.
- **Spare Parts Non-Availability:** OEM support has been discontinued, breaker model has obsolete, and genuine spare components are either unavailable or sourced through unreliable channels, increasing operational risk.

Required work details:

Sl. No.	Description	Quantity
1	132 kW motor feeder	4 Nos.

Sl. No.	Description	Quantity
2	2500 Amps, 415V Breakers	4 Nos.
3	55KW motor feeder	4 Nos
4	Service Charges for Retrofitting (Modules & Breakers)	—

Tentative Cost Estimates:

Name of Scheme	Total Proposed cost (Rs. Lakh)	Proposed cost (apportioned to Unit- 2 & 3) (Rs. Lakh)	Capitalisation Phasing (Rs. Cr.)	
			FY27	FY28
Jemco MCC retrofitting	50	21.92	21.92	-

Enclosure:

Annexure-22_Obsolescence certificate from OEM (L&T)

Paul Shantanu

From: SHAKTI PANDA <shakti.panda@lk-ea.com>
Sent: 11 February 2026 18:59
To: Paul Shantanu
Cc: Parag Sanyal; Ranajit Ghosh
Subject: Required Obsoletion letter for CNCS ACBs

Dear Customer,
Thank you for your continued support for the Lauritz Knudsen Electrical & Automation range of products. As a part of our continuous commitment to provide customers with the most current technology and best experience, we would like to inform that our CNCS Range of ACBs has been upgraded to the C Power Range. Accordingly, Lauritz Knudsen Electrical & Automation has stopped manufacturing of CNCS Range. This product was dropped from our standard product offerings in 2008. This range was superseded by Lauritz Knudsen Electrical & Automation's C Power range of products.

To avoid any inconvenience to our customers, we have provided spares support to our customers till 2018 for our CNCS ACBs. As per our site visit, now we recommend/offered you for using Lauritz Knudsen Electrical & Automation Omega ACB – our latest offering one to one replacement with retrofit kit in place of our CNCS Range.

For retrofitting of your existing installation of CNCS ACBs with the new Omega ACBs, please refer to the Catalogue attached herewith for your ready reference. Our team will also provide the necessary support for the smooth transition and retrofitting of your installations. Lauritz Knudsen Electrical & Automation appreciates and values our business relationship and looks forward to your continued interest in our products. We are eager to supply your future product requirement with our quality product lines. Please feel free to contact us in case of any further query regarding this or any further assistance.

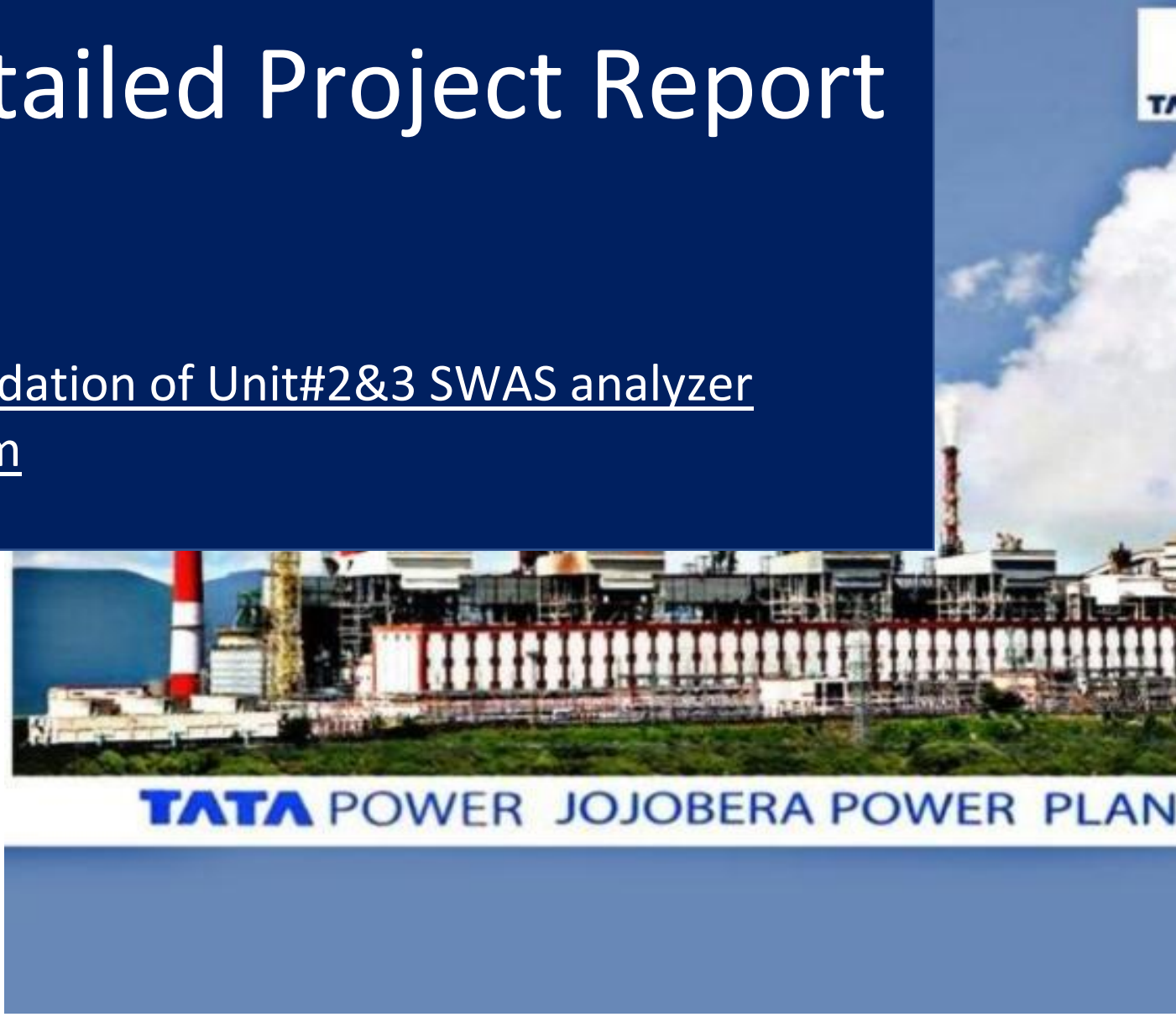
SHAKTI PRASAD PANDA
Manager
Sales Service BD
Electrical Standard Products
Lauritz Knudsen Electrical & Automation

Mobile - 7304022761
Email - shakti.panda@LK-EA.com
Customer Support – CIC@LK-EA.com

Office Address - Ground Floor, GDR Siddha, N Road, Bistupur, Jamshedpur, 831001 Jharkand

Detailed Project Report

Upgradation of Unit#2&3 SWAS analyzer System



Contents

Background

Jojobera Plant is 1*67.5MW & 4*120 MW thermal power plant having Coal Fired PF boiler. The energy generated is transmitted to the consumers through 220KV transmission line. Jojobera power Plant have 5 units. Each unit have its own TG, Boiler, BOP and AHP system.

The Generating Capacity of Units 2 & 3 is:
U#2- 120 MW
U#3- 120 MW

Steam and Water Analysis Systems (SWAS) play a critical role in ensuring the reliable, safe, and efficient operation of thermal power plants. In Unit #2 and Unit #3 (each rated at 120 MW), the existing SWAS has been in service for 25 years and is based on outdated analyzer technology, manual sampling arrangements, and limited online monitoring capabilities.

