Invitation for Expression of Interest (EOI)

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For

PROCESS TECHNOLOGIES FOR VALORISATION OF NH3 FROM NH3 RICH GAS

EOI Document Ref. No. EOI/PE/2024-25/01

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Rev	Date	Issue for	Prepared	Checked	Approved
MANGALORE REFINERY AND PETROCHEMICALS LTD.		**PROCESS TECHNOLOGIES FOR VALORISATION OF NH3 FROM NH3 RICH GAS**	Specification Number		

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1. INTRODUCTION:

1.1. Mangalore Refinery and Petrochemicals Limited (MRPL) is a Schedule 'A' Miniratna, Central Public Sector Enterprise (CPSE) under the Ministry of Petroleum & Natural Gas, Government of India. The 15 Million Metric Tonne Refinery has got a versatile design with complex secondary processing units and a high flexibility to process Crudes of various API, delivering a variety of quality products.

1.2. MRPL in its Phase 1 & 2 refinery complex has 2 Hydrocrackers and one Gas oil hydrotreating unit for hydrocracking/hydro-processing of straight run VGO and Gas Oil from CDU. The sour water (water containing H2S & NH3) generated from these hydrocracking/hydro processing units is processed in sour water strippers (HSWS) where the H2S and NH3 in the sour water is stripped off.

2. BRIEF DESCRIPTION OF SYSTEM

2.1. MRPL Phase 1 & Phase 2 refinery complexes have 2- stage Sour Water Stripper Units (HSWS – 1 & 2) to treat the sour water containing ammonia and hydrogen sulphide by a stripping operation.

2.2. The first stage of the HSWS consists of a column that operates at a pressure of 7 kg/cm² and temperatures of 166°C at the bottom and 84°C at the top. The majority of H_2S in the sour water is stripped off in the first stage, and the water is then sent to the second stage for the removal of NH_3. The heat required for the stripping operation in the first stage is supplied by medium-pressure (MP) steam through a reboiler, with an additional provision for direct stripping by injecting MP steam into the column

2.3. The second stage of the HSWS consists of a column that operates at a pressure of 0.8 kg/cm² and temperatures of 121°C at the bottom and 90°C at the top. The NH_3 in the sour water is stripped off in this stage, and the water, with H_2S and NH_3 content of less than 20 ppmw, is sent to other destinations for recycling. The heat required for the stripping operation in the second stage is supplied by low-pressure (LP) steam through a reboiler, with an additional provision for direct stripping by injecting LP steam into the column.

2.4. The Stripped off gas from the 1st stage of HSWS (H2S rich gas) is sent to Main combustion chamber of Sulphur Recovery unit and the off gas from 2nd stage (NH3 rich gas) is sent to either incinerator or Main combustion chamber of Sulphur Recovery Unit.

2.5. MRPL has four sulfur recovery units in the Phase 1 & 2 complex, with a provision to route NH_3-rich gas to the main combustion chamber in only one of the units (New SRU). In the other three SRUs, the NH_3-rich gas is routed to the incinerator which generate considerable amount of NOx. In either case, the

stream is combusted without any major value addition. MRPL intends to generate value addition from this process stream rather than combustion of the same.

3. OBJECTIVE

3.1. To identify suitable commercially proven process technologies at a commercial scale for the recovery of NH_3 from the 2nd Stage HSWS off-gas or for processing this NH_3-rich gas to produce other value-added products, exploring potential applications and benefits.

3.2. To evaluate the identified technologies with respect to implementation viz-a-viz cost-benefit analysis

4. FEED STREAM DETAILS

4.1. The total process gas (NH3 rich gas) flow, composition and Process condition details for the project is given below:

Description	**UOM**	
Flow	Nm3/hr	2030
Composition		
NH_3	mol%	61.2
H_2S	mol%	3.3
H_2O	mol%	35.4
Hydrocarbon	mol%	< 0.1
Molecular weight	kg/kmol	17.9
Pressure	kscg	0.8
Temperature	degC	90

5. SCOPE & TECHNICAL DETAILS SOUGHT

5.1. The vendor is required to offer a proven process technology for the recovery of NH_3 from similar feed streams (NH_3-rich gas) or a proven process technology in which similar feed streams (NH_3-rich gas) are processed to produce other value-added products. The technology offered by the vendor shall be in commercial operation.

5.2. Vendor to note that MRPL will not consider process technologies which uses additional feed streams which are unavailable in the refinery

5.3. The vendor shall provide the following details on the process technology being offered

5.3.1. Process Flow diagram with basic process parameters like temp, pressure (min)

5.3.2. Process description with following minimum details

5.3.2.1. Typical Product yield

5.3.2.2. Basic equipment details

5.3.2.3. Details of any additional feed streams required for the process (if any)

5.3.2.4. Effluents from the unit

5.3.2.5. Utility requirements for the unit

5.3.3. Storage and product movement facilities envisaged

5.3.4. Details of the unit where the technology is in commercial operation

5.3.4.1. Contact details of the person where the technology is in commercial operation

5.3.5. Specific energy consumption for the overall process (per MT of the product) with typical specific fuel, steam and power consumption.

5.3.6. Typical plot Area requirement for

5.3.6.1. The Process unit with feed gas rate as given in section 4

5.3.6.2. Storage and product movement envisaged for the same

5.4. The vendor shall provide the CAPEX Cost (+/-50% Estimate) for a process unit with feed gas rate as given in section 4 with all facilities including storage and product movement facilities

5.5. The Vendor shall provide following details on the final product for which the process technology is offered

5.5.1. Product chemical formula with MSDS

5.5.2. Basic write-up on the product with its commercial uses/applications

5.5.3. Market data/details for the product along with the source for the same

5.5.4. Last one year product price and the source for the same

5.5.5. Product Pricing mechanism and the source for the same.

5.6. The typical OPEX (operating expenditure) cost for a unit using the process technology offered, based on the feed gas rate provided in Section 4, expressed as Rs per metric ton (MT) of the product. The basis for calculating the OPEX, including utility costs, feed costs, and product costs, and other relevant factors, shall be provided.

