

BOKARO POWER SUPPLY CO. (P) LTD.

**HALL NO:- M-01, OLD ADMINISTRATIVE BUILDING,
ISPAT BHAVAN, BOKARO STEEL CITY – 827001**

**Reg. Office : Ispat Bhawan, Lodhi Road, New Delhi – 110 003
CIN:U40300DL2001PTC112074**

TENDER NOTICE NO.: BPSCL/MM/21-22/C-008/NIT-986/1131

Dated 15/04/2021



TENDER DOCUMENT

NAME OF WORK: Capital Repair & RLA of Turbo Generator # 2.

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Bokaro Power Supply Co. (P) Ltd.

(A Joint Venture of SAIL & DVC)
Hall No: - M-01, Old Administrative Building,
Ispat Bhavan, Bokaro Steel City – 827001
Reg. Office : Ispat Bhawan, Lodhi Road, New Delhi – 110 003
CIN:U40300DL2001PTC112074

NOTICE INVITING TENDER

NIT No. : BPSCL/MM/21-22/C-008/NIT-986/1131

Date: 15/04/2021

For and on behalf of BOKARO POWER SUPPLY COMPANY (P) LTD, sealed tenders in two parts, **Part - A :** Earnest Money Deposit and **Part- B :** Technical & Commercial Offer with copy of system generated acknowledgement-slip for online submission of sealed price are invited from the bidders meeting the eligibility and qualifying criteria stipulated in the bidding documents for the following work at our Power Plant.

Description of Work	Capital Repair & RLA of Turbo Generator # 2.
Estimated Cost (in Indian Rs.)	Rs.2,03,94,843.00 (Rupees Two Crore Three Lakh Ninety Four Thousand Eight Hundred Forty Three Only) Excluding GST.
Earnest Money (in Indian Rs.)	Rs. 1,00,000.00 (Rupees One Lakh) only
Period of Contract	Work Order will be valid for One (01) Year from the date of issue. Completion Period : 35 days (from stopping of barring gear to again putting the machine on barring gear after its capital repair) Mobilization Period : 21 days from date of intimation
Last Date & Time of submission of Tender	14/05/2021 at 12:00 Hrs. (IST)
Bid opening Date & Time	14/05/2021 at 12:15 Hrs.

Qualifying Requirements / Eligibility Criteria :

Financial Capability:

- Bidder should have Minimum average annual turnover (MAT) of **Rs. 61.18 Lakhs** in preceding three (03) Consecutive Financial years.
 - Average annual turnover shall be determined taking into consideration turnover of preceding three consecutive financial years. Other income shall not be considered for arriving at annual turnover.
 - Audited annual accounts along with auditor's report of the bidder should be furnished in support of the same. Where audited annual account is not mandatory as per the law, the bidder has to submit annual financial turnover during the consecutive last three (03) years, ending 31st March of the previous financial year duly certified by CA.

Technical Capability:

- Bidder should have experience of having completed **similar work** in India in any Public Sector Undertaking / Government / Semi Government organization or joint venture thereof / Company registered under Companies Act during last 7 years ending last day of month previous to the one in which offers are invited. Value of such work order shall be either of the following :
 - Three similar completed works each costing not less than to **Rs. 81.57 Lakhs**
OR
 - Two similar completed works each costing not less than to **Rs. 101.97 Lakhs**
OR
 - One similar completed work costing not less than to **Rs. 163.15 Lakhs**

Similar Work means: Work of overhauling / Capital repair of Turbo Generator of Capacity 55MW or above. The scope of work should include Turbine as well as Generator.

The overhauled / repaired turbo-generator shall be in operation for at least 6 months after commissioning. The firm needs to submit documentary evidence in support of the same.

- Completed Work means the executed/completed portion of Work Order/AMC/RC, even if the work has not been completed in totality (subject to furnishing proof of executed value of work in the form of certified copies of RA Bills) along with successful work execution certificate (by the concerned authority)
- The bidder must submit Satisfactory Work Execution / Completion Certificate(s) for the work (s) for which copy (copies) of work order (s) is (are) being submitted as given above issued by the competent authority.

4. In support of their eligibility and experience, the bidder is required to submit self attested photo copies of work orders & completion certificates (by the concerned competent authority) along with the techno-commercial bid. In addition, bidder shall submit a self declaration as per format at **Annexure-VI**.
5. Credentials of having experience as Sub-contractor will not be considered.
6. The bidder shall submit self certified copies of the following:-
IT Return (*Latest*), Copy of EPF, ESI Certificate, Partnership Deed / Affidavit for Proprietorship / Memorandum & Articles of Association, including changes in the Constitution of the Firm, (if any) and Copy of GST registration certificate).
7. The bidder shall submit acceptance for finalization of rates through Reverse Auction as per **Annexure**.

General Terms & Conditions:

1. Offer shall be accompanied with Earnest Money Deposit (EMD) in the form of Demand Draft / Pay Orders / Bankers Cheque Payable at Bokaro Steel City or Bank Guarantee having validity for one (01) year, from any Nationalized Bank / Scheduled Bank except Co-operative Bank drawn in favour of **Bokaro Power Supply Company (P) Ltd.** as per format available at our website: www.bpscl.com. Earnest Money can also be deposited online in our account through NEFT/RTGS/SWIFT/TT Remittance, details of which are given below. The proof of such transfer shall be submitted with the offer in the envelope titled "Earnest Money Deposit".

Banker Details as under:

Name of Bank	:	STATE BANK OF INDIA
Branch Name	:	SME BRANCH, Sector 4, Bokaro Steel City
Bank Account No.	:	35665021458
IFSC Code	:	SBIN0004231
Bank A/c Type	:	Current Account

In case of forfeiture of EMD by BPSCL, you will be required to reimburse the applicable GST to BPSCL.

2. In place of EMD, Bidders shall have the option of submitting a Bid Securing Declaration on their firm's letter head accepting that if they withdraw / modify their Bids during the period of validity without assigning any valid reason for the same or refuse to submit Performance Security / Performance Guarantee as per the relevant Clause of this tender enquiry or refuse to accept the price quoted by them in Online Price Bid / Reversed Auction within the period of validity of the same or refuse to sign the Contract Agreement upon emerging as the successful bidder, they will be suspended for a period of one year from being eligible to submit bids against tender enquiries of BPSCL. A Format of Bid Securing Declaration is provided at **Annexure X**.
3. However, Micro & Small Enterprises (MSEs) / PSU /Govt. Undertakings and Co-operative societies will be exempted from submission of Earnest Money as per government policy. For MSEs, the exemption from submitting Earnest Money will be granted only on submission of valid copy of Udyam Registration Certificate. SSI/NSIC certificate holders should also submit Udyam Registration Certificate. Further, unit claiming exemption is required to submit copy of Udyam registration certificate clearly indicating the item category for which they are registered.
4. **Offers not accompanied with Earnest Money Deposit (EMD) (as per clause 1) or Bid Security Declaration (as per clause 2) or documents for exemption (as per clause 3) will be treated as INVALID.**
5. Consortium bids will not be considered unless the provision for consortium is specifically mentioned in Tender Document.
6. If you withdraw your bid after opening of bids without giving any satisfactory and acceptable explanation thereof, you shall be debarred from participating in any tender of BPSCL for a minimum period of 01 (one) year and your Earnest Money will be forfeited.
7. **SUBMISSION OF PERFORMANCE GUARANTEE BOND FOR QUOTING UNWORKABLE RATE:**
If you quote unworkable rates, i.e. if the quoted price is less than **75%** of the estimated price and is considered for placement of order, you will be asked to justify the rate quoted. On non acceptance of justification / refusal of the same, you will be asked to furnish Performance Guarantee Bond in the form of Bank Draft/Bank Guarantee. The amount of Performance Guarantee Bond will be equal to the difference between **75%** of estimated price and your quoted price. In case you refuse to give Performance Guarantee Bond, your Earnest

Money will be forfeited and you will not be considered for participating in any kind of Tender for next 01 (one) year from the date of issue of letter to you, if order / contract is not finalised from the present tender.

In case of forfeiture of Performance Guarantee Bond, you shall be required to reimburse the applicable GST to BPSCL.

8. **Handling of Earnest Money:**

- Earnest Money will be refunded to the un-successful bidder after determination of L1 Bidder and no interest will be paid upon the same. You are requested to provide Bank Details for refund of EMD.

9. **RATE FINALIZATION**: BPSCL reserves the right to finalize the rate through either of the following modes:

- a. Opening of Online Price (*submitted on www.buyjunction.in*) submitted at the time of techno-commercial bid.
- b. Through Reverse Auction to be conducted by our service provider **M/s. mjunction**.