The current system primarily measures basic parameters such as pH, conductivity, and dissolved oxygen, with several measurements performed offline or manually. Over time, this has resulted in:

- Reduced accuracy due to sensor aging and drift
- Increased maintenance effort and calibration frequency
- Delayed detection of water chemistry excursions

In High pressure and temperature operating conditions, even minor deviations in water and steam chemistry can lead to serious equipment damage such as boiler tube corrosion, turbine blade deposits and reduced heat transfer efficiency.

As per current practices, it is recommended that thermal generating stations to rely on continuous, online, and highly accurate water chemistry monitoring to meet international standards (such as EPRI and IAPWS guidelines). Therefore, upgrading the SWAS of Unit #2 and Unit #3 has become necessary to maintain plant reliability and to support long-term asset protection.

Sl. No	System	Make	Brief functionality
1	SWAS Dry and Wet System	Emerson process	Online Measurement and Monitoring of: Boiler Blow down pH, Conductivity Condensate Water pH, Conductivity, DO Feedwater pH, Conductivity, DO Saturated Steam pH, Conductivity Main steam pH, Conductivity

Significance and Justification

The significance of upgrading the Steam and Water Analysis System lies in its direct impact on plant safety, efficiency, and equipment life. Proper water chemistry control is the first line of defence against corrosion, scaling, and contamination in the boiler–turbine–condenser cycle.

Equipment Protection:

- Inadequate monitoring of parameters such as silica, sodium, dissolved oxygen, and cation conductivity increases the risk of:
- Boiler tube failures

- Turbine blade fouling
- Condenser corrosion
- Feedwater system degradation
- Operational Reliability

Delayed or inaccurate water chemistry data can result in forced outages or load reductions. An upgraded SWAS provides early warning of contamination events such as condenser leakage etc.

Compliance with Industry Standards

Current best practices recommend continuous online analysis rather than manual sampling. The existing system does not fully comply with modern standards and OEM recommendations. Manual measurement of silica and sodium for MS and Feed water.

- Reduction in Human Error
- Manual sampling and laboratory testing introduce delays and dependence on operator skill. Automation improves consistency and reliability of measurements.

Life Extension of Plant Assets
Given the aging infrastructure of Units #2 and #3, precise chemistry control is essential to extend remaining plant life and reduce capital repair costs.

Frequent Analyser Maintenance:
Most of analyser accuracy drifted due to ageing of sensor and working on outdated technology. All pH analyser glass electrode must replace and change with new one as per OEM guidelines. Unit#2&3 DO analysers are in stopped conditions due to non-availability of analyser spares and same to be upgraded with new analyser to improve measurement reliability and reduce defect PPM.

To address these issues, we plan to upgrade SWAS system Dry and wet system with new analyser system working on latest technology. We have evaluated different mechanisms to decide on the method of upgradation, which are explained in the next section.

Evaluation, Execution, and testing:
Evaluation:

Through brainstorming, a set of criteria were defined to assist in evaluating various decision alternatives with respect to identification of the best integrated and active upgradation method.

These criteria were:
1. Seamless integration with existing SWAS infrastructure.
2. Operational Familiarity
3. Equipment Availability.
4. Ease of implementation.
5. Maintenance Cost. (service & Spare)
6. Measurement Reliability.

The various alternative available were:

1. Upgrade the SWAS dry and wet analyser systems with Latest version/technology analyser
2. Strengthening of Lab monitoring
3. Replaced the outdated analysers with New Analyser and rectify the wet analyser defects

The performance of all the alternative decisions against the identified criteria were scored on a scale of 0-10 and the total score was calculated based on the relative weightages assigned to the 'Criteria of evaluation'. The relative weightages were assigned based on the relative importance of a criterion against the other criteria. The evaluation tables are shown below. System Alternatives Criteria of evaluation Wt. 1 2 3

System	Alternatives			
Criteria of evaluation	Wt.	1	2	3
Seamless integration	10	6	7	8
Operational Familiarity	20	8	5	8
Equipment Availability.	20	10	4	6
Ease of implementation.	10	7	8	8
Cost. (service & Spare)	20	8	8	4
Reliability.	20	8	3	6
Score	100	810	550	640

Table: Evaluation of alternatives for SWAS system upgradation

From the evaluation tables, it is evident that the best possible alternative would be to Upgrade the SWAS dry and wet analyser systems with Latest version/technology analyser as it helps for ease of implementation, reliability, and Low maintenance cost.

Items to be procured for upgrade:

The proposed upgrade includes procurement of modern, online analyzer and associated infrastructure:

- Online dual pH & conductivity analyzer (high temperature compensated)
- Cation conductivity analyzer for CEP samples
- Optical Dissolved oxygen analyzer (ppb level)
- Silica analyzer
- Sodium analyzer
- Sample conditioning panels with coolers and pressure reducers
- Automatic calibration systems
- Necessary piping, valves, and fittings
- Spare sensors and consumables

Job plan:

Purchase requisition to be provided after getting approval of capex budget it is planned to start the implementation of project from Q2FY27 and complete by Q4FY27. The implementation of upgradation will be executed after receiving of materials. Detailed job planed as below:

- Engineering & Design
- Finalization of Analyser requirements and installation Location
- Preparation of P&IDs and layout drawings
- Procurement
- Vendor selection based on technical compliance
- Material quality Testing at site (SAT)
- Installation
- Removal of obsolete equipment
- Installation of new sample conditioning panels
- Analyzer mounting and cabling

- Commissioning
- Loop checking and signal verification180
- Calibration and functional testing
- DCS integration and alarm testing
- Training & Handover
- Operator and maintenance training
- Submission of manuals and as-built drawings

Benefits:

- Continuous and accurate monitoring of critical chemistry parameters
- Early detection of condenser leaks and contamination events
- Reduced forced outages and maintenance costs
- Improved turbine and boiler reliability
- Enhanced operator confidence and decision-making
- Compliance with modern power plant chemistry standards
- Extended life of boiler, turbine, and auxiliary equipment

Impact of deferring the project:

- Deferring the SWAS upgrade may result in:
- Increased risk of corrosion-related failures
- Higher probability of turbine contamination and efficiency loss
- Unplanned outages leading to revenue loss
- Escalating maintenance and repair costs
- Difficulty in sourcing spare parts for obsolete equipment
- Reduced plant availability and reliability
- In the long term, deferral may lead to catastrophic equipment damage requiring major capital expenditure.

Budget requirements:

Projected Cost including capitalization phasing is shown below:

Particulars	**UoM**	**FY 27**	**FY 28**	**FY 29**	**FY 30**	**FY 31**
Unit#2 Revamping of SWAS	Rs Lakh	125.00				
Unit#3 Revamping of SWAS	Rs Lakh		125.00			
Total For Unit 2 & 3	Rs Lakh	125.00	125.00			

Detailed Project Report

Sertel Time Synchronization System

Tata Power, Jojobera Power Plant

FY 2027-28

Table of Contents

A1. BACKGROUND

Tata Power Unit#2 & Unit#3 are commissioned in the year 2001 & 2002 respectively. The SERTEL Time Synchronization System is installed to provide a common, accurate, and synchronized time reference to all connected equipment across 2 & 3 units. This ensures that events, alarms, fault records, sequence-of-events (SOE) logs, and data logs generated by different systems are time-stamped accurately and consistently.

