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1.0 INTRODUCTION


- 1.1 BHEL is seeking a qualified Licensor who meets the criteria outlined in clause 5.0 of this TCC. The selected Licensor will be **responsible for providing Licensor services and developing the Process Design for the SRU package during the proposal preparation phase. Additionally, the Licensor will conduct Basic Engineering, supply the proprietary catalyst for five years, review engineering documents, and provide training during the Post-order phase, if BHEL secures the order for LSTK-2 Package** of the Syngas Purification Unit at the Coal Gasification Plant owned by Bharat Coal Gasification and Chemicals Limited (BCGCL) in Lakhanpur, District Jharsuguda, Odisha, India. BHEL intends to submit a bid as the EPC contractor for this project.
- 1.2 The capacity of the SRU plant will be engineered and determined by the SRU Package Licensor, based on the feedstock supplied. The feedstock specifications will be designed by the LSTK-2 Licensor and shared with the SRU Package Licensor. The SRU plant is anticipated to have a nominal capacity of approximately 8 TPD, with a possible variation of $\pm 30\%$.
- 1.3 The intent of this TCC is to specify the minimum requirements of SRU package Licensor to be eligible to associate with BHEL for the subject job both for **Pre-Bid and Post-Order Basic Engineering** (if BHEL gets the order from BCGCL in above referred LSTK-2 Tender). This document provides details to be used as input by the bidders for submitting their competitive offer.

2.0 LEGEND

BCGCL	Bharat Coal Gasification and Chemicals Limited (OWNER)
BHEL	Bharat Heavy Electricals Limited (EPC Contractor)
PE&SD	Project Engineering & Systems Division, Hyderabad (unit of BHEL)
PMC	Project Management Consultant
BQC	Bidder Qualification Criteria
WO	Work Order
LOI	Letter of Intent
LSTK	Lumpsum Turnkey
BEDP	Basic Engineering & Design Procedure

3.0 PROJECT DETAILS

- 3.1 Coal India Limited (CIL) and Bharat Heavy Electricals Limited (BHEL) have formed a Joint Venture Company in the name of BHARAT COAL GASIFICATION AND CHEMICALS LIMITED, hereinafter also referred to as "OWNER" with its registered office at Bandhabahal Old PO Belpah, BIT Colony, MCL (In front, Bandhbahal Colony, Lakhanpur, Jharsuguda- 768211, Orissa).
- 3.2 Projects & Development India Ltd. (PDIL) has been appointed by OWNER for Preparation Detailed Feasibility Report (DFR) for setting up of High Ash coal-to-Ammonium Nitrate Plant at Lakhanpur area of Mahanadi Coalfields Limited, Jharsuguda district, Odisha

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- 3.3 Projects and Development India Limited (PDIL) on behalf of OWNER has invited eligible bidders to submit Bid for “Syngas Purification Plant” for Setting up of High Ash Coal to Ammonium Nitrate Plant at Lakhanpur area of Mahanadi Coalfields Limited, Jharsuguda district, Odisha on a Lump sum Turnkey (LSTK) basis on single point responsibility as per Technical Specifications, Commercial Conditions and details laid down in the NIT.
- 3.4 **BRIEF SCOPE OF LSTK CONTRACTOR’S(BHEL) WORK:** The Scope of work of the LSTK Contractor shall include License, Basic and detailed engineering, Procurement, Supply, Fabrication, Inspection by Third Party Inspection Agency (TPI) as applicable, Expediting, Route survey for Over Dimensional Consignments (ODCs), Insurance, Transportation of equipment / materials to work site, Storage, construction and erection of all civil, mechanical, electrical and instrumentation works, assembly and Installation, obtaining all necessary statutory approvals, Testing, Mechanical Completion, Pre-Commissioning, Commissioning, Sustained Load Test Run, Operator Training, Performance Guarantee Test Run (PGTR) including Total Project Management and handing over of the plants and facilities under contractor’s scope of work duly completed on single point responsibility basis.
- 3.5 **Sulphur Recovery Unit (SRU) & Sulphur Storage:** Recovery of Sulphur from H₂S generated in Acid Gas Removal Unit and transportation of liquid Sulphur to storage shall be in LSTK Contractor’s scope. LSTK Contractor shall construct the Sulphur storage area. Liquid Sulphur gets solidified during storing and same shall be dispatched through trucks by owner.

4.0 SCOPE OF WORK OF LICENSOR

- 4.1 **PRE-BID ENGINEERING:** Licensor to provide technical information for SRU package during the proposal preparation by BHEL.


Order for Pre-bid engineering shall be placed by BHEL on L-1 Bidder after reverse auction and /or price negotiation on the terms & conditions as per NIT. The following documents shall form part of the contract:

- Notice Inviting Tender
- This Technical Specification (relevant part for Pre-Bid Engineering order)
- General Conditions of Contract (Annexure-A)
- Special Conditions of Contract (Annexure-B)
- Price Bid for Pre-Bid Engineering

Scope for Pre-Bid Engineering:

SRU Package Licensor shall support BHEL comprehensively during pre-bid stage and enable BHEL to submit a competitive bid. The following shall be submitted as a minimum during pre-bid stage:

- Provide required minimum inputs/documentation indicated in **Annexure-1** to enable BHEL to quote for the tender.
- Technical inputs for the preparation of BHEL’s Offer and inputs for various FORMs/ Data to be submitted as part of Bidding Document Reference PC0288/E/001/P-II/ SEC-13.0.
- Detailed study of Owner’s tender documents. Preparation of Pre-Bid Queries/ Questionnaire for seeking clarifications from Owner/PMC on tender documents.