Note: BPSCL may ask techno-commercially accepted bidders to submit decrement in percentage (%) on their online price submitted at the time of techno-commercial bid. On line price bid alongwith % decrement shall be considered together in case online price bid is opened.

10. **BPSCL reserves the right to :**

- a) Re-tender / extend the due date of submission of offer.
- b) Accept or reject any offer / all offers in full or part at any time at any stage without assigning any reasons and without any compensation thereof to the bidders.
- c) Modify the tender documents at any stage before the due date of tender.

Note:

1. Tender documents are to be downloaded from **Website: www.bpscl.com** only.
2. Bidders are requested to visit above website regularly for any addendum / corrigendum / extension till opening of the NIT. **Any such changes shall not be published through Press advt.**

For and on behalf of
Bokaro Power Supply Company (P) Limited

(A.K. Das)
GM I/c (MM)
Tel: 8986874119
Email: purchase.bpscl@gmail.com

Conditions & Rules to be observed in submitting Tenders**1.01 Manner of Submission of the Tender**

The tender shall be divided into 02 parts as follows:-

- a) **Part A:** This part shall comprise of EMD / proof of online submission of EMD.
- b) **Part B:** This part shall comprise of Technical and Commercial details, consent on terms & conditions of NIT/ signed Tender Document along with copy of SYSTEM GENERATED **ACKNOWLEDGEMENT-SLIP FOR ONLINE SUBMISSION OF SEALED PRICE*** bid etc.

Sealed Tender *through Regd. Post/Speed Post/In-person/Courier Service* only, in an envelope containing 02 (Two) separate sealed envelopes (*as mentioned above*) with NIT No. & date of opening along with Sender's Name & Address printed on it, is to be sent to the below mentioned address:

GM I/c (MM)
Bokaro Power Supply Co. (P) Ltd.
Hall No.M-01, Old ADM Building
Ispat Bhawan, Bokaro Steel City – 827001
Ph: 06452 240380, Mob: 8986874119

*** PROCESS FOR ONLINE SUBMISSION OF SEALED PRICE :**

1. Online sealed Price Bid (% above / % below) through URL : <http://www.buyjunction.in>

The process of submission of Online Price bid is as detailed hereunder-

Step 1: Type <http://www.buyjunction.in> in the internet explorer.

Step 2: Click on Login (present on Top right side of the Page)

Step 3: Click on **View Live Auctions and Tenders**.

Step 4: In the right side open/ global tenders link will be displayed.

Step 5: Click on the link for the above mentioned tender link present under Open tenders

Step 6: Click on new user if you are not registered in buyjunction earlier. Click on Existing user in-case you have already registered in buyjunction earlier. Existing users can login with their user id and password.

Please note foreign bidders are required to select their bidding currency from the drop down menu available before proceeding further (where ever applicable).

New Users:

Steps to get your **User ID** and **Password**

1. Click on the required tender link under “**Open Tenders**”
2. Choose your Auction currency in-case any option is coming to select currency. Click on “**New User**”
3. Fill up the “**Registration Form**” and click on “**Submit**”. All fields marked with (*) are mandatory fields.
4. On submitting the filled-up registration form, an auto generated email will be sent to the email address you have mentioned in the registration form containing your User ID and Password.
5. Changing of password on first login is compulsory.
6. On receipt of the User ID and Password you become an **Existing User**. Now follow the steps of existing user to login to the auction site.

Existing Users

1. Click on the required tender link under “**Open Tender**”
2. Click on “**Existing User**”.
3. Log in with your existing user id and password for placing your bid.
4. Read through the “**Bidding Procedure**” to proceed further for bidding.

Bidding Procedure

After logging in with your user id and password you have to accept the “**Auction Terms**”.

Steps to accept the “Auction terms”:

1. Click on “**Auction Terms**”.

2. Then click on “**View term without DSC**”
3. Click on the relevant auction terms appearing under “**Term**” column.
4. Select the check box on the left-side of the relevant auction terms.
5. Click on the button besides “**Accept**”.
6. Then click on “**Submit**”.
7. A message will be displayed to you mentioning your acceptance to terms for auction.
8. It is mandatory to accept the terms of online bidding in order to proceed for submission of bid.

Steps to Submit Price Bid

1. Click on “**Bids.**”
2. Then click on “**Live Auction.**”
3. Put your login password as transaction password
4. Select the auction id and click on add to watch list.
5. Now the bidding screen is visible.

6a. For Template Bidding

1. Click on **Icon “T”** on left column of bidding screen (Which will appear separately **for each lot**).
2. A template form will open where you need to fill up the price & click on evaluate at the bottom
3. If you want to quote the evaluated price then click on “**confirm**”.
4. After clicking on the confirm button of the template window, your price will appear in the “**New Bid**” box.

6b. For Non-Template Bidding

1. Fill your Price in the “**New Bid Box**” visible on the bidding screen.
2. Select the check box at the extreme left of the bidding screen
3. Click on “**Submit**” button placed at the bottom left of the screen.
4. Bid once placed will have to be honoured.
5. You will see “**Bid Accepted**” in the “**Result**” column. This indicates that your bid is accepted and registered in the system.

Steps to take a print-out of the receipt

1. Once you have placed your bid, to download Bid Receipt, kindly click on “**Download**”.
2. Then click on “**Bid Receipt for Open Tender**”.
3. Select the auction to generate receipt.
4. Take print out of the same market-wise (Term List)/ item-wise (Auction list).

Note: For any clarification on the bidding process please contact

Mr. Anjan Buda- 9163348263 - anjan.buda1@mjunction.in

Ms. Debalina Maity - 8336991451 - maity.debalina@mjunction.in

Ms. Bingyasini Pradhan – 9163348173 – pradhan.bingyasini@mjunction.in

Ms. Priyanka Muzumdar – mazumdar.priyanka@mjunction.in

Mr. Mukesh Kumar Singh- 8873002741 – mukesh.singh@mjunction.in

A copy of System generated **acknowledgement-slip** for Online submission of sealed price bid is to be submitted along with Techno-commercial Bid.

1.02 Tender Validity Period

Validity of the offer shall be **Four (04) months** from the bid opening date. In case of extension of "Bid Submission Date", the validity will be counted from the extended bid opening date.

1.03 General Instructions:

- i) You shall have to quote price in any of the two options given below:

Percentage ABOVE with respect to Total Estimated Cost excluding GST
OR

Percentage BELOW with respect to Total Estimated Cost excluding GST

- a) If you do not quote price in terms of percentage or quote in more than one option, your offer will be rejected.
- b) In the tender schedule at the place where you have to quote PERCENTAGE, ‘**above**’ will mean mathematically **positive** and ‘**below**’ will mean **negative**.

- c) The Lowest-1 (L-1) Bidder will be the one whose PERCENTAGE is mathematically lowest and all other Bidders will be ranked/termed as Lowest-2 (L-2), Lowest-3 (L-3) and so on, in the increasing order of PERCENTAGE quoted by them.
- ii) You are requested to visit site for actual assessment of the job before submission of offer.
- iii) You shall clearly indicate that your quoted prices shall remain firm in all respects till execution of the work order.
- iv) Any conditional offer or offer having deviations is liable to be rejected.
- v) You have to submit Tender document bearing your signature and seal on all the pages along with Techno-Commercial Offer / consent on NIT's Terms & Condition. Otherwise, it will be presumed that you do not accept our terms and conditions and this may lead to rejection of your offer forfeiting your claims if any.
- You are advised to mention page no. on each page of documents submitted by you. BPSCL shall not bear any responsibility in case of any loss of documents submitted by the bidder during tender opening or thereafter.
- vi) If you are a Firm or Company, then you shall, in the forwarding letter, mention the number and names of all the partners & shall sign before submitting the same, unless the Power of Attorney holder has specifically been authorized in this respect.
- vii) Price or any indication of price shall **NOT** be mentioned in the Techno-Commercial Bid.
- viii) The sealed tenders received will be opened on scheduled opening date and time in the office of Material Management, in presence of such bidders who might choose to witness the same
- ix) In case the date of tender opening happens to be holiday, the tender will be opened on the next working day at the same time.
- x) Communication regarding date of Opening of Price-Bid shall be displayed on the Notice board of Material Management Department and individual communication to the techno-commercially eligible bidders will be sent only to their e-mail address given in the tender documents.
- xi) Offers from two or more bidders shall summarily be rejected if they have any of the following parameters in common:
- a) Same PAN
 - b) Same GST Number
 - c) Same Postal address
 - d) Same E-mail ID
 - e) Same Mobile number
 - f) Same person signing in more than one offer/representing more than one bidder.
- xii) BPSCL reserves the right either to reject any/all the tenders without assigning any reason thereof.