The existing SERTEL Time Synchronisation System installed in the plant has been declared obsolete by the SERTEL (OEM). As per OEM communication, the system is no longer under active production and critical spare parts are not available.

Due to the age and obsolescence of the system, the plant is experiencing frequent failures of system cards/modules, resulting in unreliable time synchronisation. The absence of OEM-supported spares has made timely repair and restoration increasingly difficult, leading to prolonged downtime and increased operational risk. Without a centralized time synchronisation system, each unit and subsystem may operate on different internal clocks, leading to:

- Incorrect or mismatched event time stamps
- Difficulty in fault analysis and root cause identification
- Delays in troubleshooting and maintenance activities
- Reduced reliability of historical data and reports

Considering the above-mentioned threats, including system obsolescence, frequent card failures, and non-availability of spares, upgrading the time synchronization system with the new SERTEL system is technically necessary.

A2. PURPOSE OF INVESTMENT

A representative from SERTELELECTRONICS (OEM) visited Jojobera plant and confirmed that installed GPS System were supplied by OEM around 15 years before. Now the Installed models are currently Obsolete. Therefore, it was recommended by OEM to upgrade GPS system unit with latest model. Accordingly, it has been decided to replace existing GPS System unit due to following reasons:

- To replace the obsolete SERTEL time synchronisation system which has been declared obsolete by the OEM.
- To ensure continuous availability of accurate and reliable time synchronisation across two units of the plant.
- To eliminate frequent failures of existing system cards and reduce maintenance and downtime issues.
- To address non-availability of spares and lack of OEM technical support for the existing system.
- To improve accuracy of event logging, alarm timestamping, fault analysis, and sequence-of-events (SOE) records.
- To provide a modern, OEM-supported time synchronisation system with long-term maintainability.

A3. PROJECT DESCRIPTION & EXECUTION

The project shall be executed by the Tata Power Instrumentation Maintenance Department. Prior to commencement of the project, a detailed project execution schedule and contingency plan shall be prepared by the Planning Engineers of the Maintenance Department in close coordination with the Operations Department, to ensure uninterrupted and safe operation of the plant through alternate modes of evacuation during the execution period.

Supply of the SERTEL Time Synchronisation System shall be carried out by competent external agencies having a proven track record and relevant experience in execution of similar time synchronisation system projects in power plants or industrial installations.

The execution activities shall be planned and carried out in a phased and controlled manner, ensuring minimal impact on plant operation. The total execution period is estimated to be approximately 10–15 days, subject to operational constraints and system availability.

A3.1 IMPROVEMENT IN OPERATIONAL EFFICIENCY:

The SERTEL Time Synchronisation System supports standard time protocols (such as GPS-based synchronization, NTP/IRIG-B as applicable), ensuring high accuracy and reliability. Implementing this system across two units will:

- Ensures accurate and reliable time synchronisation across two units of the plant.
- Eliminates operational risks associated with the obsolete SERTEL system and frequent failures of existing cards/modules.
- Improves accuracy of event logging, alarm time stamping, and sequence-of-events (SOE) analysis, enabling faster and more reliable fault diagnosis.
- Reduces maintenance effort, downtime, and forced outages caused by time synchronisation system failures.
- Addresses the issue of non-availability of spares and OEM support, ensuring long-term maintainability of the system.
- Improves plant safety and operational efficiency by providing consistent and synchronized system data during normal operation and disturbances.
- Supports regulatory, audit, and compliance requirements related to accurate data recording and reporting.
- Provides a modern, scalable, and OEM-supported time synchronisation solution suitable for future system expansions or upgrades.

Considering the critical nature of synchronized time in modern automation and power/industrial systems, installation of the SERTEL Time Synchronisation System for two units is technically essential and operationally justified.

A3.2 CAPITALIZATION/IMPLEMENTATION SCHEDULE:

It is proposed that this project will be implemented in FY 28 and capitalization will be done in FY28.

A4 COST BENEFIT ANALYSIS

Improved reliability, safety, and maintainability of plant systems through accurate and centralized time synchronization.

A5. RATE REASONABILITY

The estimated cost for replacement of Sertel Time Synchronization system, based on prevailing market prices, is Rs. 1.50 Crore.

A6. CONCLUSION:

With the implementation of the proposed Time Synchronisation System upgradation scheme, the overall reliability and availability of plant systems will be significantly improved. The new, OEM-supported time synchronisation system will ensure accurate and consistent time stamping across all protection, control, SCADA, and monitoring systems, which is essential for effective fault analysis and system coordination.

The latest system will be equipped with advanced diagnostics and monitoring features, enabling faster fault identification and reduced troubleshooting time, thereby minimizing downtime and maintenance effort.

In view of the critical importance of reliable time synchronisation, the obsolescence of the existing system, and the operational benefits expected from the proposed upgradation, approval of the CAPEX proposal is hereby recommended.

A7. ENCLOSURE

Annexure- 1: Copy of email from OEM confirming obsolescence of GPS system.

Verma Rajeet

Subject: FW: Regarding Upgradation of Exisitng GPS System Units----SERTEL

From: Sertel Support <support@sertelelectronics.com>
Sent: 09 February 2026 18:16
To: Verma Rajeet <rkverma@tatapower.com>
Subject: Re: Regarding Upgradation of Exisitng GPS System Units----SERTEL

[EXTERNAL sender, Exercise caution..!]

Dear Sir,
Reference to our Engineer service visits at Tata Power -Jojobera,

We have concluded the followings:

(i)The installed GPS System units(SERTEL Make) were supplied around 15 years before.Now the Installed models are currently Obsolete.So, we are facing difficulties for getting spares/components in the market for servicing also.

(ii) So, we recommend to Upgrade the SERTEL Make Existing GPS System units (installed at Unit -1 to Unit-5) with Latest Models of SERTEL Make.

(iii) In the Latest Configuration, the Redundant GPS System and Multi-constellation reception (e.g., GPS, GLONASS, Galileo, BeiDou and IRNSS) are possible.

Thanks & Regards.
K.JAYAPRATHAB
CUSTOMER SUPPORT MANAGER.

SERTEL ELECTRONICS (P) LTD.,
377, Nehru Nagar, I Cross Street,
Old Mahabalipuram Road, Chennai – 600 096.
Mob: 09381033422. New Ph. Nos.: 044-23454060 / 62

Detailed Project Report

Unit 2 & 3 Cooling Tower Dosing System

Table of Contents

A1. BACKGROUND

Tata Power, Jojobera Power Plant, Jamshedpur is having hypo and Sulphuric Acid Dosing system for Unit 2 & 3 Cooling Tower. This dosing used to dosage Sulphuric acid and Hypo Chemical to 2-3 Cooling tower , at present we have 1 no Sulphuric acid and Hypo Dosing system, Each Consist of Storage tank, Day tank, Unloading pump with Isolation valve, and Dosing Pump with Piping and Required instrument for. This plant was installed and commissioned in the year 2001.

A2. PURPOSE OF INVESTMENT:

The Chemical Dosing Systems are 25 years old, and life of almost all the equipment has been exhausted. This plant has approached the retiring age. No other standby arrangement is there, and condition of all the vessels, pumps, pipeline, valves, instruments, panel and cabling is in poor condition due to natural ageing.

A third-party inspection was carried out on the chemical dosing systems for Unit-2 Cooling Towers. The plant currently operates a single Sulphuric Acid Dosing System and one Hypochlorite (Hypo) Dosing System, each comprising a storage tank, day tank, unloading pump with isolation valve, dosing pump, associated piping, and required instrumentation.