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- d) Support for the Preparation of comprehensive consolidated Technical Offer inclusive of Scope of Supply & Services/ Terminal Points/ Exclusions, Technical Deviations & Clarifications on tender specifications, Filled-up Technical Schedules etc. as required.
- e) Process/Thermal Design data for BHEL In-house Manufactured Equipment.
- f) Finalizing the optimized Performance Guarantees of the SRU package considering bid evaluation criteria of tender specification.
- g) Provide broad specifications/ technical data sheets of applicable equipment / systems etc. and suggest suitable/ probable sub-vendors/ agencies for obtaining the budgetary quotations during proposal stage.
- h) Support during proposal stage activities for the technical closure and acceptance of the bid including providing technical clarifications to Owner's queries, participation in pre-bid/ post bid-meetings as required.
- i) Re-Engineering in case of change in specifications or amendments issued by customer/ Process Licensor of Syngas Purification Unit shall be carried out by SRU Package Licensor at any stage during execution of pre-bid or Post order activities.
- j) SRU Package Licensor shall also furnish the suggested Price to be quoted for the subject tender considering expected Market Level Prices. However, the final decision and responsibility of pricing will be by BHEL.
- k) Specify all necessary catalysts and chemicals, along with their quantities & replacement periods, needed to operate the plant for 5 years.
- l) SRU Package Licensor shall submit the comprehensive list of deliverables in his offer during bidding.

4.2 POST ORDER LICENSE, ENGINEERING & SUPPLY: Licensor to make pre-bid tie-up with BHEL for License, transfer of Technical Information of SRU, Basic Engineering, Review of Engineering documents & Training for SRU package operation & "Supply of Catalyst"

Memorandum of Understanding (MoU) will be signed on non-judicial stamp paper of ~~Rs. 200/-~~ appropriate value by BHEL for Post-bid engineering support such as transfer of Technical Information of SRU, Basic Engineering, Review of Engineering documents & Training for SRU package operation, with L-1 Bidder after reverse auction and /or price negotiation after submission of Bid Bond for 1% value of the finalized price as per attached draft ([Annexure-4](#)). The MoU shall be converted into contract after BHEL wins the order from M/s BCGCL. BHEL will intimate the MoU partner for entering into the contract once the order is received from the customer. Two separate orders, a) Work order for Engineering services for Post Bid engineering and b) Purchase order for "Supply of Catalyst" shall be placed on MOU partner. The following documents (As per the details mentioned in draft MoU at [Annexure- 4](#)) shall form part of the contract:

- i. Notice Inviting Tender
- ii. This Technical Specification (relevant part for Post-Bid Engineering order)
- iii. General Conditions of Contract (Annexure-A)
- iv. Special Conditions of Contract (Annexure-B)
- v. Forms & Procedure
- vi. Price Bid pertaining to Post-Bid Engineering

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4.2.1 Supply of License and Know-How:

Licensors shall grant license to BHEL for operation of Syngas Purification plants.

4.2.2 Process Design and Basic Engineering:

For deliverables in the scope of SRU Package Licensors in Post-Order Stage, Licensors shall carry out Basic Engineering of **SRU package** as per “Drawings and documents” of Bidding Document Reference: PC-288/E001/Sec-9. The roles, responsibilities and scope of work of Licensors shall include the following, as a minimum, for the Basic Engineering Stage:

- Comprehensive study of Owner’s Tender documents and Preparation of Detailed Scope of Supply, including scheduling/ planning of the design activities, identifying and defining the basic engineering deliverables during contract stage execution.
- Carry out the Basic Engineering of process design as per **Clause 6.0, Customer Specification: PC0288/E/001/P-II/Sec-3.0**, including process design calculations, sizing data of various equipment and systems, finalizing process flow diagrams, P&IDs / Process Schematics, control and operation write-ups, process and electrical utility requirements, chemicals consumption requirements, O&M consumable requirements etc.
- Review of Mechanical and Electrical layouts (Plant/ Buildings/ Equipment/ Area/ Piping etc.).
- Review of Electrical and C&I engineering inputs such electrical load list, IO list etc.
- Review of Civil, Architectural and Structural engineering inputs such as equipment supports & loading details.
- Provide engineering support in getting the engineering documentation approved by Owner/ PMC, including participating in technical discussions with them as required.
- Assisting BHEL in review and approvals of engineering/technical, Quality related documentation of Sub-vendors/Suppliers, as applicable.
- Assistance in Preparation of Plant Performance Guarantee Test Procedure and in conducting the Plant Performance Guarantee Tests for SRU package.
- Finalize the requirements of O&M consumables & chemicals along with the BOM and technical specifications.
- Technical Support in Technical & Construction Audits
- Documentation for Statutory Approvals.
- Technical Support in Mechanical Completion, Pre-commissioning, Commissioning and PGTR.


4.2.3 Review of Detailed engineering documents:

Review of Detailed engineering documents for process compliance (list of such mandatory review documents shall be provided by Licensors).

4.2.4 Review of P&I Diagram:

Review of P & I Diagram after HAZOP/ HAZAN/ SIL Study.