GENERAL TERMS AND CONDITIONS

1. You are requested to visit site for actual assessment of the job before submitting of your offer.
2. You shall make yourself fully conversant with the actual site condition, nature of subject job(s) to be executed and terms and conditions of contract, cost of all the input materials and facilities, cost of labor, transport, incidentals, royalties etc. or any other taxes and duties before submitting the tender.
3. You will have to arrange necessary Gate Passes for your workmen.
4. You will have to deploy proper category of manpower for execution of the job.
5. You have to comply with all labor laws, ESI Act, EPF rules & AWA rules applicable in the Industry.
6. You will have to strictly adhere to the provision of various labor laws including Payment of Bonus Act 1965.
7. **Payment Default Clause:** You must ensure that payment is made to the workers as per provisions of Payment of Wages Act and CLC norms failing which BPSCL shall make payments to concerned workers directly. The amount so paid along with 15% of Administrative cum Service charge shall be deducted from any of the concerned Contractor's bill. If the provision of Payment of Wages Act is not adhered to second time, the Contractor shall be liable for banning of business dealing with BPSCL as per procedure in Vogue. Such Contractor shall not be permitted to work in BPSCL through sub-contracting also for the banning period.
8. **You have to pay your workmen as per circular / notification published by the State Government in regard to rates of payment of VDA in vogue.**
9. You will have to pay an additional amount of **Rs.4/-** to every worker engaged by you for the subject work over and above their daily minimum wages, as per BPSCL rules.
10. **AWA CLAUSE:** You shall have to pay an amount of Rs 96.15 per day on actual attendance per month (not exceeding Rs 2500/month) to the workers engaged by you in this job as Additional Welfare Amenity (AWA) as per relevant circular/notification of BPSCL.
11. You shall execute the work in compliance with the provisions of contract and contract Technical Specification and/or design drawings furnished by BPSCL in terms of the contract and as per codes and standards specified therein, wherever applicable.
12. Supervision of the work is your responsibility. Inspection of executed work will be done by Site Engineer/BPSCL.
13. If situation demands, you will have to execute the work round the clock.
14. After completion of work, Engineer-in-charge or his representative will review the work(s), you will have to rectify any defect, if found, at no extra cost.
15. You shall remove all debris, surplus materials, etc., if any, and dump the same at place as directed by the Engineer-in-charge.
16. All the applicable taxes will be deducted from your bills.
17. During contract period there will be no consideration for idle & escalation charges.
18. You will be fully responsible for any sort of unsafe activity of your workmen and all your workmen should be trained for operational safety and to avoid fire hazards of Power Plant and must have proper safety certificates issued by BPSCL before start of work.
19. You will have to follow and observe the safety & statutory requirements and comply with all safety rules & regulations applicable in the plant area as per Booklet of Safety rules for BPSCL contractors. If you are not having that booklet, same may be collected from the safety department with a request letter.
20. For working at height, you shall produce medical fitness certificate for your workmen. Height passes to be obtained from safety department, if required.
21. All the working tools & tackles, men, material etc. and safety appliances like personal protection equipment are to be provided to your workmen by you at your own cost. All safety appliances of reputed make are to be provided by you to your workmen in presence of Safety Officer of BPSCL. The list and make of safety appliances may be obtained from safety office.
22. In case any documents/information submitted by you are found to be false or containing any misrepresentation or having any fraudulent declaration in it then in such eventuality EMD will be forfeited and legal action (including cancellation of contract, banning of business dealing, criminal proceedings etc.) as deemed fit may be initiated by BPSCL against you.
23. **GST RELATED CLAUSES:**
 - a. You should quote GST as extra. If not mentioned in offer it will be considered as extra.
 - b. You have to pass on the tax benefit/savings, if any, on account of output taxes to BPSCL.

- c. You shall agree to do all things not limited to providing GST invoices or other documentation as per GST Law relating to the above Services, payment of taxes, timely filing of valid statutory returns for the tax period on the Goods and Service Tax Portal etc. that may be necessary to match the invoice on GSTN common portal and enable BPSCL to claim input tax credit in relation to any GST payable under this agreement or in respect of any part under this agreement.
 - d. In case the Input Tax Credit of GST is denied or demand is recovered from BPSCL on account of any non-compliance by you, including non-payment of GST charged and recovered, you shall indemnify BPSCL in respect of all claims of tax, penalty and/or interest, loss, damage, costs, expenses and liability that may arise due to such non-compliance. Further, in case of any differential tax liability on account of any wrong classification/valuation etc. by you, BPSCL will not be liable to reimburse any part of such differential tax, interest, penalty etc. It will be your responsibility to discharge appropriate taxes, as applicable.
 - e. You have to maintain high GST compliance rating track record at any given point of time.
24. **Banning of Business Dealings:** On arising of any situation or occurrence of any event as mentioned in Clause 6 of the Guidelines on Banning of Business Dealings, you shall be liable for action under and in accordance with the aforementioned Guidelines. The “Guidelines on Banning of Business Dealings” shall form part of the Tender/Contract and can be viewed on our website www.bpscl.com.
25. **RISK AND COST:** Failure on your part to start the work within reasonable time/ the progress of the job is poor/ for any breach of contract will entail termination of the Contract. In such an event, the job will be executed at your risk and cost by alternate arrangements.
26. **SAFETY CLAUSE:** You shall be liable for penalties mentioned below for violation of safety norms:
- i. Up to Rs.5000/-by Head of safety Engineering Department /Head of the Department where work is being done for 1st violation of safety norm, non-use of PPEs (Personal Protective Equipment) like safety shoes, hand gloves, safety helmets, goggles etc. as per work requirements by You or your workers. This condition is applicable in case of violations of Road Safety norms also.
 - ii. Fine up to Rs. 20,000/- on 2nd Violation as mentioned in clause (i) above
 - iii. You shall be debarred for one year / deregistered from taking up further contractual work in BPSCL from the date of issue of debarring / deregistering order on 3rd violation as mentioned in clause no. (i) above.
 - iv. Fine up to Rs. 10,000/- for violation in use of Full Body Harness by you or your worker for working at height (above 1.8 meter from immediate floor).
 - v. Fine Rs. 25,000/- (minimum) to Rs. 50,000/- (Maximum) for serious injuries and disabilities caused by violations as mentioned in Clause No. (i) and (iv) above.
 - vi. Independent of the above, You shall be fined Rs. 1,00,000/- (1 Lakh) or more and debarred / deregistered from taking up further contractual work in BPSCL from the date of issue of debarring / deregistering order in case any Fatal accident occurs due to violations as mentioned in Clause (i) and (iv) above.
27. **FORCE MAJEURE:** You shall not be considered in default if delay occurs due to causes beyond your control such as acts of God, natural calamities, civil wars fire, strike, frost, floods, riot and acts of unsurpassed power. Only those causes which have duration of more than seven days shall be considered in force majeure clause. In the event of delay due to such cause the delivery / completion period will be extended for a length of time equal to the period of force majeure without imposition of LD at the option of BPSCL.
28. **Work accident**
- a. You will be fully responsible for the safety of the workers employed by you. In the event of any work-accident, major or minor, your representative must take care of the injured person immediately and provide him the required treatment as suggested by the doctor. If you or your representative is not available for medical care, the injured worker will be treated in Bokaro General Hospital and the cost of treatment will be recovered from you.
 - b. You shall be fully responsible for making payment of compensation to your own workmen in respect of any accident or injury occurring to them. BPSCL will in no way be responsible for it and will remain indemnified against all such claims of compensation in such cases.
29. **You shall also maintain all records/register/return/cards such as:**
- i) Register of workmen employed by contractor
 - ii) Employment card
 - iii) Muster Roll
 - iv) Register of wages-cum-muster roll
 - v) Submission of Return
 - vi) Order book

Scope of Work:**PART-1 : CAPITAL REPAIR OF TURBINE & GENERATOR (with their AUXILIARIES)****A. Turbine (Capacity- 55MW, Make- LMZ, Russia)**