The 3rd party consultant recommended replacing these systems for both Unit-2 and Unit-3, the recommendations are enclosed in this DPR for kind consideration of the Hon'ble Commission.

To check the healthiness of vessels from inside,

1) Hypo Storage Tank an internal inspection done by spark and hardness test method and found internal damage/cracking in the FRP Liling (photos are attached for reference below).

2) Sulphuric Acid Storage Tank: internal inspection done by thickness meter. Erosion found in vessel plate (photos are attached for reference below).

3) Civil Work: Damage found in Civil foundation; chemical resistance tiles found damage

This may lead to increase in internal corrosion of vessels and resulting in vessels rupture and possibility of fatal accident and deterioration of Cooling water quality, due to which it hampers production of Power.

A3. RISK:

In view of the afore said information, there is possibility that fatal accidents may happen, and entire dosing may stop working and consequently impact the performance of the cooling tower. Revival of chemical dosing system under such circumstances will also take a lot of time and so will affect prolonged unit outage. At Present, the necessary precautionary measures are being undertaken to mitigate the risks, however considering the prolonged risk, it is being proposed for a major renovation/upgradation of the present hypo and sulphuric acid dosing system.

The above proposal has been taken as a part of **Risk Mitigation Plan of Tata Power, Jojobera.**

A4. PROPOSED PROJECT/SCHEME:

Based on the above requirement as a part of Risk Mitigation Plan, a detail study has been carried out.

The summary of the proposal is as below: -

a) Installation of new Sulphuric acid and Hypo Storage tank with day tank.

b) Installation of Unloading pump with isolation valve, suction and discharge header, instrumentation, piping up to storage tank

c) Installation of Dosing pump, isolation valve and suction and discharge header, instrumentation, piping up to cooling tower basin

c) Complete renewal of MCC panel with cabling

d) Rectification / Making of New Foundation for unloading pump and Storage tank

e) Dyke wall & Acid Proof Tiles or epoxy coting for Acid & Hypo Storage Area.

A5. EQUIPMENT DETAILS:

Main equipment & activity required for renovation / renewal shall be:

a) Pipes and pipe fittings
b) Piping Supports
c) Pumps and Valves
d) Vessels 4 Nos (Hypo Storage tank, Sulphuric Acid Storage tank and Day Tank)
e) Online Level Transmitter, ph Transmitter, FRP transmitter
f) Panels (Electrical panel)
g) Support for Piping and Cable Tray
h) Painting of vessels, pipes, cable trays, building structure

A6. SCHEDULE OF ACTIVITIES:

Estimated time for completion of the proposed installation after Capex approval and order finalization shall be 6 to 8 months and planned to complete the project by FY-26-27.

1. Publishing RFQ
2. Finalization of Vendor
3. PO Placement to the finalized vendor.
4. Job activity planning preparation and execution of job as per planning chart
5. Dismantling of existing system
6. Replacement of storage tanks, pumps and cabling along with power cabling.
7. Painting of Pipes, markings, and structures (Maintaining 5S)
8. Disposal of Waste Materials
9. Completion of Job

A7. ESTIMATED PROJECT COST:

Estimated cost of the proposed system Supply and replacement of existing equipment, erection and commissioning is worked out to be in order of INR 127,00,000/- (Rs. One Crore Twenty-Seven lacs) excluding taxes.

A8. BENEFITS OF THE PROJECT:

This renovation will enhance the availability of chemical dosing systems and will reduce the unwanted breakdown due to recurring problems and possibility of fatal accident.

A8. ENCLOSURE:

Annexure- 26: Inspection report for 3rd party

INSPECTION REPORT BY 3RD PARTY:

Watertech
An ISO 9001:2015 Certified Company
WATERTECH SERVICES PVT. LTD.
"Yash", Plot No. 94, Jai Durga Society No. 3
Manish Nagar, Beltarodi Road,
Nagpur- 440 015. Mob.: 9822934432

INSPECTION REPORT

WSPL/ IR/2025-26/04 **Dt 25/06/2025**

1. Project Information

- **Project Title:** Bulk Chemical (Sulphuric acid & Hypo) System
- **Client:** TATA POWER CO LTD
- **Site Location:** Jojobra Unit # 2 Cooling tower

2. Scope of Inspection

Inspection was carried out for the following components of bulk chemical dosing system (Acid & Hypo)

- Acid & Hypo Storage Tank
- Acid & Hypo Day Tank
- Unloading Pump & Motors for Acid & Hypo
- Dosing Pump for Acid & Hypo
- Pump Suction and Discharge Piping for Acid & Hypo
- MCC Panel for Acid & Hypo
- Dyke Wall and Civil Foundation for Acid & Hypo storage tank, Pumps & Motor

3. Inspection Observations & Findings

3.1 Storage Tank (Hypo)

- Rubber lining found completely damaged.
- Rubber lining has become hard, brittle, and lost elasticity.
- Multiple cracks, surface peeling, and delamination observed.
- Internal lining condition not suitable for chemical storage.
- **Recommendation**: Storage tank rubber lining must be fully replaced or tank replaced depending on structural condition. (Details Report Attached)

3.2 Storage Tank (Acid)

- MS Plate corroded at upper side & damaged at nozzles.
- Multiple cracks, surface peeling, and delamination observed.
- Internal lining condition not suitable for chemical storage.
- **Recommendation**: Storage tank must be fully replaced or tank replaced depending on structural condition.

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3,3 Day Tank(Acid & Hypo)

- Day tank found damaged externally and internally.
- Visible corrosion, deformation, and thinning of tank wall.
- Internal surface shows chemical attack and coating failure.
- Leakage marks and structural weakness observed.
- **Recommendation**: Day tank is not repairable and must be replaced with a new tank.

3.3 Unloading Pump with Motor (Acid)

- Pump body found **corroded and damaged**.
- Base frame found **corroded and damaged** and alignment disturbed.
- Pump not operational during rotation check.
- Leakage observed at mechanical seal area.
- **Recommendation:** Unloading pump must be **replaced**.

3.4 Unloading Pump with Motor (Hypo)

- Pump body found **damaged**.
- Base frame found **corroded and damaged** and alignment disturbed.
- Leakage observed at mechanical seal area.
- **Recommendation:** Hypo Unloading pump must be **replaced**.

3.5 Dosing Pump (Acid & Hypo)

- Dosing pump condition varies across systems.
- Some pumps operational but with reduced efficiency
- Leakage observed in suction/discharge fittings in several units.
- **Recommendation**: Dosing pumps to be replaced or upgraded

3.5 System Piping (CS & PVC)

- Piping found Damaged at multiple points.
- Suction and discharge lines found brittle and chemically attacked.
- Flange gaskets deteriorated.
- Several joints leaking
- Support clamps missing or loose.
- **Recommendation**: Replace entire piping with new CPVC Chempro chemical-resistant piping.

3.6 MCC Panel

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- MCC panel found severely corroded.
- Internal wiring insulation deteriorated.
- MCB, contactors, and relays aged and unreliable.
- Panel door hinges and gasket damaged.
- Cable found damage in various place
- **Recommendation**: MCC panel must be replaced with a new panel meeting electrical safety standards.