4.2.5 Assistance:

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Assistance during Detailed Engineering, Procurement, Construction, Pre-commissioning, Commissioning and Performance Guarantee Test Run (PGTR).

4.2.6 Final checking:

Final Checking of the plants after Mechanical completion before start of Commissioning.

4.2.7 Support:

Support during advanced process control system implementation if necessary.

- 4.3 **SUPPLY OF PROPRIETARY CATALYST:** Package Licensor shall supply the proprietary catalyst required to run the plant for 5 years. Bidder shall indicate the quantities of Catalyst. Required inputs shall be provided by BHEL at least 10 days before opening of “Techno-commercial Bid”. The unit of quantities indicated as “1 Set” shall be changed to the Unit of Catalyst quantities which shall be provided by the bidder along with quantities. The total price of the item no. 2.3 calculated as per weightage provided there on shall be later split into the rate as per bidder’s unit and supply of catalyst shall be paid on actual supply of quantities.

To ensure performance guarantees by supplying the required proprietary catalyst for the SRU package.

- Supply the proprietary catalyst as specified, ensuring it meets performance requirements. Performance Guarantee: Guarantee that the catalyst will meet contract performance standards. Provide technical specifications and quantities for initial and replacement loads.
- Adhere to a delivery schedule aligned with project timelines. Manage packaging, transportation, and storage.
- Assist with catalyst installation and handling. Support performance monitoring and troubleshooting.
- Define replacement intervals and ensure availability. Offer maintenance instructions to extend catalyst life. Provide technical documentation and compliance certificates. Address changes in specifications as required.


Condition of catalyst.

Bidder to specify Item-wise information on catalysts used in their process as per pro-forma given below:

Type	Supplier	Loaded Volume	Expected Life (Only For Catalyst)
		m ³	Years

Bidder shall provide following w.r.t. Catalysts:

- Consumption figures.
- Physical, Chemical and Qualitative properties including all thermodynamic data as required for design and operation.

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- c) Material safety datasheet and disposal procedures for hazardous materials.
- d) Loading, unloading and make-up procedures.
- e) Detailed regeneration procedures, if applicable.
- f) Shelf life.
- g) Any specific warehousing requirement.
- h) Three (3) proposed permanent suppliers for each item (based on availability).

4.3.1 10% of full charge for Catalyst shall be supplied as Spares. Supply of Catalyst (1 set) shall include 10% of Spares quantity.

4.3.2 Stand performance guarantee for Licensor's engineering.

4.4 TRAINING OF OWNERS PERSONNEL / SUPERVISION:

Training of Owner's Operating and Maintenance Personnel. Training of Owner's personnel as per PC0288/E/001/P-II/ SEC-12.0 for owner's and operation's personnel w.r.to SRU package.

4.5 RETENDERING OF CONTRACT BY END CUSTOMER:

In the event of retendering of Tender by end customer, the following methodology will be adopted:

Case-1: Retendering with change in scope of work:


SRU Package Licensor to provide the man hours applicable for all disciplines for the execution of tender. The man hour rate shall be decided by the formula = Final negotiated Price of L1 bidder/ 2680. In case of retendering of Tender by customer, the man hours furnished shall be used to finalize the additional price required for the execution of the change order / additional scope during pre-bid stage and post order stage. A new MOU shall be signed by BHEL & Licensor as per the procedure in line with the new tender references.

Case-2: Retendering without any change in scope of Work:

If there is no change in the scope of work during re-tendering, there will not be any change in the MoU except for extension of the validity period as per new timelines of the retender by customer. However, a new MOU shall be signed by BHEL & Licensor in line with the new tender references, as required.

5.0 TECHNICAL DETAILS FOR SRU PACKAGE

- 5.1 The inputs gas quality at the input of SRU unit for design & sizing of SRU shall be provided by BHEL 10 days before the Bid submission due date. Bidder shall calculate the quantities of Utilities accordingly.

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- 5.2 All the applicable sections of the tender documents listed in Bidding Document Reference: PC0288/E/001 (BCGCL Technical specification) to be complied with while designing the SRU Package and other facilities that are included as part of the NIT.
- 5.3 The capacity of the SRU plant will be engineered and determined by the SRU Package Licensor, based on the feedstock supplied. The feedstock specifications will be designed by the Syngas Purification Licensor and will be shared by BHEL with the SRU Package Licensor. **The SRU plant is anticipated to have a nominal capacity of approximately 8 TPD, with a possible variation of $\pm 30\%$.**
- 5.4 Sulphur recovery unit shall be based on gasifier feed coal quality and shall be installed in single train. Design of the unit should take care minimum/maximum Sulphur in the feed when Gasifier is running on 100% coal. LSTK Contractor to consider recovery of Sulphur as 99.9%. No credit shall be given for Sulphur recovery.
- 5.5 Following minimum facilities may be considered:
- Combustion air blowers can provide the discharge.
 - Acid gas Knock out drum and Sour gas knock out drums can be shared after which the acid gas can be split for single train of SRU.
 - Sulphur Pit for SRU can be shared for Sulphur run down flow from each lock can flow into common pit.
 - All utilities header such as HP steam, LP steam (if available from balance of plant), BFW, condensate recovery system shall be provided at B/L at one point.
- 5.6 Tail Gas treating unit which can be used for recovery of H_2S from tail Gases. Tail gas from final condenser of SRU will be passed through TGTU followed by Incinerator/boiler and stack. H_2S gas recycled from TGTU can be sent back to common Acid gas KOD inlet.
- 5.7 Analyzer for incinerator stack for Sulphur plant (SRU)
The analyzer system design and analyzer selected for incinerator stack are suitable for the sample containing high Sulphur contents. The sample handling system shall be designed for such eventuality which is likely to occur during start up or under plant upset condition.
Any one of the following techniques shall be considered meeting other requirements:
- a) Dilution technique with sample handling system designed considering the worst conditions of Sulphur.
 - b) Hot extraction technique with heated analyzers.
- 5.8 Quality **Specification By-product Sulphur (solid)** produced from the plant shall cater to the following minimum specification:



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By-Product Sulphur (solid) Quality:

Sulphur (S)	Wt. %(min, dry)	99.9
Hydrogen Sulphide (H ₂ S)	Wt.ppm(max, dry)	10
Ash	Wt.ppm (max)	200
Pressure	Kg/Cm2abs	Atmospheric

By- Product Sulphur shall be indicated as below:

Sl.No	Description	Units	At 100% capacity	At 110 % capacity	At 50% capacity
i	Capacity (Note:1)	TPA of Sulphur (Solid)			
ii	Capacity (Note:1)	TPH of Sulphur (Solid)			
iii	Plant Turn-down ratio	%			
iv	By-Product Sulphur (Solid)	Wt%			
	Hydrogen Sulphide (H ₂ S)	Wt.ppm			

5.9 Gaseous Emission:


Stack gas Emission Limits:

S. No.	Source	Suspended Particulate Matter (mg/Nm ³)	SO _x (mg/Nm ³)	NO _x (mg/Nm ³)	CO (mg/Nm ³)
1.	Gas Purification section	≤ 5	<50	<250	<100

Licensor to refer applicable latest statutory norms of stringent CPCB / State pollution control board. Since the failure to meet above guarantees shall be breach of contract requiring corrective action by LSTK contractor involving cost.

Notes:

- The above is a typical minimum activity to be carried out by "SRU Package Licensor" as part of the Licensing and Post Order Basic Engineering support.
- In general, it is expected that the SRU Package Licensor shall maintain high standards of engineering, quality in deliverables submitted and accuracy in documentation submitted meeting the intended contractual requirements.
- If the Bidder is in JV/corporation with the principal firm, all the drawings submitted by the bidder/SRU Package Licensor shall be vetted by the competent person in principal firm before submitting the deliverables to BHEL.
- The deliverables of SRU Package Licensor shall be submitted to BHEL only, unless instructed otherwise.

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- e. SRU Package Licensor shall clarify, with all supporting details on any queries raised by BHEL on their deliverables.

6.0 BIDDER (LICENSOR) QUALIFICATION CRITERIA

6.1 Technology Criteria:

The bidder shall satisfy the requirement indicated below:

- Bidder has supplied process license for SRU package of minimum **3 TPD** Capacity.
- Bidder shall provide details of at least one commercial plant with minimum capacity indicated above in single plant /multiple plants which has operated successfully for at least One Year in the last Fifteen (15) years reckoned from the date of issuance of the NIT/Bidding document. Bidder shall submit documentary proof for Licensor's plant/s, issued by plant OWNER / technology licensor's certificate/s regarding the same.


6.2 Financial Criteria

- 6.2.1 The average annual financial Turnover of LICENSOR during any of the preceding five financial years i.e., 2023-2024, 2022-2023, 2021-2022, 2020-2021 & 2019-2020 or financial year ending 31.12.2023, 31.12.2022, 31.12.2021, 31.12.2020 & 31.12.2019 from the date of NIT publication shall be equal to or more than **Rs. 5.0 Cr.**
 - 6.2.2 Audited financial statement have to be submitted for all the five years as indicated against clause 5.3.1 above. If financial statements are not required to be audited statutorily, then instead of audited financial statements, financial statements are required to be certified by chartered accountant. Published Annual Report available in the public domain shall also be acceptable.
 - 6.2.3 In case audited Financial statements have not been submitted any of five years as indicated above, then the applicable audited statements submitted by bidders against the requisite three years, will be averaged for three years i.e. total divided by five.
- 6.3 SRU PACKAGE LICENSOR shall not be under banned or blacklisted or de-listed or put on Holiday by any Government / Quasi-Government / Public Sector Undertaking / Private Firm / Financial Institutions on due date of submission of bid.

7.0 DOCUMENTATION FOR BIDDER QUALIFICATION CRITERIA:

- 7.1 Copy of Work Order/ relevant Extract of Work Order/Contract Agreement/relevant Extract of Contract Agreement shall clearly indicate the LOA/Work Order/Contract/Agreement number, Name of Project, Scope of Work, Contract/Investment Value, Contract Period etc.
- 7.2 The Completion / Acceptance Certificate shall clearly indicate the LOA/Work Order/Contract/Agreement No., Name of Project, Scope of Work, Contract Value, Contract Period, Executed/Investment Value, Actual date of completion. Documentary proof of satisfactory commercial operation for a minimum period of at least one year issued by plant owner.