1. Recording of all relevant operational parameters before stopping.
2. Removal of thermal insulation of the turbine components and pipelines (about 5m length).
3. Barricading of the working area and shifting of all T&P & storing it properly on TG floor.
4. Opening of front pedestal cover and removal of all governing system items. Recording of turbine float, bump, seal bores etc .for reference
5. Removal of the barring gear and bearing top covers.
6. Hot loosening of the HP parting plane bolts and cap nuts, wherever necessary cap nuts and studs are to be cut only after the instruction of engineer in charge. Machine & operator should reach site well in advance so that there is no delay due to its non availability.
7. Lifting of top casing.
8. Taking the Rotor run out, checking swing, taking seal bore, alignment reading. Bearing top half removal, alignment reading, decoupling of Turbine & Generator rotor.
9. Checking bearing interferences and oil clearance, seal clearance, repairing of the bearing pedestal load bearing areas as per need.
10. Checking of journal slopes & pedestal slope.
11. Checking of steam flow path clearance & float of the rotor.
12. Removal of thrust pad.
13. Removal of rotor.
14. Removal of top & bottom liners and diaphragms, repair/ replacement of the same. Recording the thermal clearances of the top diaphragms/casing.
15. Cleaning of rotor diaphragms, Liners, gland seal boxes by alumina blasting/manual
16. Cleaning of the parting plane and checking of thermal distortion of the parting planes. Repairing (*to the extent required in consultation with the engineer in charge*) of casing, lining diaphragms, seal boxes by proper welding and blue matching.
17. Cleaning of all the components including, rotor, diaphragm, seal boxes, liners etc to be done by alumina blasting process/ manually with consent of the Engineer-In-charge.
18. Replacement of the nozzle segments of the cylinder, Dye penetration testing of casing and nozzle box areas, Diaphragms, carriers, Gland of the turbine are to be carried out by contractor.
All grinding and welding of cracks (*detected during overhauling*) to be carried out by contractor as per OEM standards. If any defect is noticed the same is to be rectified/ replaced as per OEM standards at no extra cost. Any specialized welder, welding rod, flux and welding Engineer required for this purpose will be arranged by Contractor. Preheating and stress relieving required will be carried out by contractor at no extra cost.
19. All the internal threads in casings, bearing pedestals and bearing covers are to be tapped by same size taps and damaged threads are to be drilled and higher size tapping is to be done, any dowels or locating pins if required are to be reamed to new sizes and to be replaced. All taps and drilling machines are to be arranged by Contractor.
20. Seal bore readings are to be corrected wherever feasible. Efforts should be made to ensure that the position of the bearing bottoms are concentric to the centre line of the casing and seal bore readings are to be recorded after completion of the alignment.
21. Removal of the generator rotor. Removal of bearings, repair/ replacement of all the bearings after the DPT and Ultrasonic testing and readjustment of the bearing clearances as per standard values and re- assembly.
22. Testing of all the bearings by VI, DPT, and UT and replacement of the defective ones and readjustment of the bearing clearances as per standard values and reassembly. Alignment of rotors and finalizing the positioning of the bearings.
23. Cleaning and lubrication of the sliding surfaces of the front pedestal for improving free sliding over the key. Ensuring the sliding ability of the same and carry out the repairs if any needed for the same. Clearance recording for MOP and necessary repair or replacements of bearings as per need.
24. Replacement after inspection of the thrust bearing if required. Assembly of the thrust bearing checking/adjustment of the float.
25. Centering of all the diaphragms and internals. Sealing ring adjustment by new one or old one is to be done as per OEM standards. Thermal clearance of diaphragms with carrier's bottom and top casing is to be done. For this all grinding and welding required is to be done by contractor. Repair/Replacement of damaged diaphragms by new one, cleaning of exhaust hood sprays nozzles are also to be done by contractor.
26. Check/ adjust steam flow path clearances, axial float, seal clearances, and thermal clearances. Machining jobs required for this purpose is to be done by contractor. Welding and matching (of diaphragms, gland boxes liners

- etc.) to be done by the contractor. If new seals are fitted in the diaphragms, the clearances of the same are to be adjusted by the contractor.
27. CRO, Bump/swing check of the rotors.
 28. Replacement of the parting plane fasteners wherever necessary, boxing up of the top & bottom casings and tightening of the fasteners.
 29. The external surfaces of the casings are to be thoroughly cleaned and then painted with heat resistant Aluminum paint. The paint will be supplied by contractor.
 30. Checking the final alignment with normal level in the hot well and C.W pumps in service and making the final corrections. Checking the bearing interference and corrections to be done.
 31. Reaming of the coupling holes and coupling the rotors by fixing new/ old coupling bolts as is necessary. If any sleeve is to be fitted in any coupling hole then it is in contractor's scope. The machining of the coupling bolts and sleeve will be undertaken by BPSCL.
 32. Preparation for oil flushing and then normalizing of the bearings after oil flushing. For the purpose of oil flushing, if some of the bearings are required to be bypassed/blanked al arrangements for the same to be done by the contractor and necessary de blanking after flushing.
 33. Assembly of the cross over pipelines and the leak off and the sealing steam lines. Rectification of any defects during the rolling or on barring gear or during over speed testing pertaining to the workmanship of contractor as per the instruction of Engineer- in – Charge.
 34. Trim balancing of the rotor system (In situ balancing).
 35. Contractor has to bring **three nos.** of experienced EOT crane operators (*who has handled same type of job in power plant 55 MW and above*) for operation of 2 x 100/20 Ton EOT cranes at BPSCL for the duration of the overhaul (*From the start of the overhaul to the commissioning*). As this job is very critical; most experienced persons are to be deployed with full responsibility of contractor. However maintenance of EOT crane will be done by BPSCL, but before start of job it will be the operator's duty to check the healthiness of crane. In case of any fault/ abnormality Engineer-In- charge should be informed and crane work should be stopped immediately.
 36. Spare Turbine bearings (*Bearing no.1 to 4 along with bearing of MOP*) would be inspected with DPT, MPI and UT by Contractor's expert, along with Turbine Maintenance team of BPSCL for any defect, well in advance (*Up to one month approx.- The date will be informed to the contractor by Engineer- In – Charge*) of overhauling. All consumables and machines are to be arranged by Contractor. Healthiness of the bearings shall be reported to BPSCL.
 37. Oil guard portion of the rotor is to be machined by Contractor as per the manufacturer's norms, if found uneven/worn out.
 38. Inspection/Repair of vertical joint of the HP turbine casing by suitable method to prevent leakage of steam from this joint.
 39. Cleaning of all the components of turbine like rotors, diaphragms, liners etc required for RLA and repair/replacement of same after RLA as per Manufacturer's norms.
 40. Overhauling of the barring gear. (complete dismantling, component repair/replacement, as per norms and re-assembly)
 41. Overhauling & refurbishment of the governing system along with CVSM, MOP, control valves of HP with operating mechanism, cam shafts, ESVs and barring gear. Lapping and blue matching of the ESV and Control Valves are to be done. The liners and valve internals of the ESV, control valves and other components of the governing system and CVSM are to be replaced as per requirement. Checking and adjustments of the Governing characteristic.
 42. Shifting of the spares to the site from the store and shifting of the unused material and scrap from site to the scrap yard or to stores.
 43. Any rerouting/modification of pipe lines/ flanges at turbine floor, directly connected to the turbine are required to be done, if found necessary.
 44. As soon as the turbine cylinders are opened, all the steam, extraction and drain lines are to be plugged with wooden plugs/sheet metal and kept in place till the time of box-up to avoid any ingress of foreign materials into the connected pipelines.
 45. After overhauling, when the turbine is rolled and loaded, the turbine should run with normal TSI parameters (*Including the bearing vibrations*). It should be ensured that there is no leakage of steam from the parting plane of the turbine or other connecting joints. The contractor shall be at site at least for 72 hrs, after synchronization of machine to attend any defect.
 46. This scope of work is indicative but not exhaustive and all the allied works necessary for successful completion of above work during normal overhaul are deemed to have been included in the scope of work and the contractor is responsible for carrying out the same without any extra cost to BPSCL.

B. .TURBINE AUXILIARIES:

1. Oil System: -

- a) Removal of oil from MOT, oil coolers, seal oil cooler, transferring to drums supplied, in proper way and keeping them in a safe place for reconditioning.
- b) Dismantling, cleaning of oil coolers (1 no. seal oil coolers & 4 nos. oil cooler) tube bundle by nylon brush, hydraulic test of the coolers at a pressure of 1.25 times of the rated Pressure. Plugging, re-placement as per instruction of Engineer In-charge.
- c) Re-visioning of the valves which includes tightness testing, proper matching of discs and seat and if required replacement of the same.
- d) Cleaning of MOT and its filters.
- e) Inspection and rectification of any defect of the oil injector.
- f) Assistance in refilling of oil to the MOT.
- g) Changing all existing oil gaskets, cleaning all oil lines. If any pipe line is found thin or damaged, then replacement is to be done as per norms. IBR quality welder is to be arranged by the contractor. Servicing of the oil system valves and their hydro test is to be done. All the lines and valves are to be painted.

2. Oil Pumps :-

- a) Dismantling, re-visioning and reassembly of starting oil pump (01 No), main oil pump, A/C & D/C oil pump (02 Nos.) and seal oil pump (0 2Nos.) along with motor.
- b) Damaged or worn out components to be repaired by welding, grinding, polishing as per the instruction of Engineer Incharge.
- c) Re-visioning of pump components, cleaning, run out checking of shaft and coupling, repair coupling , coupling bolts and coupling bush.
- d) Removal and placement of motor, coupled trial run for 72 Hrs.