3.97 Dyke Wall and Civil Foundation of Vessel and Pump

- Dyke wall and Base found completely damaged.
- Cracks, surface erosion, and chemical attack visible.
- Dyke not capable of containing chemical spills.
- **Recommendation:** Dyke wall and Foundation must be rebuilt with proper chemical-resistant coating.

.4. Overall System Condition

Bulk chemical system (Acid and Hypo) are in heavily deteriorated condition due to prolonged chemical exposure, aging, and lack of refurbishment.

Major components such as:

- Storage Tanks
- Day Tanks
- Unloading Pumps
- MCC Panels
- Dyke Walls
- Piping Systems

are beyond repair and require complete replacement.

5. Compliance Status

The existing system **does not comply** with:

- Safety standards
- Chemical storage guidelines
- Mechanical integrity requirements
- Electrical safety norms

6. Conclusion & Recommendation

Based on the inspection, the following conclusions are drawn:

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- The old Bulk chemical (acid & Hypo) Systems are not suitable for continued operation.
- Multiple components are damaged, unsafe, and non-functional.
- Revamping requires complete replacement of major equipment and piping.
- Upgradation is mandatory to ensure safe and reliable dosing operations.

For **WATERTECH SERVICES PVT LTD**

MILIND THAKRE

Watertech Services Pvt. Ltd. Nagpur

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WSPL/ IR/2025-26/041 Dt 25/06/2025

PHYSICAL INSPECTION REPORT		
Customer	Tata power Ltd	
JOB	Bulk Chemical Dosing System	
Vessel Detail	Hypo Storage Tank	
Area of Test	100 % Area Inside Vessel	
Type	Cylindrical Horizontal Vessel Both End Disc	
Vessel Size	Φ2000mm X3000 mm LOS	
Rubber Line Thickness	4.5 mm	
Sr No	Description Test Area	Observation
1	Physical Test	1) Crack on Rubber line Surface
2		2) Rubber Damage
3		3) Bulging on Surface
4		4) Multiple Crack on rubber line Surface
5		5) Air Bubble
6		6) Rubber Worn Out

Remark :
Tank Rubber line found heavily damage and it also affects Vessel metal internally

Recommendation :
As Rubber lining is heavily damage and beyond repair, we recommend to change Bulk Hypo Storage tank

Note : Photo graph attached with report

For **WATERTECH SERVICES PVT LTD**

MILIND THAKRE

Watertech Services Pvt. Ltd. Nagpur

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WSPL/ IR/2025-26/02 **Dt 25/06/2025**

HARDNESS TEST REPORT

Customer	Tata power Ltd
Job	Bulk Chemical Dosing System
Vessel Detail	Hypo Storage Tank
Area of Test	100 % Area Inside Vessel
Machine No	5591
Calibration Certificate No	23/4097 dt 06/06/2024
Vessel Size	Φ2000mm X3000mm HOS
Rubber Line Thickness	4.5 mm

Sr No	Description Test Area	Observation	Remark
1	Hand Hole	Above 100 Shore A	Tank Rubber is Completely hard and Observed Crack / Damage on rubber line surface
2	Shell Area	Above 100 Shore A	
3	Top Dish	Above 100 Shore A	

Note : Photo graph attached with Report

For **WATERTECH SERVICES PVT LTD**

MILIND THAKRE

Watertech Services Pvt. Ltd. Nagpur

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WSPL/ IR/2025-26/03 Dt 25/06/2025

SPARK TEST REPORT

Customer	Tata power Ltd
JOB	Bulk Chemical Dosing System
Vessel Detail	Hypo Storage Tank
Area of Test	100 % Area Inside Vessel
Applied Voltage	10 KV
Machine No	2304609
Calibration Certificate No	CC/ST/0098/24-25
Applied Voltage	10 KV
Vessel Size	Φ2000mm X 3000mm HOS
Rubber Line Thickness	4.5 mm

Sr No	Description Test Area	Observation	Remark
1	Shell Area	Test Fail	From all test area Current leakage Observed
2	Top Dish	Test Fail	
3	Man Hole	Test Fail	

For **WATERTECH SERVICES PVT LTD**

Nagpur

MILIND THAKRE

Detailed Project Report

Fire system/equipment upgradation

Tata Power, Jojobera Power Plant

FY 2027-31

Table of Contents

A1. BACKGROUND

Jojobera Unit-2 and 3 require reliable fire safety infrastructure to mitigate risks associated with high-pressure steam systems, electrical equipment, and fuel storage areas.

There are a few identified areas where the fire system and equipment need upgradation/revamping for addressing the risk associated. (i) Fire Tender replacement (ii) Implementation of Fire Paint and Fire Safety Boards in Cable vault (iii) The Medium Velocity Water System (MVWS)

Fire Tender

The existing fire tender (Make: [MAN TRUCKS INDIA PVT LTD/CLA25.280], Registration No. [JH05 BN 2543]), commissioned in the year 2015, has been in continuous service for over 10 years and had undergone multiple repairs. It has exceeded its normal service life. Moreover, this model has also been discontinued by the OEM.

Fire Paint and Fire Safety Boards

It is proposed to implement a Fire Paint and Fire Safety Boards Package valued at ₹3.5 Crores under the same scheme. This package includes application of certified fire-retardant/intumescent coatings and installation of statutory fire safety boards across critical plant areas to prevent fire propagation and improve emergency preparedness.

The importance of this package is further reinforced by the recent fire incident at Trombay Power Plant, which led to prolonged unit shutdown. The incident demonstrated that both active firefighting systems and passive fire containment measures are critical to prevent large-scale operational disruption.

This proposal is aligned with critical action items emerging from safety audits and industry learnings to strengthen fire prevention and statutory compliance.

Upgradation of MVWS

The Medium Velocity Water System (MVWS) installed in the Coal Handling Plant (CHP) is a critical fire protection system designed to provide automatic fire detection and actuation for high fire-risk zones such as like Conveyor galleries, Transfer points, Crusher house, Cable galleries & Coal bunker areas

The MVWS system electronic control and detection system comprising Control panels, LHS Cables, Electronic cards/modules, Fire detection sensors, Actuation logic controllers, Junction Boxes (JBs), Interface relays and signal conditioning modules has become obsolete and unsupported by the OEM (SCHRACK).

Key issues:

Fire Tender

High maintenance cost: ₹2-3 lakhs annually due to frequent repairs and unavailability of spares. Model discontinuation*: Spare parts sourcing is challenging, impacting uptime.

Fire Paint and Fire Safety Boards

The plant presently lacks comprehensive application of certified fire-retardant/intumescent fire paint in critical areas such as MCC rooms, Cable galleries/vaults, Transformer zones, Turbine floor areas & Control room structures

The absence of structured fire paint application and statutory fire boards represents a gap in passive fire protection measures and compliance with State Fire Service norms and safety audit recommendations.

To address this gap, it is proposed to include a **Fire Paint and Fire Safety Boards Package valued** under this scheme. This package forms part of critical action items identified in safety audits and risk mitigation reviews to prevent fire propagation and ensure statutory compliance.

Upgradation of MVWS system

Due to aging and technological obsolescence, the following problems are being encountered.

- Electronic cards are frequently failing.
- Sensors are giving false alarms or no response.
- Controller modules are unreliable during periodic testing.
- Spare parts are not available in the market.
- OEM support is discontinued.

The failure of electronic control components directly affects the automatic actuation of MVWS, thereby compromising fire protection reliability.

Considering the critical safety function and obsolescence of the existing system, replacement of the SCHRACK MVWS is technically and operationally essential.