8.0 NON-DISCLOSURE AGREEMENT & CONFIDENTIALITY AGREEMENT

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8.1 This shall be applicable as per Licensor's NDA clause

9.0 BID EVALUATION CRITERIA

- 9.1 The bid evaluation shall be on Lumpsum L1 basis as per the Lumpsum Price in the attached Price Bid Format. Quotations submitted in partial will be summarily rejected. BHEL will not entertain any other expenses/ assumptions written separately elsewhere other than those specified in the price bid format.
- 9.2 To facilitate evaluation and comparison of prices, the OWNER will convert all bid prices expressed in foreign currency into Indian rupees at reference rate of the concerned foreign currency, available on RBI website, on the date of opening of price bids. If the bid opening date happens to be a bank holiday then the rate of previous working day would be considered.
- 9.3 Price Factors shall be binding on the Bidders as provided in the Price Bid Format. No deviation shall be permitted.
- 9.4 Successful Bidder shall be awarded the PO/LOA for execution of work during Pre-Bid Stage engineering. Memorandum of Understanding (MoU) will be signed on non-judicial stamp paper of Rs. 200/- by BHEL for Post-bid engineering with L-1 Bidder after reverse auction and /or price negotiation after submission of Bid Bond for 1% value of the finalized price as per attached draft (Annexure-4). **The MoU shall be converted into contract after BHEL wins the order from M/s BCGCL.** BHEL will intimate the MoU partner for entering into the contract once the order is received from the customer.
- 9.5 **SRU Package Licensor shall not have any claim whatsoever on the Post-Order Engineering component, if BHEL is not successful in winning the Contract.**

10.0 TERMS OF CONTRACT

- 10.1 BHEL reserves the right of cancellation of this NIT and ordering of either Pre-Bid Engineering work or Post Bid Engineering work or both at its discretion, based on the status of Tender or time available for submitting BHEL's offer to BCGCL or as per business decision.
- 10.2 **The MoU shall be valid for at least 365 days** from the last date of opening of Unpriced Technical and Commercial bid by Customer (BCGCL) or date of signing of contract agreement post issue of work order in case BHEL gets the order from BCGCL, whichever is earlier. Further extension of the validity of MoU shall be on mutual agreement.
- 10.3 BHEL shall at its discretion may depute its personnel at the design center of the SRU Package Licensor - to control, monitor and approve the Engineering design work/ deliverables of the SRU Package Licensor prior to their issuance for review/ approval by Owner/ Consultant.
- 10.4 **SRU Package Licensor shall not sublet the work without prior written permission of BHEL.**

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11.0 ENGINEERING GUARANTEE

- 11.1 Since Basic Engineering of SRU package is within SRU Package Licensor's scope and the work shall be executed & established based on the basic Engineering performed, it shall be the prime responsibility of SRU Package Licensor to carry out such design and engineering in accordance with good and sound engineering practices using Indian/ International Standards and Indian Codes & Regulations wherever applicable to such design and/or engineering.
- 11.2 In case any error or omission in design or engineering within SRU Package Licensor's scope i.e. the process design or basic engineering requires re-engineering, which results in any new requirements for equipment/ materials, the same shall be re-engineered by the SRU Package Licensor within the scope of relative work and within the contractual period without extra cost to the BHEL or entitlement of extension of time.
- 11.3 SRU Package Licensor shall guarantee that the system design for the Unit / Plant shall meet and comply with the Licensor's package, if so applicable, and;
- the equipment selected
 - the site criteria
 - the Engineering specifications, standard and design guides
 - the Front-end engineering data as mentioned in Bidding document
- 11.4 SRU Package Licensor shall check and satisfy themselves with Process Package, Front End Engineering Data for its accuracy, correctness and completeness to meet the agreed guarantees and in case of deficiency, SRU Package Licensor shall inform BHEL/ OWNER/ PMC the modifications proposed to be carried out to overcome the deficiency and rectify the same at no extra cost. SRU Package Licensor, if required, shall carry out corrective technical studies and engineering as may be required without any extra cost to the BHEL/ OWNER.

12.0 PERFORMANCE GUARANTEE

LICENSOR is responsible for the Performance & Guarantee Tests as per below:

12.1 By-Product Sulphur (Solid) Quality after Degassing:

Sulphur (S)	Wt. %(min, dry)	99.9
Hydrogen Sulphide (H ₂ S)	Wt. ppm(max, dry)	10
Ash	Wt. ppm (max)	200
Pressure	Kg/Cm ² abs.	Atmospheric
Temperature	°C	Ambient
Colour		Bright Yellow

12.2 Quality of HP/MP/LP Steam (if generated) Exported at B.L.:

The quality of Steam produced in Purification Plant shall be according to the Clause No-2.0 of Section 2.0 of Part-II Technical (Doc. No. PC0288/E/001/P-II/ SEC-2.0)

12.3 Catalyst Life Guarantees:

The Catalysts in the Purification Plant shall retain their full abilities and performance for the following periods which commence from the date of Preliminary Acceptance of the Plant.

Sl. No.	Service	Guaranteed Life (in years)
1)	Catalyst	5

Bidder guarantees that if the catalyst or adsorbent does not meet the guaranteed EOR conditions before the expiry of its guaranteed life as specified in table above, from the date of preliminary acceptance of plant, contractor shall replace as follows:

If the catalyst /adsorbent fail to fulfil the guarantee, contractor shall deliver full replacement of catalyst volume free of charge for the 1st year. For the 2nd & 3rd year replacement would be on pro-rata basis. Pro-rata catalyst volume shall be calculated by multiplying full charge of loaded catalyst volume with the ratio between un-expired portion of the 2nd & 3rd year (in days calculated from the date of failure) and 730 days.