3. Seal Oil System :-

- a) Re-visioning of differential pressure Regulars, revising of all the valves associated to seal oil system.
- b) Adjustment of pressure relief valve. Overhauling of seal oil pumps.
- c) Cleaning of seal oil tanks and re-visioning of valves, level controller, level switches, filters and gauge glasses.
- d) Replacement of gaskets of all the associated flanges.
- e) Replacement of damaged impulse lines.
- f) Overhauling of H₂ venting fans.

4. LP Heater, gland steam cooler, ejector, drain cooler :-

- a) Dismantling of cooler bundle.
- b) Cleaning & hydraulic test at 1.25times the rated Pressure.
- c) Plugging of the leaking tube. If required, replacements of tube bundle as per the instruction of Engineer Incharge.
- d) Cleaning, re-visioning of g/glasses, inlet & outlet valves, level switches & associated valve. Replacement of gasket, rubber & washers.

5. Pumps:-CEP (2 nos.):-

- a) Dismantling of the pumps & motor.
- b) Rotor, run out checking.
- c) Building up of the damaged impeller, bearing housing, and worn-out parts if required by welding, grinding and finishing as per the instruction of Engineer Incharge.
- d) Removal of the suction filter, cleaning and box up.
- e) Cleaning/ replacement of the cooling line and sealing line valves.
- f) Assembly and replacement of coupling bushes.
- g) Alignment and trial run for 72hrs at full load.
- h) Inspection and revising of NRV, suction & discharge valve, replacement of worn-out parts. Blue matching of disc & seal.

6. Gas Cooler lift Pumps (02 Nos.):-

- a) Dismantling of the pump & motor removal.
- b) Rotor, run-out checking.
- c) Assembly of the pump, replacement of coupling bush.
- d) Motor placement, alignment and coupling.
- e) Inspection of NRV, inlet & outlet valve, blue matching of disc & seat, replacement of worn out parts if required metal building up and finishing.
- f) Dismantling & cleaning of 02 Nos. of line filter. Replacement of damaged parts.

C. TURBINE'S VALVES, PIPES & SUPPORTS

1. Turbine ESV:

- a) Dismantling of the servomotor and its components. Cleaning & checking for their healthiness and minor repair/ replacement of damaged components.
- b) Dismantling of ESV. Cleaning of the seat & disc.
- c) Proper lapping & blue matching of seat & disc.
- d) Checking of the studs for thermal elongation.
- e) Run out checking of the ESV spindle.
- f) Assembly & boxing up.
- g) Adjustment for proper lightness of ESV as per OEM norms.
- h) Characteristic setting of ESV as per OEM norms.

2. NRV Extraction:-

- a) Dismantling of servomotor & valves, L/S etc.
- b) Lapping of valve & disc. Blue matching.
- c) Revising of servomotor.
- d) Assembly and operation checking for tightness and indication.

3. Valves:-

- a) Revising of all the valves along with gearboxes NRVS. ($\text{Ø}150$ to $\text{Ø}600$) – 10nos, ($\text{Ø}25$ – $\text{Ø}100$) – 40 nos. which will comprise of dismantling, lapping & blue matching of disc and seats. Repair of worn out parts by welding & finishing with suitable electrodes as far as possible. Replacement of gland packing and associated gaskets. Hydraulic tests of each valve at 1.25 times the rated Pressure.
Damaged valves to be replaced as per the instruction of Engineer In-charge.
- b) Dismantling and revising of the level & Pressure Control valves (06 Nos.).

4. Pipes :-

- a) Replacement of high pressure pipe line (NB 15 to NB 20) – about 100meters (joints approx. 30 Nos.)
- b) Replacement of low pressure pipe line (NB 50 to $\text{Ø}100$) – 50 meters (joints approx. 20).
- c) Replacement of low pressure pipe line ($\text{Ø}100$ to 300) – 30 meters. (joints approx. 15)

The high Pressure Pipes are to be welded by TIG welding by certified high Pressure Welder and Contractor has to submit the certificate before start of job. All joints should be of radiographic quality and UST/ Gamma ray of joints will be carried out by Contractor on random basic as per the Engineer Incharge's discussion. The Contractor will assist to carry out these tests.

For low Pressure Lines arc welding will be allowed but Contractor should engage welder and gas cutter having at *least working experience of 5years of the similar nature*.

5. Springs & Supports:-

- a) Inspection of the springs & Supports of steam lines, condenser, extraction lines.
- b) Repair / replacement of damaged components.
- c) Fixing of brackets and other accessories properly by welding /bolting.
- d) Adjustment of the spring as per the OEM norms/instruction of engineer in charge.

6. Insulation:-

- a. Complete replacement of top/ bottom casing insulation and corresponding cross over/ leak off pipes re-insulation by spray insulation method with proper density (*up to a lead of 10meters*). All cladding over the insulation as required.
- b. Drain lines and replica test places by proper thermal insulation.
- c. Plastering and nonflammable painting of the insulation of turbine.
- d. Repair and fixing of cladding covers of turbine which will include changing of part of the frame, sheeting etc.

D. Generator / Auxiliaries

1. Recording stator/ rotor IR/PI values before disassembly.
2. Removal and restoration of measuring instruments.
3. Disconnection of the slip ring cables, removal of brush rocker cover/assembly. Check healthiness of current carrying bolts.
4. Removal of slip ring Brush gear.
5. Alignment readings at 2.0 bar air pressure.
6. Breaking of oil seal of Generator.
7. Dismantling of generator rotor diffuser.
8. Dismantling of top cover of bearings Nos. – 3 & 4.
9. Removal of top end covers from both sides.
10. Logging of air gap
11. Removal of fan blades of TG rotor.
12. Hanging of Generator for removal of bearing No. – 3 & 4.
13. Threading out of Generator rotor with rail, plate & roller.
14. Inspection of overhang spacers/tying of winding.
15. Cleaning & replacement of putty & re-insulation of terminal bushing. Confirm healthiness and tightness of flexible connections.
16. Inspection of core clamping /wedge mapping & re- wedging wherever necessary and necessary repair/ replacement to strengthen them.
17. Cleaning and Varnishing of stator and rotor.
18. Thread in of rotor.
19. Placing of main bearings, fixing of end covers & seal bearings & setting in position (if needed new bearings will be provided by BPSCL).
20. Servicing of all hydrogen gas valves, gas coolers water line valves, replacement of all flange gasket, of seal oil & hydrogen line for the entire system. Replacement of valves and erection of new valve as per requirement.
21. Re-visioning of RTDs connection of Generator for Cu temperature, Fe temperature, Hot and Cold gas temperature.
22. Box up of generator and seal restoration.
23. Leakage test to be carried out throughout the hydrogen system before Co₂ filling purging air out.
24. Cutting & Polishing of slip rings and measurement of the slip ring dia before and after polishing. Slip ring groove depth to be measured and groove to be deepened by special lathe if required.
25. Removal & dismantling of all gas coolers, cleaning of gas coolers tubes, hydro-jet cleaning of coolers hydraulic test, painting of coolers, cleaning of gas cooler ducts.
26. Hydraulic test of Gas cooler tubes as per OEM recommendation.
27. Erection/ placement of all gas coolers in position after over hauling.
28. Brush gear cable reconnection & assembly of brush gear to be done after over hauling. Replacement of all brushes, adjustment of spring tension and checking of proper seating of new brushes
29. Improvement of Pedestal insulation resistance. Check healthiness of insulation washers and insulating sleeves of pedestal foundation bolts. Replace if cracked/damaged.

30. Servicing of hydrogen drier. Replacement of silica gel. Re-visioning / replacement of hydrogen and seal oil system valves.
31. Servicing of hydraulic seal oil tank, buffer tank.
32. Servicing of DPR, seal oil filters.
33. Air tightness test of Generator and complete system to be carried out and immediate re-arresting of any leakage.
34. Re-insulation & sealing of CC Bolt (both inner & outer) in case of leakage if any. Gasket & sealing materials to be supplied by the party.
35. Assembly of seal oil & lube oil pipe lines to be done.
36. Air tightness test of Generator & its gas system pipe lines and all other components of gas system after final assembly to be carried out.
37. Following tests are to be carried out on Stator:
 - (a) IR & PI measurement.
 - (b) DC winding resistance measurement.
 - (c) Tan delta and capacitance measurement.
 - (d) Partial discharge / corona probe test.
 - (e) Computerized digital ELCID test.
 - (f) DC step voltage / leakage current test.
 - (g) RTD element check.
 - (h) Natural frequency test on end winding.
38. Following tests are to be carried out on Rotor:
 - (a) IR & PI measurement.
 - (b) DC winding resistance measurement.
 - (c) AC impedance measurement.
 - (d) Digital RSO test.
 - (e) Pole drop test / voltage balance test.
 - (f) Leak test of rotor (after inspection of current carrying bolts).
 - (g) N.D.T. of necessary places on rotors.

