

VOLUME-1A	Form No:	 PE&SD	BHARAT HEAVY ELECTRICALS LIMITED PROJECT ENGINEERING & SYSTEMS DIVISION	PEMC-07722
			TECHNICAL CONDITIONS OF CONTRACT	Rev. No. 00
			for FSR preparation in IGCC Plant by NLCIL	Page 1 of 9

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Refer Doc	PROPOSALS	PREPARED	CHECKED	APPROVED	DATE
		PROJECT ENGINEERING & SYSTEMS DIVISION Chintan Gajera	Vilas Reddy	K Srinivas	18.08.2023

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1.0. INTRODUCTION

1.1. A Lignite gasification-based 56 MW Integrated Gasification Combined Cycle (IGCC) Pilot Plant is proposed to be set up at Neyveli, using BHEL's in-house developed PFBG technology on an EPC basis as per MOU between BHEL & NLCIL.

1.2. The project is to be carried out by BHEL, based on the viability worked out in the Feasibility Study Report (FSR).

1.3. BHEL intends to engage a consultant for preparation the FSR.

2.0 LEGEND

NLCIL	NLC India Ltd (OWNER)
BHEL	Bharat Heavy Electricals Limited (EPC Contractor)
PE&SD	Project Engineering & Systems Division, Hyderabad, unit of BHEL
WO	Work Order
FSR	Feasibility Study Report
FSRC	Consultant for preparation of Feasibility Study Report
Bidder	Entity responding for this enquiry for award of FSR

3.0 PROJECT DETAILS

The Proposed Oxy-Enriched Lignite Gasification based Combined Cycle plant envisages the following major processes:

- Process of Lignite Gasification into Syngas
- Process of Syngas Cleanup
- Power Generation process

Based on these three processes, the following are the major sub-systems of the project:

- Gasifier Island
- Syn Gas Clean-up System
- Steam & Power Generation
- Balance Of Plant

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Scope of Supply

A) Gasifier Island:

- i. PFB Gasifier
- ii. Air Compressors
- iii. Oxygen Generation plant
- iv. Loop Seal System
- v. O₂, Air & Syngas Heating System
- vi. Particulate Separation System (Cyclone Separators and filters)
- vii. Syngas Cooler
- viii. Flare System
- ix. Lignite Feeding System
- x. Lignite Handling System/Drying unit
 - a) Trough conveyors
 - b) Crusher House
 - c) Storage silo
 - d) Lignite feeding to Gasification Tower
 - e) Dust extraction system
 - f) Bucket elevators
 - g) Tandem Bucket elevator
- xi. Ash Extraction System
- xii. Ash Handling System
 - a) Bed ash from bottom ash hopper to silo
 - b) Fly Ash from fly ash hopper to silo
 - c) Pneumatic conveying System
 - d) Ash Silo

B) Syngas Cleanup Unit:

- i. Gas to Gas Heat Exchangers
- ii. Coolers
- iii. Venturi scrubber
- iv. Water wash system
- v. High-pressure circulating pumps

C) Power Generation Unit:

- i. Gas Turbine Generator & Its Aux.
- ii. HRSG & Its Aux.
- iii. Steam Turbine Generator & Its Aux.
- iv. Condenser
- v. BFP, CEP, etc.
- vi. Deaerator
- vii. Chemical Dosing System (HP & LP)

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D) Balance of Plant:

- i. Water System
 - a. Clarified Water Storage
 - b. DM Plant
 - c. Potable / service water system
- ii. Cooling Water System
 - a. CW system for STG condenser
 - b. ACW to Plant Auxiliaries
 - c. Closed cycle CW system for GTGs auxiliaries(DM Closed Circuit)
 - d. Cooling Tower with CW & ACW Pumps
 - e. CW Treatment System
- iii. Fire Detection & Protection System
- iv. Compressed Air system (IA & SA)
- v. Gas Compressor System(for Back Wash of Filter system)
- vi. Nitrogen Generation System
- vii. Air Conditioning & Ventilation System
- viii. Effluent Collection system
- ix. Material Handling System like EOT, HOT, etc.
- x. Oily Effluent Treatment System
- xi. Chemical Waste Treatment System
- xii. Water Waste Treatment System
- xiii. Sewage Treatment System
- xiv. Solid waste disposal
- xv. Effluent treatment

The land required is expected as 1.5 Lakh sq. m. (400 m x 360 m) – excluding lignite storage area.