A2. PURPOSE OF INVESTMENT

To maintain a safe and reliable operating environment, Tata Power seeks approval for add cap towards (i) replacement of the Fire Tender, (ii) implementation of fire-retardant paint and installation of fire-safety boards within the cable vault, and (iii) replacement of MVWS.

Fire Tender

Th OEM of the existing Fire Tender has closed its manufacturing/service facility, making procurement of spares and availability of service are no longer feasible. Therefore, the management has decided to procure a new fire tender for plant to replace the existing 10-year-old, discontinued model fire tender.

This will Ensure reliable fire safety for our plant, protecting personnel and equipment. It is proposed to condemn and dispose of the existing fire tender as per standard disposal procedures and procure a new modern fire tender equipped with the latest firefighting technology and safety features.

Fire Paint & Fire safety Board

The Fire Paint and Boards Package will:

- Delay fire spread in cable galleries and structural steel
- Enhance fire containment capability
- Provide clear emergency evacuation guidance
- Meet statutory norms of State Fire Services, BIS standards, and safety audit observations
- Address critical action items identified in fire risk assessments

Upgradation of MVWS

Similarly, to fire tender system, the MVWS and associated fire-safety installations have significantly exceeded their standard service life and now operate with reduced reliability. These systems form the first line of defence against fire hazards in high-risk operational zones.

The purpose of the proposed investment is:

- To replace obsolete electronic cards and controller modules of MVWS.
- To replace unreliable fire detection sensors installed in CHP areas.
- To replace unreliable LHS cables in CHP areas.

- To upgrade junction boxes and field interface wiring where deteriorated.
- To ensure reliable automatic detection and actuation of MVWS.
- To eliminate false alarms and non-actuation risks.
- To ensure compliance with fire safety and insurance requirements.
- To provide a modern, OEM-supported electronic control system

It is submitted that any failure of the fire-fighting systems may lead to severe safety incidents, including potential loss of life and extensive damage to critical plant assets, timely replacement and modernization is essential. The proposed capex is therefore crucial to ensure compliance with safety standards and to enhance the plant's resilience against fire-related risks. We request the Hon'ble Regulatory Commission to approve the additional capital expenditure for these works. All required documents, technical justifications, and supporting evidence will be submitted as needed in due course. As stated above the add cap is obsolete and the relevant documents shall be shared with the Hon'ble Commission as and when required.

A3. INVESTMENT DESCRIPTION & EXECUTION

The project will be executed by Tata Power fire and safety Department and other maintenance department. Prior to commencement, the planning department will prepare a project schedule and contingency plan, coordinating with procurement departments. Supply and operationalize done in phased manner.

The new tender should conform to the latest BIS/ARAI/State Fire Service standards and include:

- High-pressure pump system
- Water tank capacity of at least [8000] liters
- Foam tank of [2000] liters
- Modern control panel with electronic monitoring
- Crew cabin with safety features (seat belts, communication system, etc.)
- Optional: CAFS (Compressed Air Foam System), GPS tracking, and night vision lights

Fire Paint & Fire Safety Boards Package:

- Application of certified intumescent fire-retardant coatings
- Fire-resistant paint for cable trays and structural steel
- Fire compartmentalization enhancement
- Emergency exit boards
- Hazard identification boards
- Fire equipment location signage

- Assembly point boards

The scope of this project includes replacement/upgradation of:

- MVWS Control Panel
- Electronic logic cards and processor modules
- LHS Cables.
- Fire detection sensors (Heat/Flame/Linear Heat Detectors as applicable)
- Actuation relays and output modules
- Junction Boxes (JBs) in field areas
- Signal cabling and termination (where required)
- Integration with existing Fire Alarm System / DCS

Upgradation of MVWS

The new system shall:

- Be microprocessor-based
- Have self-diagnostic and fault monitoring capability
- Provide event logging and alarm history
- Be compatible with existing fire water system
- With latest LISTEC make standard cables.
- Comply with NFPA fire detection standards

Execution will be carried out in a phased manner to ensure:

- Continuous fire protection coverage
- Temporary manual backup during switchover
- Minimal impact on CHP operation

The above upgradation significantly enhances fire prevention capability and ensures statutory compliance with State Fire Service norms and safety regulations. The scheme is also linked to critical safety action items identified in plant fire audits.

A3.1 IMPROVEMENT PLANT SAFETY:

Acquiring a new fire tender along with implementing the Fire Paint & Fire Safety Boards Package improves both active and passive fire protection.

While fire tender is very critical for Faster emergency response, Fire Paint & Fire Safety

Boards Package improves the following

- Delayed structural failure during fire
- Reduced fire propagation in cable galleries
- Clear evacuation routes during emergencies
- Enhanced preparedness during mock drills
- Compliance with statutory safety norms

Upgradation of MVWS provides following

- Reliable automatic fire detection
- Faster and accurate actuation of MVWS
- Elimination of false alarms
- Reduced maintenance and troubleshooting time
- Improved system diagnostics and monitoring
- Compliance with latest fire safety norms
- Availability of spares and OEM support
- Enhanced overall fire safety reliability in CHP

Given that fire detection is the triggering mechanism for MVWS actuation, modernization of electronic control components is essential for dependable system performance.

The proposed package strengthens operational continuity and fulfils critical action items related to fire risk mitigation.

A3.2 CAPITALIZATION/IMPLEMENTATION SCHEDULE:

The investment is planned for implementation and capitalization as per the following schedule.

Projected Cost including capitalization phasing is shown below:

Total Project Cost with Capitalization Phasing						
Particulars	**UoM**	**FY 27**	**FY 28**	**FY 29**	**FY 30**	**FY 31**
Project Cost allocated to Unit 2 and Unit 3	Rs Lakh	300	300	199	-	-

A4. COST BENEFIT ANALYSIS

The combined investment enhances system reliability and prevents prolonged shutdowns caused by fire incidents.

Fire Paint & Fire Board

The Fire Paint & Boards Package plays a key preventive role by limiting fire escalation and improving safety awareness, thereby reducing overall risk exposure.

Operational Risk Avoidance:

- Prevention of failure of automatic fire actuation
- Avoidance of delayed fire suppression
- Reduction in risk of major conveyor fire incident
- Avoidance of prolonged unit shutdown

Upgradation of MVWS

The estimated cost for replacement of electronic cards, sensors, controller modules, and junction boxes of MVWS in CHP is based on budgetary quotations and prevailing market rates. The cost includes the following:

- Supply of control panels/modules
- LHS cable laying for approx. 4Km total conveyors length.
- Sensors and detection devices
- Junction Boxes and field interface hardware
- Installation and wiring
- Testing & commissioning

The estimated cost is considered reasonable considering the critical safety nature of the system and scope of electronic upgradation.

Detailed Project Report

IT Infrastructure Update

Tata Power, Jojobera

Power Plant

FY 2026-27

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A1. BACKGROUND

Tata Power's Jojobera Power Plant consists of five units (Unit #1–5) with a total generation capacity of 527.5 MW. Multiple IT assets—including laptops, desktops, switches, firewalls, and other network components—have been deployed to support plant operations and security surveillance systems (IP CCTV cameras, servers, client desktops, and network components). These IT assets are essential for day-to-day activities such as SAP, Outlook, reporting, and operational data monitoring, as well as for ensuring 24×7 security surveillance of critical areas.