E. COMMISSIONING

- a) Oil flushing and leakage rectification.
- b) Help in re-fixing of turbovisory sensors, all temperature measuring sensors of turbine casing, front pedestal and generator stator.
- c) Assistance in rolling & trim balancing at optimum level.
- d) Stabilization at Full load/ maximum load for 72 hours.

PART-2: RLA OF TURBINE & GENERATOR

The scope of work is restricted to the **R.L.A. and condition assessment** of main Turbine Type – K-50-90-4, Make –LMZ, Russia (Turbo Generator#2), **its Auxiliaries and Generator**. The Contractor shall employ latest and all necessary methodology for the execution of job.

A. List of equipment covered is as following.

1. TURBINE

1.1. Main casing (top and bottom)

- a) Parting planes
- b) Nozzle boxes
- c) Curtis chamber groove
- d) Liner/Diaphragm grooves
- e) Parting plane bolts/grooves
- f) Extraction pipes
- g) Cross over pipes
- h) H.P. control/ stop valves
- i) Condenser
- j) Governing system

1.2. Rotor

- a) Boroscopic hole checking
- b) Blades
- c) Blade roots (last two stages)
- d) Curtis stage collar
- e) Bearings/ journal
- f) Gland seals collars
- g) Oil seal journal
- h) Natural frequency test of blades (Last two stages)

1.3. Auxiliaries

- a) Steam pipes 100 ata / 540⁰C
- b) Steam pipes bends/T joints
- c) Hanger supports and springs. Weld joints of hanger supports
- d) Condenser
- e) LP Heaters

2. GENERATOR 2.1.Stator

- a) Windings
- b) Core Laminations
- c) Wedges
- d) Bushings

2.2. Rotor

- a) Retaining rings
- b) Current carrying bolts
- c) Windings
- d) Bearing journals

2.3. Auxiliaries

- a) Carbon brush gear
- b) Hydrogen gas coolers
- c) Seal oil system
- d) Bearings of seal oil and main

B. DESCRIPTION OF JOB:

1. Contractor shall generate required/ additional data for the study, from the control room log sheets / history books of customer regarding major failures, modification done on equipments and any significant abnormalities. The Contractor shall compare the present data with the rated values for assessing the present status. Vibration measurement and signature analysis should be done as part of condition assessment.
2. Contractor shall observe the machine in running condition after capital repair (*as at present the machine is already under shutdown*) to evaluate the deficiencies from rated value, behavior of machine. Contractor has to study the present supports system of pipe lines.
3. After the disassembly of the Turbine/Generator Contractor shall do detailed study of all individual components as required to assess general condition /extent of damages/deviation from design values. These should be properly recorded and intimated for further course of action.

C. TEST PROCEDURES:

1. **NON DESTRUCTIVE TESTS:** This includes all tests like U.T., D.P.T., M.P.I, Metallography, Eddy current test, Hardness, Chemical analysis etc.
2. **DESTRUCTIVE TESTS:** This includes deposit chemical analysis test of condenser tube and deposits on turbine rotor & stator blades
3. **VISUAL INSPECTIONS:** This includes physical examination of parts for cracks/ bulges/ breakages/ erosion/corrosion/ pitting etc. All /any deposits found during above inspection should be sent for Chemical analysis. All external inspection defects should be supported by photographs clearly indicating the defective area. Boroscopic inspection for Steam line before E.S.V. should be done for detecting internal cracks/deposits.

D. Residual Life Assessment/ Condition Assessment for Turbine

R.L.A. of all the parts in detail as per mentioned scope through the above mentioned procedures should be done to assess the remaining life span of the equipment. Number of points selected for testing should be as mutually agreed upon and selection of points should be so to assess the condition. The various inspection procedures at different points are as following.

SI. No.	Region/component	Tests to be done (detail given at note)	No. of points
1.	Turbine internals		
	Parting plane of turbine casings	1,3,5,6,	As needed
	Liners	1,3,5,6,	5
	Diaphragms	1,3,5,6,	15
	Gland boxes	1,3,6,7	3
	Liners/ Diaphragm grooves	1,3,4	8
	Parting plane studs and cap nuts	1,4,6,7	24
	Nozzle box	1,3,5,6	3
	Extraction lines joints	1,2,8	6
	Keys and keyways	1,4	6
2.	Rotor		
	Surface	1,3,7,10,11	As needed
	Moving blades	1,3,12(last two stage)	As needed
	Shrouds	1,3,4	As needed
	Blade roots	1,3 (last two stage)	As needed
	Rotor bore	1,13	1
	Journal	1,2,4,7	3
	Curties disc	1,3,5,11	4
	Stellited portions	1,4	As needed
	Coupling bolts, sleeves and nuts	1,2,6,7	12
3.	Valves (E.S.V. and H.P. control valve)		
	Valve chamber	1,3,4,5,6,	5
	Valve cone	1,2,4	5
	Spindle	1,2,4	5
	Seat	1,4	5
	Studs and cap nuts	1,4,6,7	20
4.	Pipe lines		
	Crossover pipes	1,2,3,5,6,7,8,	12
	Pipe after valve 215	1,4,5,6,7,8	2
	T joint before C.Vs.	1,4,5,6,7,8	8
	Leak off steam line	1,4,5,6,7	6
5.	Auxiliaries		
	Journal bearings/ Pedestal & Bearing Housings	1,2,4,7	6
	Condenser tubes	9,11	5000
	Condenser shell	1,4,8	10
	Support springs	1	10
6.	Pipes Hanger supports		
	Pipes Hanger supports	1	10

7.	HP Heaters	1,2,4,8	1000
8.	LP Heaters , Gland steam cooler, ejectors	1,2,8,9	300

Note:

1. Number of points for **INSITU METALLOGRAPHY** checking is approx. 60 nos. Locations to be mutually agreed upon.
2. All the tests mentioned ABOVE are not exhaustive. Any other test needed for successful evaluation of R.L.A. has to be done by the Contractor within the same cost. (*RLA of generator rotor retaining ring and overhang is excluded.*)

3. Detail of Tests:

- | | |
|------------|---------------------------|
| 1. V.I | VISUAL INSPECTION |
| 2. U.T | ULTRASONIC TESTING |
| 3. M.P.I. | MAGNETIC PARTICLE TESTING |
| 4. L.P. | LIQUID PENETRANT TEST |
| 5. I.M. | INSITU METALLOGRAPHY |
| 6. H.M. | HARDNESS MEASUREMENT |
| 7. D.M. | DIMENSIONAL MEASUREMENT |
| 8. T.M. | THICKNESS MEASUREMENT |
| 9. E.C.T. | EDDY CURRENT TESTING |
| 10. S.A. | STRESS ANALYSIS |
| 11. C.A. | CHEMICAL ANALYSIS |
| 12. N.F.T. | NATURAL FREQUENCY TEST |
| 13. B.I. | BOROSCOPIC INSPECTION |

Residual Life Assessment / Condition Assessment for Generator

HOT ANALYSIS:

During operation of Turbo Generator at different operating conditions various parameters for life assessment calculations need to be noted by you, like

- Rotor, stator winding and core temperatures
- Measurement of rotor shaft voltage.
- Shaft bearing vibration analysis along with generator casing vibration analysis etc.
- Generator loss in % of output.

COLD ANALYSIS:

A. STATOR

1. Visual inspection and photographs of parts, over heating signs if any.
2. Stator laminations checkings (core compactness).
3. Stator wedges tightness checks.
4. End winding supports
5. Elcid test
6. Tan Delta test, stator capacitance measurement, Dielectric loss etc.
7. Stator winding insulation resistance checking and leakage current checks.
8. Stator winding resistance measurements.
9. High voltage test of stator winding.
10. Partial Discharge test.

B. Rotor:

1. Visual inspection and photographic evidence, overheating signs if any.
2. U.T of retaining rings , and all other parts like journals, collars and seal surfaces.
3. Hardness, M.P.I. and D.P. of slip rings of brush gear.
4. Tightness test of end leads.

5. Rotor winding resistance measurements & inter turn short circuit testing by surge comparison method (RSO).
6. Rotor winding insulation measurements & leakage current measurements.
7. Checking of brush gear insulation brush holder, surface, spring testion
8. Journal brgs. like main and seal system checks for cracks improper adhesion and deformity of babbitt metal. seal bearing & oil catchers
9. Bearing housing and supports U.T& D.P.T.
10. Brgs supports insulation checking.
11. Hydrogen coolers chemical analysis of deposits in the tubes.

