



मंगलूर रिफाइनरी एण्ड पेट्रोकेमिकल्स लिमिटेड

MANGALORE REFINERY & PETROCHEMICALS LTD.

(ऑयल एण्ड नेचुरल गैस कॉर्पोरेशन लिमिटेड की सहायक कंपनी)

(A Subsidiary of Oil and Natural Gas Corporation Ltd.)



EXPRESSION OF INTEREST (EOI)

FOR

**SUPPLY OF PRESSURE SWING ADSORPTION
ADSORBENTS FOR HYDROGEN GENERATION UNIT
AT MRPL**

EOI NO.: MRPL/TS/2021-2022/321

Expression of Interest (EOI)

For the supply of Pressure Swing Adsorption adsorbents for Hydrogen Generation Unit at MRPL, Mangalore

1.0 Introduction

Mangalore Refinery and Petrochemical Limited (MRPL), subsidiary of ONGC, is a public sector company. MRPL operates a 15MMTPA Refinery cum petrochemical complex in Dakshina Kannada district of Karnataka. Company is primarily engaged in crude refining and petroleum product marketing.

MRPL is having three Hydrogen Generation Units namely HGU-1, HGU-2 and HGU-3. Design Hydrogen production capacity of HGU-3 unit, which is licensed by M/S Haldor Topsoe, is 70KTPA. This unit, which has a 12 bed Pressure Swing Adsorption section, supplied by M/S UOP, was commissioned in 2012. The PSA process uses adsorbent to purify the syn gas produced from steam methane reforming process to produce 99.9 mole % pure hydrogen as product.

2.0 Objective

MRPL intends to procure PSA adsorbent in M/s UOP licensed PSA system for HGU-3 unit. This EOI outlines the vendor's scope of work for the supply of PSA adsorbent for the required product quality and adsorbent parameter.

3.0 Feed and Product Details:

Adsorbent should be able to handle 100% of syn gas produced from the mentioned feed cases for hydrogen generation unit.

Feed Cases	Typical Feed split, wt. %				
	Paraffinic Rich Naphtha	Mixed Pentanes	Straight Run Naphtha	CHTU Naphtha	Natural Gas
Case - 1	93%	-	3%	4%	-
Case - 2	-	-	100%	-	-
Case - 3	-	70%	30%	-	-
Case - 4	-	65%	-	-	35%
Case - 5	-	-	-	-	100%

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The typical feed stream composition and properties of PSA feed for 5 different cases are mentioned below:

Properties	UOM	Case 1	Case 2	Case 3	Case 4	Case5
Feed Flow	Nm ³ /hr	157531	158403	157019	157363	147598
Temperature	°C	39.97	40	40.01	39.94	46.27
Compositions						
Hydrogen	Mol%	72.67	72.02	72.60	74.04	75.67
Methane	Mol%	3.84	3.69	3.82	4.17	4.55
Water	Mol%	0.33	0.33	0.33	0.33	0.45
CO	Mol%	0.56	0.58	0.56	0.52	0.46
CO ₂	Mol%	22.60	23.38	22.69	20.92	18.84
Nitrogen	Mol%	0.00	0.00	0.00	0.02	0.02

Expected production quality is as given below

S.No	Parameter	Guaranteed Value
1	Hydrogen Product Recovery	90 Mole% (Min)
2	Hydrogen Purity in Product	99.9 Mole% Min
3	CO+CO ₂	20 ppm max
4	Adsorbent Life	Min 5 years

4.0 Vendors Scope of Work:

- 4.1. Supply suitable quantity of PSA adsorbents for all 12 PSA beds.
- 4.2. Modification of PSA Control System with new proprietary software with step times, modes of operation, pressure profiles, switchable steps, alarms and trips routines etc in order to cater all the operating requirements for various no of online beds (12bed/10 bed/8bed operation, Bed outage, Valve online stroking etc.).
- 4.3. In case existing PSA Control System is not suitable, vendor may have to supply or modify control system suiting his adsorbent requirements.
- 4.4. Technical assistance and on-site supervision of catalyst supplier representative during loading, start-up and PGTR.

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- 4.5. Technical assistance and trouble shooting of PSA issues during the entire tenure of guaranteed life.
- 4.6. No hardware/mechanical change in the PSA system is envisaged other than the Instrumentation PSA controls system scope. Also power supply, analog input, outputs existing loop arrangement shall not be changed in any case. Communication with DCS, HMI shall be re-established with same configuration.
- 4.7. Any additional Instruments/Analysers required shall be supplied by bidder.
- 4.8. Operating manual for the PSA to be submitted.

5.0 Other Conditions:

- 5.1. Potential vendor is required to do NDA (Non-Disclosure Agreement) with PSA original licensor M/s UOP as UOP Confidential Information (PLC software Parameters), so as to get access to UOP software (PSA Process cycles / step times on other cycle parameters etc.,)
- 5.2. MRPL doesn't envisage the upgradation of PLC hardware and PSA adsorber system hardware. Vendor will be permitted to program the existing PSA to handle the PSA feed with desired product quality as mentioned in section 3.0 at his own cost.
- 5.3. Vendor to note that Owner (MRPL) will not share information about PSA process cycle including step times, modes of operation, pressure profiles, switchable steps, alarms and trips routines etc., as M /s UOP (PSA licensor) developed and installed PLC operation software program and parameter within the software is confidential.
- 5.4. However hardware details such as PSA vessel dimensions/capacity is as follows.

Details	Parameters
Number of Vessels	12
Vessel Volume	43.9 m3
Each vessel Diameter	2800mm ID
Tangent Length	6150mm
Direction of flow	Bottom to Top
Design Pressure and Temperature	30 Kg/cm2 g and 16°C-120°C.

*Further vendor may seek specific information on hardware aspect of PSA system.

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6.0 Deliverables of EOI:

- 6.1 Based on the above details interested vendors can express their interest in participation for PSA adsorbents tender. Any disagreements on the above will not be entertained in the subsequent tender processing.
- 6.2 Vendor to indicate whether new PSA control system is required along with necessary instrumentation or existing Control system Hardware can be used as informed under scope of work.
- 6.3 Vendor to indicate cost of adsorbents along with necessary control system modifications.

7.0 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.

Based on EOI feedback, MRPL reserves to alter the PSA adsorbent procurement process or procedure. No reimbursement of cost of any type whatsoever will be paid to persons, or entities, expressing interest in the project. With this EOI, MRPL does not guarantees acceptance of proposal nor commit any future actions of procurement.

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Mangalore Refinery and Petrochemicals Limited (MRPL) is a subsidiary of M/s. Oil and Natural Gas Corporation Limited (ONGC). MRPL proposes to invite Expression of Interest.

EOI Details as follows:

EOI No.	MRPL/TS/2021-2022/321
EOI on Website	From 19.02.2022 to 12.03.2022
Closing date for submission of	Upto 17:00 hrs (IST) on 12.03.2022
EOI documents available at	www.mrpl.co.in/eoi

Please contact below mentioned personnel for further details:

Designation	Contact No.	Email id
Ch. Manager (TS)	+91-824-2882916	sprabhu@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 superscribed **“Documents for the supply of Pressure Swing Adsorption Adsorbents for Hydrogen Generation unit at MRPL”**