Exact Area of land required to be worked out by FSRC, including future facilities like Hydrogen generation & CCUS.

Site geological data will be furnished after finalization of location.

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4.0 SCOPE OF WORK OF FSRC

4.1 FSRC shall prepare a ***detailed FSR*** to cover ***following aspects as minimum:***

- i. Project Location (selection from different locations indicated by NLCIL)
- ii. Connectivity
- iii. Climate Analysis
- iv. Market Analysis
- v. Project Facilities & Description
- vi. Optimum Capacity & Technology Options
- vii. Process Description
- viii. Raw Material and Utilities
- ix. Project Implementation Plan
- x. Man Power Requirement & Time Schedule
- xi. Environment Management Plan
- xii. Project Financials, Cash Flows
- xiii. Cost of Power Generation
- xiv. Financial & Sensitivity Analysis
- xv. Risks & Mitigation
- xvi. Critical Analysis on Selling Price of Power
- xvii. Strategic Recommendation
- xviii. Financial Statement
- xix. Project Schedule

and related Documents & Drawings

4.2 FSR shall have an accuracy of +/- 25% in BOM and cost

4.3 Bidder shall furnish along with offer, the methodology of carrying out Feasibility Study and the inputs required.

4.4 FSRC shall attend the Kick-Off Meeting at BHEL Hyderabad along with his team of working personnel and shall depute his personnel to BHEL-Hyderabad, Tiruchirapalli, New Delhi and NLCIL-Neyveli for collection of data

4.5 FSRC shall visit the site at Neyveli for evaluating on feasibility, suitability, ranking of shortlisted locations for the project

4.6 FSRC shall explore the possibility of utilizing the existing facilities at NLCIL and appropriately incorporate in the report.

4.7 FSRC visit terms and condition.

- i. BHEL has considered 16 man visit (to and fro) and 32 man days (Boarding, Lodging & local transport/conveyance etc. and out office charge/fee) for sl.nos.4.5, 4.6 above.
- ii. In case additional man-visits are envisaged by FSRC, same shall be considered in their price for base offer, refer un-price bid format for details.
- iii. In case the work is completed with less than estimated man visits and man days same shall be short closed.
- iv. FSRC shall obtain prior approval from BHEL for persons being deputed along with their individual agenda, before commencing the tour.

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9.0 BID EVALUATION CRITERIA

9.1 The bid evaluation shall be on Lumpsum L1 basis. Refer the un-price bid format for details.

9.2 Accordingly, the Bidder shall quote the Price as per Price Bid Format.

9.3 Quotations submitted in partial will be summarily rejected. BHEL will not entertain any other expenses/ assumptions written separately elsewhere.

10.0 DELIVERABLES TO BE SUBMITTED

10.1 In general, it is expected that the FSRC shall maintain high standards of engineering, quality in deliverables submitted and accuracy in documentation submitted meeting the intended contractual requirements.

10.2 The list of deliverables to be submitted along with offer

10.3 The deliverables of FSRC shall be submitted to BHEL only, unless instructed otherwise.

10.4 BHEL will review the deliverables and furnish its observations, comments, if any to FSRC for their incorporation and resubmission to BHEL.

10.5 FSRC shall clarify, with all supporting details on any queries raised by BHEL, NLCIL on their deliverables

10.6 2 sets of hard copies and Soft copies are to be submitted at each stage.

11.0 PAYMENT TERMS & COMMERCIAL CONDITIONS:

11.1 **No Advance payment shall be done.**

11.2 **Payment Schedule:**

- a) 50% shall be paid, after furnishing of Draft Report by FSRC.
- b) 20% shall be paid, after furnishing of Final Report by FSRC subject to incorporation of all observation of BHEL in the final report.
- c) 30% shall be paid, after furnishing of acceptance of Final Report by BHEL/NLCIL, BHEL/NLCIL will furnish the acceptance of final report within one month from the date of submission of final report by consultant.