All the tests mentioned above are not exhaustive. Any other test needed for successful evaluation of R.L.A. has to be done by contractor at no extra cost to BPSCL.

STANDARDS TO FOLLOW

1. ASME Power test code for turbine – PTC 6 S
2. ASME Power test code for steam condenser – PTC 12.2
3. ASME PTC 12.1 or heat exchangers
4. ASME – B 31.1 – 1995 POWER PIPING
5. ASNT –SNT-TC-1A Qualification and certification of NDT
6. **Personnel :**
 - ASTM E – 165 Test method for penetrant examinations
 - ASTM E-709 Standard guide for magnetic particle examination
 - ASTM A –275/A-275M Standard for M.P.E of steel forgings
 - ASTM E –114 Standard for pulse echo straight beam ultrasonic exam by contract method
 - ASTM E –587 Standard angle beam ultrasonic test by contract method
 - ASTM A-418 Practices for ultrasonic test for turbine /generator rotor forgings
 - ASTM E-1158 Standard guide for material selection and fabrication of reference blocks for the pulsed longitudinal wave ultrasonic exam of metals and metal alloy production material.
 - ASTM E-804 Calibration of ultrasonic test system by extra flat bottom hole Sizes.
 - ASTM E-164 Standard for ultrasonic test of weldings
 - ASTM E-7797 Standard for testing thickness by pulse echo method
 - ASTM E-309 Practices for Eddy current exam of steel tubular products using magnetic saturation
 - ASTM E-1030 Standard for radiographic test of metal castings
 - ASTM E-3032 Standard for radiographic test of WELDINGS
 - ASTM E-1351 Standard for production and evaluation of field metallographic replicas
 - ASTM E- 45 Standard practice for determining inclusion content of steel
 - ASTM E-112 Test method for determining average grain size

- ASTM E – 139 Practices for conducting creep, creep rupture and stress rupture tests of metallic materials
 - ASTM E- 1444 Standard for magnetic particle examination
 - ASTM A-472 Test methods for head stability of steam turbine shafts and rotor forgings
7. IEC 34 for rotating electrical machine code
 8. VDE 0530 for rotating electrical machine code
 9. BSS 4999 for rotating electrical machine code
 10. BS 2757 for classification of insulating material

INPUTS BY BPSCL (Free of Cost)

1. All the spares of the machine including supply of special screws & fasteners etc.
2. All the special T& P as provided by manufacturer.
3. Stator wedges, under wedge packers, materials required for re-braiding.
4. All scaffolding materials like sleepers, wooden planks, pipes etc. and fabrication fixture materials like steel channel, angles & plates etc., are required at site for the job.
5. Availability of EOT cranes in operating condition.
6. Workshop facility.
7. Truck/Crane/Hydra etc. as & when required for in plant transportation of turbine internals for machining at different workshop.
8. Adequate lightening, low pressure air supply points, power supply points and water supply points nearby the working area.

TO BE PROVIDED BY THE BIDDER.

- a) All consumables, special or ordinary like Molykote, Hylomer, Stag – B, Silicone sealants, Rustolene, Different type of gasket, SS shim, Metallic and Nonmetallic gland packing, All Rubber Parts, Coupling bushes etc. as required for commission of the m/c.
- b) All necessary equipment including air compressor and accessories for alumina blasting for cleaning of rotor and internals. The equipment including the high pressure piping, air compressor, consumable items required for alumina blasting are to be arranged by the contractor. The material required for erecting the tents will be arranged by the contractor.
- c) Induction heating equipment for bolt heating during casing opening & again during assembly.
- d) All electrodes for welding. In case of special purpose, electrodes for critical jobs it should have consent of E.I.C. as well as supported by the documentary certificate of O.E.M.
- e) E.O.T. crane operators
- f) All tools and tackles, safety items for work men.
- g) All N.D.T. kits, consumables and personnel.
- h) Special Consumables for generator like silicon rubber cord of different sizes and required quantity, rubber sheet, dendrite, Cork sheet and all other consumable as required for commission of the machine.
- i) All instruments, consumables and other accessories required to carry out the job for electrical testing of generator.
- j) All materials, consumables and equipments required for insulation and spray paintings.

SPECIAL TERMS & CONDITIONS:

1. Contractor has to submit bar / PERT chart for schedule from receipt of permit to final commissioning date before start of work for approval by BPSCL.
2. Contractor's tools and tackles, slings and all lifting tackles will have valid test certificates issued by competent persons as approved by Chief Inspector of factories, Government of Jharkhand. These certificates are to be produced before Engineer in charge before start of job.
3. Contractor will have to arrange lodging, boarding and local transporting facilities for his entire team at his own cost.
4. All tools, tackles necessary for execution of the job has to be arranged by contractor.
5. Contractor has to deploy persons every day including holidays & Sundays, whenever necessary extra man power has to be deployed.
6. Job has to be executed round the clock.
7. Defects found due to poor workmanship have to be liquidated by contractor at no extra cost.
8. For working at height, height passes have to be obtained from safety department.
9. **Guarantee Clause:** Guarantee period for the repaired work shall be 06 months from date of commissioning after repair.
10. All safety procedures, standards for the workmen, equipment have to be adhered to by contractor the party as per norms.
11. Transportation of items from site stores, gantry area and disposal of scrap to a distance of 200 meters is contractor's responsibility.
12. Any additional work not specifically mentioned in scope of work but felt essential for commissioning of the machine shall be carried out by contractor at additional price mutually agreed upon.

13. Reports to be Submitted :

1. Evaluation of present condition & operation data.
2. Recommendation to run/ repair/ replace for T.G. Components. Recommendation for R&M for the unit for betterment and capacity enhancement.
3. All the collected technical data of equipment/ components.
4. Comparative graph/ details for present and rated values/ parameters.
5. All test reports (NDT, visual or any destructive) as per standards clearly correlating components and its exact location.
6. Various data collected for equipment in running condition and in disassembled condition.
7. Chemical analysis of all the varieties of scales, deposits collected.
8. Report for recommendations regarding items to be replaced immediately, within 03 years and within 06 years. For this, you should submit supporting documents and photographs, Root cause analysis reports etc. Preliminary report should be submitted immediately.
(All the above in hard and soft copy format in 03 sets.)
9. Final comprehensive report in 03 copies (hard copy) & 1 soft copy within 03 month after work completion.

14. Payment Terms :**a. For Capital Repair :**

- i. **80%** of the contract value to be paid after putting the machine on turning gear after Capital Repair duly certified by Engineer in – charge.
- ii. **17%** of the contract value will be paid on achieving full load for 72 hours after commissioning.
- iii. **03%** of contract value to be retained as security deposit, which is to be released upon successful completion of guarantee period of 6 months.

b. For RLA :

- i. 100% of the contract value to be paid after submission of final RLA report.

The expression satisfactory execution of the order shall mean fulfillment of all obligations arising out of and in connection with the Contract. In case of default in satisfactory execution of the order, the security deposit shall be forfeited.

Amount of penalty and/or Liquidated Damages imposed (if any) will be recovered from Bill / Security Deposit. If the amount of Bill / Security Deposit is not sufficient, the bidder will be required to pay the balance amount to BPSCL. If you do not pay the balance amount, the same shall be deducted from any sum or sums which may be due or may become due to you from BPSCL on any account whatsoever.

15. PENALTY CLAUSES:

Sl. No.	Description of Violation	Amount Per Violation
1	If job is not started within 21 days from date of intimation.	Rs.5,000.00 per day delay .
2	Poor job quality	Rs. 25,000.00 per instance.
3	If work is delayed beyond contractual period of 35 days.	Rs. 20,000.00 per day of delay.

PRICE BID / RA FORMAT

Special Instruction –

1. In the event of L1 Bidder backing out prior to placement of order, in addition to forfeiture of EMD, the bidder shall be suspended for a period of 01 (one) year from the date of issue of suspension order.
2. Breakup (*as per given format*) shall be submitted by the L1 bidder. In case of refusal of L1 bidder to submit the same, EMD will be forfeited and the bidder shall be suspended for a period of 01 (one) year from the date of issue of suspension order.
3. **Price Basis: L1 bidder will be decided on mathematically lowest percentage.**

Sl. No.	Description of Job	Qty.	Total Estimated Cost (excluding GST)	To be quoted by Bidder
1.	Capital Repair & RLA of Turbo Generator # 2. (As per Scope of work)	01 Unit	Rs. 2,03,94,843.00 (Rupees Two Crore Three Lakh Ninety Four Thousand Eight Hundred Forty Three Only) Excluding GST.	Online Price Bid (% above / % below with respect to Total Estimated Cost excluding GST) through URL : http://www.buyjunction.in

Note:

1. Goods & Service Tax: EXTRA as applicable
2. Please provide following details :

1.	GSTIN	
2.	Service Accounting Code No.	
3.	Applicable GST Rate	
	CGST (in %)	
	SGST (in %)	
	IGST (in %)	

PRICE BREAK-UP FORMAT

Sl. No	Description of work	Qty.	Amount (Rs.)
1.A	Capital Repair of Turbo Generator #2 (as per scope of work).	01 Unit	
1.B	RLA of Turbo Generator # 2 (as per scope of work).	01 Unit	

Signature with seal of tenderer

Self Declaration

I.....son/daughter of Shri Aged.....
years

resident ofPS.....District.....State.....do
hereby declare that:

1. I am the authorized representative and signatory of M/s.....
(name of the firm/company).

2. All document(s) submitted/ information provided by M/s.....
alongwith the

Bid Document submitted against Tender No.....