Bidder shall pass on to Owner the residual catalyst/adsorbent life as guaranteed by the catalyst manufacturers to BHEL, if any, beyond the guaranteed life of catalyst under contract.

12.4 Pollution Level

Licensors shall guarantee the limits of pre-treated liquid effluents at the Plant Battery Limit, gaseous emission to the atmosphere and noise levels (as specified) as per the relevant existing and latest norms of CPCB, PESO and other applicable stringent environmental norms of CPCB/ state pollution control board. The determination of the ability of SRU Plant to meet these guarantees will be made during the thirty days' guarantee test or at any other time under similar conditions prior to the Preliminary Acceptance of the Process Plant/ Units.

In the event guaranteed pollution level are not fulfilled during the 30 days' guarantee test it shall be breach of contract by Customer, requiring corrective action by Licensors.

The treated liquid effluents discharged from the ISBL Plants shall meet the following limits.

Sl. No.	Parameter	Unit	Norms. (Max.)
1.	Odour & Colour		Odourless & Colourless
2.	pH Value		6.5 to 8.0
3.	Suspended solids	ppm	100
4.	Oil and grease	ppm	10
5.	Total residual chlorine	ppm	1
6.	Total Ammonical Nitrogen as "N"	ppm	50
7.	Total Kjeldahl Nitrogen as "N"	ppm	100
8.	Free ammonia (as NH ₃)	ppm	5
9.	BOD as O (3 days at 270C)	ppm	30
10.	COD as O	ppm	250
11.	Lead (as Pb)	ppm	0.1
12.	Copper (as Cu)	ppm	3
13.	Zinc (as Zn)	ppm	5
14.	Nickel (as Ni)	ppm	3
15.	Fluoride (as F)	ppm	2
16.	Dissolved Phosphates (as P)	ppm	5
17.	Sulphide (as S)	ppm	2
18.	Iron (as Fe)	ppm	3

19.	Vanadium (as V)	ppm	0.2
20.	Nitrate Nitrogen as "N"	ppm	10
21.	Chromium (Cr)	ppm	2
22.	Hexavalent Cr (Cr6+)	ppm	0.1
23.	Mercury (as Hg)	ppm	0.01
24.	Arsenic (As)	ppm	0.2

12.5 Gaseous Emission:

Stack gas Emission Limits:

S. No.	Source	Suspended Particulate Matter (mg/Nm ³)	SO _x (mg/Nm ³)	NO _x (mg/Nm ³)	CO (mg/Nm ³)
1.	Gas Purification section	≤ 5	<50	<250	<100

Licensors to refer applicable latest statutory norms of stringent CPCB / State pollution control board. Since the failure to meet above guarantees shall be breach of contract requiring corrective action by LSTK contractor involving cost.

12.6 Noise Level:

Noise nuisance from machinery selected is normally specified as sound pressure level which for standard design shall not exceed, in work areas, 85dB (a) at 1m distance from each source.


12.7 **SRU** Package Licensor is not responsible for the process guarantees of the LSTK-2's LICENSOR, however, guarantees its Engineering as set forth in this specification. If the UNIT does not achieve the results set forth in the LICENSOR's process guarantees due to defect(s) or deficiency(ies) in SRU package Licensor's Engineering, licensor shall within scope of their work and responsibilities, carry out re-engineering without extra cost to the BHEL or entitlement of extension of time.

12.8 SRU Package Licensor shall provide a list of laboratory test procedures and frequencies thereof required for validating Performance Guarantees.

12.9 Performance tests shall be started when the operation of the UNIT is stabilized under design conditions. The UNIT shall be operated and controlled in accordance with procedures set up beforehand. One or more performance test shall be carried out under the technical direction of OWNER/ LICENSOR and/or their designated representatives after successfully commissioning the UNIT in accordance with the procedures and conditions detailed in the Bid documents.

12.10 SRU Package Licensor shall be fully responsible for the accuracy and adequacy of engineering services rendered by him. Any modifications / rectification, if required in engineering and design shall be carried at / expeditiously by SRU Package Licensor at his own cost. Losses / damages if any due to wrong engineering shall be compensated by SRU Package Licensor.

12.11 SRU package Licensor's liabilities on account of not meeting the above said Engineering Guarantees, Performance Guarantees and Wrong engineering (because of Engineering related


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issues), shall be limited to 2.5% (Two-point Five percent only) of the Post Order Engineering Work Contract value between BHEL and SRU Package Licensor, payment of which is reserved against issue of Commissioning and Performance Test Certificate by OWNER.

12.12 SRU package Licensor will be responsible for the quality of the engineering and shall guarantee the same for a period of twelve months from the date of commencement of guarantee period as defined in Technical Conditions of Contract, for good engineering practice and shall rectify free of cost all defective engineering detected during the guarantee period. In the event of the SRU Package Licensor failing to repair the defective engineering within the time specified, BHEL may proceed to undertake the corrective measures of such defective engineering at the SRU Package licensor's risk and cost, without prejudice to any other rights and recover the same from the Guarantee money.