Note:

- a) Payment shall normally be released within 45 days from receipt of invoice with all supporting documents and certifications.
- b) FSRC visit claim to be raised along with above milestone payment schedule, 100% payment shall be released for visit claim as certified by BHEL engineer.

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11.3 Delivery Schedule/milestone completion schedule:

Delivery shall be within **16 weeks** from date of placement of work order/LOA.

Sl. No	Description	Period of completion of milestone	Remark
a	Kick-Off Meeting	within one week from the placement of work order/LOA.	Nil
b	Collection of inputs from BHEL, NLCIL including visit to site.	within 4 weeks from placement of work order/LOA.	BHEL/NLCIL will furnish the inputs within 1 week from the date of seeking of inputs by FSRC.
c	Submission of Draft Report on Feasibility study to BHEL.	within 10 weeks from placement of work order/LOA.	Comments on Draft Report will be furnished by BHEL, NLCIL within 2 weeks from submission.
d	Submission of Final Report on Feasibility study	within 16 weeks from placement of work order/LOA.	Nil

Note:

- Any delay by BHEL, NLCIL beyond one week in furnishing inputs (from first date of seeking inputs) will be attributable to BHEL.
- Any delay by BHEL, NLCIL in furnishing comments on Draft report/output deliverables beyond two weeks to FSRC shall be attributable to BHEL, NLCIL the calculation of Penalty/LD.

11.4 Penalty/LD Clause: Please refer the "General condition of contract" clause no.2.7.10.

12.0 OTHER CONDITIONS

- Since speedy completion of project is essential, it shall be responsibility of FSRC to ensure timely completion of all milestones.
- Bidder shall fully familiarize himself on the scope of work and may seek clarifications if required before submitting the bid. Incomplete and vague bids are liable for rejection
- BHEL shall not pay any amount, other than the fee specifically agreed, towards any cost incurred by FSRC by way of salaries to their employees (income and taxes), insurance of any nature,

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benefits/ bonus to the employees, etc. BHEL's liability is limited to the amount contracted for the services to be rendered under the scope of work defined.

- 12.4 FSRC shall not commit any expenditure on behalf of BHEL without BHEL's consent in writing, during the execution of the work defined in the scope.
- 12.5 FSRC shall bear all expenses/ fee penalties if it infringes on patents/ licenses of any persons/ organizations or in case of suits, court proceedings, damage claims etc., due to any reason whatsoever.
- 12.6 FSRC shall maintain at their own cost the personal accidents policy, life insurance and / or any such insurance required in respect of their personnel deputed to outstation visits for the given contract.
- 12.7 BHEL reserves the right to terminate or suspend the contract or withdraw part of the scope of the work at any stage of its execution, if it is found that FSRC has not met its obligation for the performance / progress is not up to the expected standards and overall work is likely to suffer. In such an event, BHEL shall give 14 days' notice in writing. In such case all costs incurred accordingly by BHEL to complete any work forming part of the contract shall be recovered from FSRC. In case of such premature termination of contract, BHEL reserves the right to claim damages from FSRC including the initiation of judicial proceedings.
- 12.8 FSRC shall keep all information/data/drawings etc. related to the work as confidential information and shall not divulge or use the information indirectly or directly in any way detrimental to the interest of BHEL. All drawings, documents, manuals, calculations including all originals prepared or obtained during the work shall remain the property of BHEL and shall be handed over to BHEL on demand.
- 12.9 FSRC shall comply with the laws and regulations of the country, the state and territories concerned, during the progress of the work.
- 12.10 FSRC shall submit progress report on the status of the work entrusted to them periodically and as mutually agreed upon.
- 12.11 FSRC shall ensure optimal & economic design while executing the work, but without sacrificing the customer requirements/ Statutory regulations/ code provisions/ safety aspects.
- 12.12 Termination of the contract can be initiated by BHEL or FSRC in following cases:
- Bankruptcy proceedings being initiated against either of the Parties
 - Mutual agreement between the "Parties"

RECORD OF REVISIONS

Rev	Date	Revision Details	Revised By	Checked By	Approved By
00	18.08.2023	First issue	Chintan Gajera	Vilas Reddy	K Srinivas