.....dated

- for.....
..... (
Name of work) has/have been submitted under my knowledge and are authentic , genuine and true. No
part of the document(s) / information is false, forged or fabricated.

3. The above declaration in respect of genuineness of the documents/ information has been made having
full knowledge of provisions of bidding conditions which entitle the Owner/BPSCL to initiate action in
the event of such declaration turning out to be a false.

4. I undertake to produce all documents in original for verification as and when asked for the same by
BPSCL.

(Name & Signature of Authorized person):.....

Designation:.....

ANNEXURE - VII

CHECKLIST TO BE FILLED BY BIDDER EXCEPT REMARKS:- All documents which are required for fulfillment of the qualifying requirement/ Eligibility criteria are to be submitted along with tender in serial order (clearly mention page no.) and the tenderer must fill the checklist.

CHECKLIST OF DOCUMENT SUBMITTED BY TENDERER

Sl. No.	Document	Page No.	Remarks by BPSCL
1.	Work Order		
2.	Completion Certificate		
3.	Partnership/ Proprietor		
4.	EPF		
5.	ESIC		
6.	Latest ITR		
7.	* GSTIN		
8.	Turnover/ PL Sheet		
*If the agency is not under the preview of GST then please write Not applicable (N.A.).			
Total numbers of pages in Techno-commercial Bid			

Signature of tenderer with seal

(To be submitted on bidder's Letter Head)

Format for Acceptance of General Terms & Conditions, Commercial Terms and all other Terms of the Reverse Auction

We _____ (Contractor Name) having

PAN _____ & registered office at _____ (Address)

agree to all the Commercial, General & other Terms & Conditions listed in the

NIT No. _____ dated _____

for the work of _____

(Name of work) through Reverse Auction.

We confirm that we are in a position to do the job as per the scope of work given in NIT/RFQ. We agree to participate in the Reverse Auction and abide by the rules.

We nominate an executive, whose details are given below, to put the bids on our behalf.

The details of the person authorized to bid on our behalf is as follows.

Name & Designation :

E-mail ID :

Contact phone nos. :

Address :

(Signature & Seal)

Place :

Date :

Format for submitting last quoted prices*(To be submitted on Company Letter Head of the Bidder)***(To be sent within 30 mins of conclusion of the Reverse Auction)**

To,

mjunction services limited
 1st Floor, Tata Centre
 43, Jawaharlal Nehru Road
 Kolkata – 700 071

Fax: 033 – 2288 3279**Ref: Reverse Auction forfor Bokaro Power Supply Co. (P) Ltd. held on**

Reference above, we hereby confirm our Market wise last quoted prices in the Reverse Auction held on forfor Bokaro Power Supply Co. (P) Ltd., Bokaro Steel City.

Market No.	Last Quoted Percentage
	<i>To be submitted by the L-1 Bidder only after finalization of RA</i>

We also confirm that we will submit item wise price break-up, within two working days from the date of Reverse Auction.

Signature :

Name :

Designation :

Date :

Format for Bid Securing Declaration (In lieu of EMD)

Date: _____

Tender Enquiry no.: _____

To
The GM In-charge (Material Management)
Bokaro Power Supply Company (P) Ltd.
Hall No. – M 01
Old Administrative Building
ISPAT Bhawan, Bokaro Steel City

I/We*, the undersigned, declare that:

I/We* understand that, according to your conditions, bids must be supported by a Bid-Securing Declaration in lieu of Earnest Money Deposit.

I/We* understand that if I/We* withdraw or modify my / our* Bids during the period of validity, or if I am /We are* awarded the Contract and I/We* fail to honour my /our* offer by way of either withdrawing my / our* bid within the bid validity period without assigning any valid reason for the same or refusing to submit Performance Security / Performance Guarantee as per relevant Clause of the tender enquiry or refusing to accept the price quoted by me / us* in Online Price Bid or Reverse Auction within the period of validity of the same or refusing to sign the Contract Agreement, I/We* will be suspended for a period of one year from being eligible to submit Bids for all future Contracts.

I/We* understand that this Bid Securing Declaration shall cease to be valid if I am / We are* not the successful Bidder and I am / We are* not awarded the Order against the tender enquiry.

Signed _____ in the capacity of _____

Name: _____

Duly authorized to sign the Bid for and on behalf of: _____

Dated on _____ day of _____, _____

Corporate Seal (where applicable)

[Note: In case of a Joint Venture, the Bid Securing Declaration must be in the name of all partners to the Joint Venture that submits the Bid.]

* *Please delete as appropriate*

ENVIRONMENT, HEALTH AND SAFETY**EHS (Environment, Health and Safety) Clause for contracts where overall site is under BPSCL control****Your Responsibilities**

You shall during the entire term of contract undertake to perform the following obligations relating to environment, health and safety:-

1. Ensure that your workforce is not exposed to asbestos or asbestos containing atmosphere.
2. Take suitable control measures to ensure that the workers are protected from dust emission.
3. Monitor and ensure that the working area is free from any toxic gas, vapour and fume. Take adequate measures to reduce level of concentration below permissible limit. Exposure to any particular toxic gas, vapour or fume shall not exceed the maximum permissible limit prescribed in local regulation for any particular period of time. Ensure adequate ventilation and no immediate danger to life and health of personnel working at site.
4. Ensure that there is no flammable atmosphere and uncontrolled fire hazard in and around the work place. In case it is required to work in flammable atmosphere, implement safe working procedure and suitable control measures in order to work safely.
5. Ensure that the workers are protected from excessive noise and heat. Take adequate measures to reduce noise/heat level below the permissible limit.
6. Ensure safe access and egress in and around work place. Ensure proper maintenance of platforms, staircases, ramps etc. special care and all safety measures should be taken while working at height. Roof work and access to roofs must not be undertaken without prior permit.
7. All Personal Protection Equipments supplied by you should be of internationally recognized standards. All tools and tackles bought by you for use during the contract period should have proper and valid certification by competent authority.
8. All lifting equipment, tools and accessories provided by BPSCL should be maintained and returned by you in sound condition after the completion of contract period.
9. Ensure that the illumination in and around workplace and access areas are maintained properly. Make sure to switch off the light, fan and air conditioners after use.
10. You must ensure that all machinery and equipment are provided with earth fault circuit breakers at all times when using electrical leads. Use of electrical tape for temporary repair is prohibited.
11. Guards and covers for equipment/machineries are to be provided where ever necessary.
12. Gas cylinders shall be securely stored, transported, identified and used in line with legislation and EHS requirements.
13. Fire extinguishers and other fire fighting equipments provided in different locations should never be misused.
14. You must ensure optimum use of water with minimum wastage.
15. You shall ensure that the work area is kept clean, tidy, & free from debris. You are also fully responsible for protection of ground and underground from pollution.
16. Identify and highlight potential hazards / risks existing.
17. Ensure suitable corrective actions are implemented for identified issues.
18. Provide adequate emergency and first-aid facilities and it should be available in all shifts.
19. All your workers should be trained and communicated about the onsite emergency and evacuation plan.
20. All equipments and plant should be maintained in safe condition.
21. You and your personnel admitted to site must conduct themselves in an orderly and safe manner and conform at all times to the EHS Requirements. Fighting, engaging in horseplay, being under the influence of or possessing alcohol or drugs, gambling, soliciting, stealing, immoral or otherwise undesirable conduct is not permitted and shall not be tolerated. Upon knowledge of such conduct, BPSCL shall exclude the concerned person from the site and take all other appropriate measures as deemed necessary. BPSCL reserves the right to perform random drug and alcohol tests.
22. You shall immediately notify BPSCL of any environmental incident, injury, illness, near-miss, unsafe condition or practice and any loss or damage to property, including incidents related to the your personnel. An investigation report assessing the root cause, corrective action, and preventative action shall be submitted by to BPSCL within 24-hours of the incident's occurrence.