12.13 Works cost (Consumption of Raw material & Utilities) Guarantee:

SL. NO.	ITEM CATEGORY	DESCRIPTION	UNIT	Quantity per Day (Q)	UNIT PRICE in INR (R)
1.	CLEAN SYNGAS INPUT		Nm ³	**Q1	2.53
2.	MP NITROGEN		Nm ³	**Q2	3.75
3.	UTILITY NITROGEN		Nm ³	**Q3	3.75
4.	De-mineralised water,		m ³	**Q4	53.69
5.	Condensate export		m ³	**Q5	(-)47.41
6.	Methanol (consumption & make-up)		m ³	**Q6	28
7.	Steam Import, MT				
a)	HP (515°C & 107 Kg/cm ² g)		MT	**Q71	800
b)	MP (380°C & 40 Kg/cm ² g)		MT	**Q72	744
c)	LP (180°C & 4 Kg/cm ² g)		MT	**Q73	622
8.	Steam Export, MT				
	HP (515°C & 107 Kg/cm ² g)		MT	**Q81	(-)800
	MP (380°C & 40 Kg/cm ² g)		MT	**Q82	(-)744
	LP (180°C & 4 Kg/cm ² g)		MT	**Q83	(-)622
9.	Make-up Water for Cooling Towers Purification Plant		m ³	**Q9	35.75
10.	Power		KWh	**Q10	4
11.	Instrument air		Nm ³	**Q11	6
12.	BFW		m ³	**Q12	429
	Guaranteed Work Cost per day: [ΣQ x Rate] per Day.				


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13.0 OTHER INSTRUCTIONS

- 13.1 Since speedy completion of project is essential for a tight project schedule, it shall be responsibility of SRU PACKAGE LICENSOR to ensure timely delivery of all milestones.
- 13.2 SRU PACKAGE LICENSOR shall familiarize fully with the standard/ procedures/ practice of BHEL/OWNER, to avoid any dispute at later date and after order placement.
- 13.3 BHEL shall not pay any amount, other than the fee specifically agreed, towards any cost incurred by SRU PACKAGE LICENSOR by way of salaries to their employees (income and taxes), insurance of any nature, 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.
- 13.4 SRU PACKAGE LICENSOR 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.
- 13.5 SRU PACKAGE LICENSOR shall ensure that it possesses the latest revisions of various national and international standards, codes of practices, statutory & environmental regulations etc. as applicable, for execution of the work. BHEL shall not provide any such documents to SRU PACKAGE LICENSOR. Engineers of SRU PACKAGE LICENSOR assigned for this project shall have familiarity on relevant documents as mentioned above for their use and applications.
- 13.6 SRU PACKAGE LICENSOR 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.
- 13.7 SRU PACKAGE LICENSOR 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, design 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

14.0 LIST OF DELIVERABLES FROM SRU PACKAGE LICENSOR

- 14.1 For minimum deliverables in the scope of SRU Package Licensor in Pre-Bid Stage, refer **Annexure-1** of this TCC.
- 14.2 For deliverables in the scope of SRU Package Licensor in Post-Order Stage, SRU Package Licensor shall carry out **Basic Engineering as per "Drawings and documents" of Bidding Document Reference: PC-288/E001/Sec-9.**

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

14.4 The detailed list of deliverables during the Pre-bid stage and during Post-Bid (Basic Engineering) to be submitted along with offer.

14.5 The deliverables of SRU Licensor shall be submitted to BHEL only, unless instructed otherwise.

14.6 BHEL will review the deliverables and furnish its observations, comments, if any to SRU Package Licensors for their incorporation and resubmission to BHEL.

14.7 SRU Package Licensor shall clarify, with all supporting details on any queries raised by BHEL on their deliverables.

15.0 PAYMENT TERMS & COMMERCIAL CONDITIONS

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

15.2 **Payment Schedule:**


15.2.1 **Payment for Pre-bid Engineering work:**

- i. **80%** of the gross value of work order shall be paid on submission of complete Purchase Specifications, BOQs, Technical Offer for OWNER Tender, filled-in formats applicable to SRU Package Licensor as required in OWNER Tender, etc. as mentioned in this specification, upon certification by BHEL as per the customer's Tender requirement for BHEL's technical offer.
- ii. **20%** of the gross value of work order shall be paid after price bid opening by BCGCL or in case of cancellation of BCGCL Tender or deemed cancellation of BCGCL Tender, upon certification by BHEL.

15.2.2 **Bid Bond, Price Discount & Payment Schedule for Post-Order Engineering Work:**

- i. The successful SRU Package Licensor on whom LOI will be placed for Post-Order Engineering Works, shall deposit to BHEL within 30 days of signing the MOU, 1% of Final agreed Price of Post-Order Engineering Works, towards Bid Bond (in the form of Bank Guarantee or any other mode as specified in GCC for Security Deposit), for continued commitment during the validity period of MOU.
- ii. In the event of price reduction during negotiation by BHEL with end Customer, corresponding reduction will be passed on to the successful SRU package Licensor (on finalized Post-Order price).