5.7. The bidder shall submit all the technical details sought above in the format attached as Annexure 1

6. OTHER DETAILS TO BE FURNISHED BY BIDDER

1. General Information		
1.1	Name of the BIDDER/Firm	
1.2	Nature or legal status of the Firm	
1.3	Name and address of associated companies to be involved in the project with relationship and role, if any.	
1.4	Registered Address of Firm	
1.5	Contact Person	

1.6	Designation and address of Contact person			
1.7	Email			
1.8	Turnover & Net worth of the Firm during last three financial years (Please enclose copy of audited annual reports)	Year	Turn Over (INR)	Net Worth (INR)
		2023-24		
		2022-23		
		2021-22		
2. Data Required:				
2.1	Reference of at least one similar unit , where in the Bidder prepared the basic Design package for NH3 rich gas processing capacity of minimum 1218 Nm/hr with same process technology licenced/designed by the bidder/firm in last 10 years for which PGTR is completed or is in continuous operation for at least one year during the period. Alternatively Bidder can provide two commercially proven units reference of capacity minimum 812 Nm3/hr of NH3 rich gas processing. Actual purity of product NH3 obtained to be specified from the commercial reference (If NH3 recovery is offered).			
2.2	Bidder should provide necessary documents sustaining the above clauses. The bidder shall give copies of signed Agreement/Work order/Purchase order/ acknowledged final report or any other document to prove the scope of completed works against the order to the satisfaction of MRPL.			
2.3	Contact details like email, phone number etc of the person in the reference unit where the technology is in successful operation as per clause 2.1			
2.4	Bidder to Confirm that they are not under Blacklist/Holiday List at the time of EOI Offer Submission			

7. DISCLAIMER

MRPL has prepared this document to give interested parties background information on the project. While MRPL has taken due care in the preparation of the information contained herein and believes it to be accurate, neither MRPL nor any office authorities, officers, employees, agents/and advisors gives any warranty or make any representations, express or implied as to the completeness or accuracy of the information contained in this document or any information contained in this document or any information which may be provided in connection therewith.

Interested parties are required to make their own inquiries and respondents will be required to confirm in writing that they have done so and they do not rely on the information provided in the Expression of Interest (EOI) document in submitting their response. The information is provided on the basis that it is non-binding on MRPL or any of its authorities or agencies or any of their respective officers, employees, agents or advisors.

MRPL reserves the right not to proceed with the project, to alter the timetable reflected in this document or to change the process or procedure to be applied for listing of enquiry partners. It also reserves the right to decline to discuss the project further with any party expressing interest. No reimbursement of cost of any type whatsoever will be paid to persons, or entities, expressing interest in the project.

Annexure 1:

Sl no:	Check list on the Technical Data Sought	
1	Name of the Process Technology and Name of the companies where the technolgy is in commercial operation (minimum one company required)	
2	Submission of details on the process technology being offered	
	(a) Basic Flow diagram submitted with basic process parameters like max temp, max pressure (min)	YES/NO
	(b) Process description submitted	YES/NO
	(c) Typical Product yield	
	(d) Basic equipment details	YES/NO
	(e) Any additional feed streams required for the process	YES/NO
	(f) Effluents from the unit	
	(g) Utility requirements for the unit	
3	Details on Storage and product movement facilities envisaged submitted	YES/NO
4	Contact details of the person where the technology is in commercial operation (phone number and E-mail id)	
5	Specific energy consumption for the overall process (per MT of the product) with typical specific fuel, steam and power consumption.	
6	Typical plot Area requirement for Process unit with feed gas rate as given in section 4	
7	Typical plot Area requirement for Storage and product movement envisaged for the same	
8	CAPEX Cost (+/-50% Estimate) for a process unit with feed gas rate as given in section 4 with all facilities including storage and product movement facilities	
9	Submission of details on the final product for which the process technology is offered	
	(a) Product chemical formula with MSDS submitted	YES/NO
	(b) Basic write-up on the product with its commercial uses/applications submitted	YES/NO
	(C) Market data/details for the product along with the source for the same submitted	YES/NO
	(d) Last one year product price and the source for the same	YES/NO
	(e) Product Pricing mechanism and the source for the same.	YES/NO

10	Typical OPEX (operating expenditure) cost for a unit using the process technology offered, based on the feed gas rate provided in Section 4, expressed as Rs per metric ton (MT) of the product. *Note: The basis for calculating the OPEX, including utility costs, feed costs, and product costs, and other relevant factors, shall be provided.*	

EOI Details as follows:

EOI No.	MRPL/EOI/ PE/2024-25/01
EOI on Website	From 26.12.2024 to 21.02.2025
Closing date for submission of EOI	21.02.2025 @ 15:00 Hrs
EOI documents available at	www.mrpl.co.in/eoi

Please contact below mentioned personnel for further details:

Designation	Contact No.	Email id
SENIOR MANAGER	**9565674036**	ananyo_sengupta@mrpl.co.in
MANAGER	**8147007118**	ajay_kumark@mrpl.co.in

All Credentials/ Documents shall be addressed to

General Manager
Materials Department
Mangalore Refinery & Petrochemicals Ltd
Kuthethoor PO, Via Katipalla, Mangalore – 575 030
Karnataka- India

The envelope containing the documents shall be superscripted

"PROCESS TECHNOLOGIES FOR VALORISATION OF NH3 FROM NH3 RICH GAS"