The existing 140 CCTV cameras (ACTi Models: KCM7311, KCM7211, KCM5211, KCM5311, and E413), along with the Dell R620 server and PI firewall (FortiGate 30E) installed across the plant, have been declared obsolete by the OEM (ACTi). As per the OEM's communication, the system has been discontinued from active production, and critical spare parts are no longer available.

Due to the age and obsolescence of the existing surveillance infrastructure, the plant is experiencing frequent camera failures, leading to unreliable monitoring and degraded video quality. The absence of OEM-supported spares has made repair and restoration extremely challenging, resulting in prolonged downtime and increased operational and security risks.

Without a functional CCTV surveillance system, the plant's operational and security-sensitive areas remain vulnerable, which may compromise round-the-clock security monitoring, leading to:

Potential Risks: -

- Compromised safety and security of plant personnel, equipment, and critical assets.
- Inability to monitor restricted and hazardous areas, increasing the risk of accidents.
- Failure to detect unauthorized entry, theft, or sabotage attempts.
- Non-compliance with audit, regulatory, and statutory requirements for surveillance coverage.
- Lack of evidence during incident investigation, impacting root-cause analysis and reporting.
- Operational impact due to unmonitored zones during plant maintenance or emergencies.

Considering the above-mentioned threats, including system obsolescence, frequent camera failures, and non-availability of spares, upgrading the IT asset with the new IT asset is technically necessary.

A2. PURPOSE OF INVESTMENT

The purpose of this investment is to replace the obsolete and unsupported CCTV surveillance system, Server & network asset and IT Asset and currently installed at Tata Power – Jojobera Power Plant. The existing cameras have reached end-of-life as declared by the OEM (ACTi), resulting in frequent failures, poor video quality, and non-availability of critical spare parts. This has compromised the effectiveness and reliability of the plant's 24×7 security monitoring. Although the OEM has declared a shortage of parts for the surveillance system, Tata Power has been able to keep the system operational through regular maintenance and interim arrangements. However, going forward, it will be necessary to replace these systems with the latest available technology.

Further, in order to ensure compliance with the Central Electricity Authority's (CEA) Cyber Security Guidelines updated from time to time, Generating Station required to upgrade computers, communication networks, and associated cyber-security systems. The CEA guidelines mandate that all responsible entities, including thermal generating station to enhance OT and IT system, and secure remote operations, communication systems, and secondary automation infrastructure. Accordingly, Tata Power has proposed add cap considering the requirement of as per CEA guidelines.

Upgrading to a modern, high-resolution, OEM-supported CCTV, Server & network assets, and associated IT assets are essential to:

- Restore reliable and continuous surveillance of operational and security-critical areas.
- Ensure compliance with safety, regulatory, and audit requirements.
- Improve incident detection and response, reducing operational and security risks.
- Enhance video quality and coverage, enabling better monitoring and investigation.
- Ensure availability of spares, service, and long-term OEM support for future maintenance.
- Enhance manpower utilization of SAP system and data mapping.
- Compliance to CEA's cyber security guidelines

This investment will strengthen plant safety, improve risk mitigation, and ensure uninterrupted surveillance across all critical locations.

A3. PROJECT DESCRIPTION & EXECUTION

The project shall be executed by the Tata Power Instrumentation Maintenance Department & IT Team. Prior to commencement of the project, a detailed project execution schedule and contingency plan shall be prepared by the Planning Engineers of the Maintenance Department in close coordination with the Operations & Security Department, to ensure uninterrupted and safe operation of the plant through alternate modes of evacuation during the execution period.

Supply of the IT asset & CCTV Camera shall be carried out by competent external agencies having a proven track record and relevant experience in execution of similar projects in power plants or industrial installations.

The execution activities shall be planned and carried out in a phased and controlled manner, ensuring minimal impact on plant operation. The total execution period is estimated to be approximately one month, subject to operational constraints and system availability.

A4.1 IMPROVEMENT IN OPERATIONAL EFFICIENCY:

Implementation of the new CCTV surveillance system, along with reliable IT assets such as laptops and desktops, will significantly enhance the operational efficiency of Tata Power – Jojobera Power Plant. The combined improvement in surveillance and IT infrastructure will support faster decision-making, reduce downtime, and strengthen overall plant performance.

1. Enhanced Real-Time Monitoring: - The upgraded IP-based CCTV system provides high resolution, real-time monitoring of critical plant areas. When integrated with reliable desktops used in control rooms and security stations, operators can detect abnormalities, unsafe conditions, or unauthorized access more efficiently. This leads to faster diagnosis and immediate corrective action, reducing operational delays.

2. Reduced Manual Surveillance and Administrative Load: - Improved camera coverage paired with dependable IT devices reduces the need for manual patrolling and physical verification. Security and operation teams can perform exception-based monitoring, while updated laptops/desktops streamline administrative tasks, reporting, and incident documentation.

3. Faster Incident Investigation & Reporting: - High-quality video footage, combined with efficient IT systems, enables quick retrieval, analysis, and reporting of incidents. The enhanced laptops/desktops offer faster processing, better software performance, and improved data handling, allowing teams to complete root-cause analysis and incident reports more quickly and accurately.

4. Improved System Uptime: - With OEM-supported CCTV devices and stable IT assets, system availability increases significantly. Reduced hardware failures and better performance of laptops/desktops ensure continuous monitoring of all plant zones, leading to improved reliability and overall operational continuity.

5. Better Coordination During Emergencies: - Real-time video visibility, supported by responsive IT systems, enables quicker coordination between operations, maintenance, and security during

emergencies such as equipment trips, fire alarms, or perimeter breaches. This improves response time and situational awareness, helping teams manage incidents efficiently.

6. Enhanced Compliance and Audit Preparedness: - Reliable surveillance and efficient IT systems simplify retrieval of video archives, logs, and reports. This reduces administrative effort and ensures compliance with regulatory, statutory, and audit requirements, enabling smoother audit processes.

A4.2 CAPITALIZATION/IMPLEMENTATION SCHEDULE:

It is proposed that this project will be implemented in phased manner and accordingly capitalization will be done in FY27 and FY28.

A5 COST BENEFIT ANALYSIS

Improved reliability, safety, and maintainability of plant systems through accurate and centralized time synchronization.

A6. RATE REASONABILITY

Projected Cost including capitalization phasing is shown below:

Name of Scheme	Total Proposed cost (Rs. Lakh)	Proposed cost (apportioned to Unit-2 & 3) (Rs. Lakh)	Capitalisation Phasing (Rs. Cr.)	
			FY27	FY28
IT Infrastructure upgradation	250	109.58	54.79	54.79

A7. CONCLUSION:

With the implementation of the proposed IT asset, CCTV Camera & Network component upgradation scheme, the overall reliability and availability of plant systems will be significantly improved. The replacement of the obsolete CCTV surveillance system and the enhancement of essential IT assets (laptops and desktops) are critical to ensuring the safe, secure, and efficient operation of Tata Power – Jojobera Power Plant. The existing systems have reached end-of-life, lacked OEM support, and frequently fail, leading to operational disruptions, security vulnerabilities, and non-compliance risks.

Upgrading to a modern, reliable, and OEM-supported surveillance and IT infrastructure will restore continuous 24×7 monitoring, improve operational visibility, strengthen plant security, and support faster decision-making. The new system will also enhance real-time monitoring, facilitate efficient incident investigation, ensure regulatory compliance, and enable future digital transformation initiatives across the plant.