15.2.3 **Post-Order engineering payments shall be done as per the following:**

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a) For Engineering Service Order

- i. 85% (Eighty-Five Percent) of the gross value of work order shall be paid on pro-rata basis against progress of Engineering Services duly certified by the BHEL for the quantum of engineering works completed.
- ii. 5% (five percent) on issue of MECHANICAL COMPLETION Certificate against CONTRACTOR's certified running Accounts Bill(s).
- iii. 8% (Eight percent) on issue of PRELIMINARY ACCEPTANCE CERTIFICATE against the CONTRACTOR's certified Running Account Bills.
- iv. 2% (Two percent) on completion of balance jobs, if any, against the CONTRACTOR's Certified Final Bill.

b) For Purchase Order for "Supply of Catalyst

- i. 90% (Eighty-Five Percent) of the value calculated on actual supply of catalyst against production of "Material receipt certificate" at site along with copy of delivery challan, LR, etc.
- ii. 10% (Fifteen Percent) of the value calculated on actual supply of catalyst against after loading of catalyst and commissioning of the plant

Completion of all the above milestones will be considered for payment only if, concerned deliverables are acceptable to BHEL and BCGCL.

*BHEL will release running account bill payments to SRU Package Licensor, preferably within **30 days** of submission of invoice along with all requisite documents complete in all respect as per contract. However, Bidder to note that delay in payment cannot be a plea by Bidder for delay in discharge of execution of work as per the Contract.*


15.3 Delivery Schedule & Contract Period:

15.3.1 Pre-bid Engineering

- i. Contract Period for Pre-Bid Engineering shall be Three (3) weeks from the date of commencement. Date of commencement shall be a mutually agreed date between BHEL & SRU Package Licensor after issue of work order.
- ii. SRU Package Licensor to submit the documents as per Annexure-1 progressively to enable BHEL to prepare cost estimates and complete proposal activities in time.

15.3.2 Post Bid Engineering


- i. Delivery schedule for **Post-Order Basic Engineering Work & "Supply of Catalyst"** Purchase Order shall be mutually agreed between BHEL and SRU Package Licensor to meet the L2 network for project execution, after receipt of order by BHEL.

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- ii. BHEL will review the deliverables and furnish its observations, comments, if any within 14 working days to SRU Package Licensor for their incorporation and resubmission to BHEL.
- iii. SRU Package Licensor shall revise and resubmit the revised documents within 7 working days of receipt of comments from BHEL/ end customer. Vendor is responsible for completion of approval cycle and minimizing number of revisions.
- iv. Project Delivery Schedule is 42 (Forty-Two) Months) including Commissioning
- v. Project Milestones shall be as per the clause 6.0, Part I: Commercial Section-1.0, Instructions to Bidders of BCGCL's bidding document PC288/E/001/P-I/1.0.
- vi. Contract Period for Post-bid Engineering works shall be 42 (Forty-Two) Months) from the date of commencement. Date of commencement shall be a mutually agreed date between BHEL & SRU Package Licensor after issue of work order.

15.4 Project Milestones for Engineering:

Sl. No.	Milestones for completion of	Duration
1.	Process and Basic Engineering documents like PFDs, Stream summary, Preliminary P&IDs, Preliminary Plot plan, Operation and Control philosophy, Design basis etc.	Six (6) Months from commencement of Work.
2.	Review of Detailed Engineering documents, P&IDs etc. till approval by end Customer	Twelve (12) Months from commencement of Work.
3.	Assistance during Detailed Engineering, Procurement, Construction, Pre-commissioning, Commissioning and Performance Guarantee Test Run	Fifteen (18) Months from commencement of Work.
4.	Final Checking of Plant	Twenty-four (24) Months from commencement of Work.
5.	Training	Twenty-eight (28) Months from commencement of Work.
6.	Support during advanced process control system	Thirty-six (36) Months from commencement of Work.
7.	As-built documents	Forty-two (42) Months from commencement of Work.

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15.5 Penalty Clause

15.5.1 Pre-Bid Engineering Work

- i. BHEL will reserve the right of accepting the delayed deliverables by SRU package Licensor, if suitable time period is available to it for submitting its offer to BCGCL, by imposing the Penalty at the rate of **2%** of the order value per week of delay or part thereof subject to a maximum of **10%** of Pre-bid Engineering work order value.
- ii. SRU package Licensor shall seek prior permission from BHEL to submit the deliverables with delay.
- iii. Beyond the permitted delivery period, deliverables shall be accepted by BHEL at its discretion.

15.5.2 Post-Order Engineering Work

- i. If the SRU package Licensor fails to maintain the required progress of engineering works which results in delay in achieving/completing the Milestones defined in this “Delivery schedule”, if any, BHEL shall have the right to impose Liquidated Damage/Penalty at the rate of 0.2 % of the contract value, per week of delay or part thereof, for each delayed Milestone.
- ii. In addition to the above, if the SRU Package Licensor fails to maintain the required progress of engineering works, which results in delay in the overall completion of the work beyond the contractual completion period, BHEL shall have the right to impose Liquidated Damage/Penalty at the rate of 0.5% of the contract value, per week of delay or part thereof.
- iii. However, the ceiling for the total Liquidated Damage/Penalty will be maximum of 10% of the contract value. For this purpose, the period of delay shall be the delay attributable to the SRU Package Licensor for the completion of work/achievement of milestone as per contract.

16.0 RECORD OF REVISIONS

Rev.	Date	Revision Details	Prepared By	Checked By	Approved By
00	05-10-2024	First Issue	MPK	AKS	SPB