This investment is essential to maintaining plant reliability, safeguarding critical assets, and ensuring uninterrupted operations across all units. It will significantly enhance operational efficiency, reduce downtime, and provide long-term sustainability and scalability for the plant's IT and surveillance infrastructure.

A8. ENCLOSURE

ANNEXURE- 28: Shortage of parts of surveillance camera and associated parts confirmed by the OEM

SHORTAGE OF PARTS OF SURVEILLANCE CAMERA AND ASSOCIATED PARTS CONFIRMED BY THE OEM:

ACTi Connecting Vision

www.acti.com
Tel: +886-2-2656-2588
Fax: +886-2-2656-2599

EOL Model Announcement

June 2nd, 2023

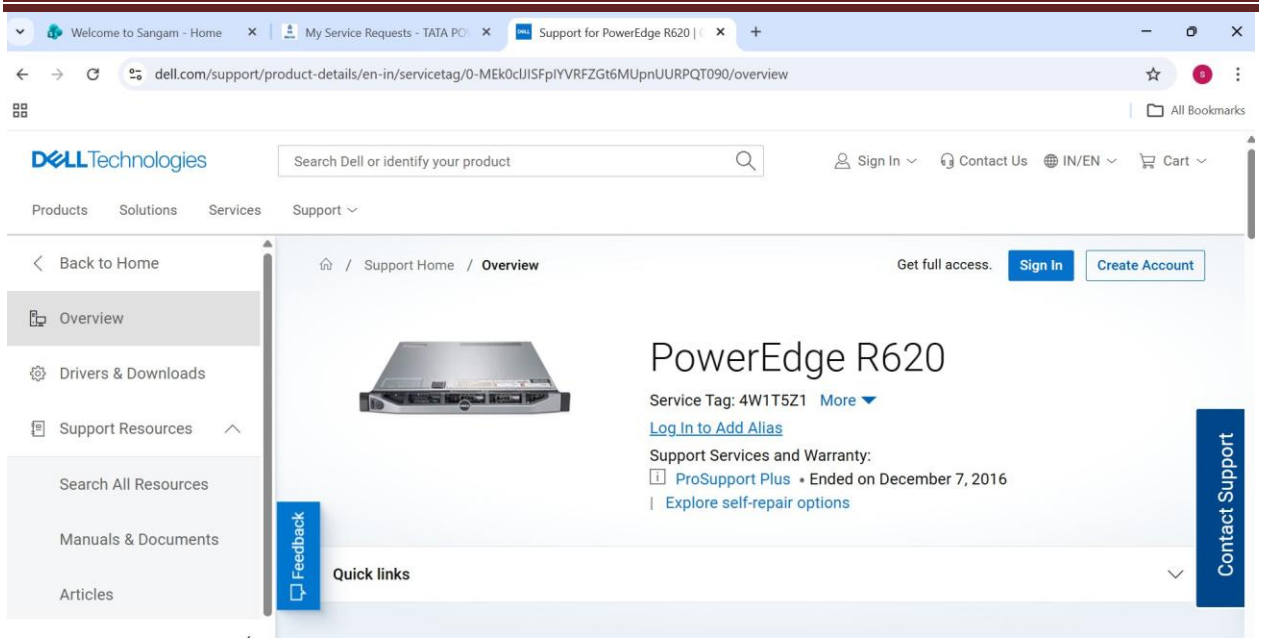
To: Tata Power

ACTi Corporation (hereinafter referred to as ACTi) is an established and reputable manufacturer of IP video surveillance solutions with its principal place of business at 7F, No. 1, Alley 20, Lane 407, Sec. 2, Ti-Ding Blvd., Neihu District, Taipei, Taiwan.

ACTi hereby confirms and declares that the below models have been EOL due to the shortage of SoC and other mechanical parts. ACTi would not be able to provide related spares by OEM for these cameras:

K- Series	KCM 5211, KCM 5211E, KCM 5311, KCM 7211, KCM 7311, KCM 3911
E- Series	E413
I- Series	I94, I27
B- Series	B23, B46

Supporting for ending the supporting service by OEM


Welcome to Sangam - Home
My Service Requests - TATA PO
Support for PowerEdge R620 |
dell.com/support/product-details/en-in/servicetag/0-MEk0clJISFpIYVRFZGt6MUpnUURPQT090/overview
All Bookmarks
DELL Technologies
Search Dell or identify your product
Sign In
Contact Us
IN/EN
Cart
Products
Solutions
Services
Support
Back to Home
Overview
Drivers & Downloads
Support Resources
Search All Resources
Manuals & Documents
Articles
Support Home / Overview
Get full access.
Sign In
Create Account
PowerEdge R620
Service Tag: 4W1T5Z1 More
Log In to Add Alias
Support Services and Warranty:
ProSupport Plus • Ended on December 7, 2016
Explore self-repair options
Feedback
Quick links
Contact Support

BEFORE THE HON'BLE JHARKHAND STATE ELECTRICITY REGULATORY COMMISSION AT RANCHI

CASE (Tariff) NO. 17 OF 2025

IN THE MATTER OF:

The Tata Power Company Limited .....Petitioner

-Versus-

Tata Steel Limited ...Respondent

AFFIDAVIT

I, Dilip Kumar, S/o Late Shri Tek Narayan Prasad, aged 41 years, R/o. Flat No. 119, Sector 56, Noida, 201301, presently at Noida, do hereby solemnly affirm and state as under:

1. That I am working as Group Head – Regulatory (Eastern Region) in The Tata Power Company Limited, the Petitioner in the above matter, and I am duly authorized and competent to swear and depose the present affidavit on behalf of Petitioner.

2. That the Petitioner has filed the MYT Petition, being case (Tariff) No. 17 of 2025 for the years FY 2026-27 to FY 2030-31 under section 61, 62, 64 and 86 of the Electricity Act, 2003 in accordance with JSERC (Terms and Conditions for Determination of Generation Tariff) Regulations, 2025; read with JSERC (Conduct of Business) Regulations, 2024 for sale of electricity from Unit # 2 & 3 (2x120 MW) of Jojobera Power Plant of the Petitioner - The Tata Power Co. Ltd. to Tata Steel Limited.

3. That the Hon'ble Jharkhand State Electricity Regulatory Commission (JSERC) has issued additional data requirement in the aforesaid Petition, vide letter dated 10.02.2026.

4. That I state that I have perused the accompanying additional information being submitted and the facts stated therein are true and correct to the best of my knowledge and information derived from the official record of the Petitioner, no part of the same is false and nothing material has been concealed therefrom.

The Tata Power Company Ltd. Noida

DEPONENT

NOTARY GOVT. OF INDIA
Karan Singh Kardam (Advocate) Reg. No. 19752

ATTESTED
Karan Singh Kardam
Notary Advocate
Reg. No. 19752
Govt. of India

14 FEB 2026

VERIFICIATION

I, the above-named Deponent, do hereby verify that the contents of this affidavit are true and correct to the best of my knowledge and information derived from the official record of the Petitioner, no part of it is false and nothing material has been concealed therefrom.

Verified at Noida on this _____ day of February, 2026.

Place: Noida

Date:

The Tata Power Company Ltd
Noida

DEPONENT

NOTARY
Karan Singh Kardam
(Advocate)
Reg. No. 19752
GOVT. OF INDIA

ATTESTED
Karan Singh Kardam
Notary Advocate
Reg. No. 19752
Govt. of India

14 FEB 2026