CSIR- Indian Institute of Petroleum

(Council of Scientific & Industrial Research)
P.O.I.I.P., MOHKAMPUR, DEHRADUN – 248005 (UA) INDIA
Ph.0135-2525762 & 2525945, Fax. 0135-2660072, 2660202-203
E-Mail- pmitra@iip.res.in, rawats@iip.res.in
Website :www.iip.res.in

Creating Future Fuels

ISO-9001 Regd. Institute

Subject : Invitation of Expression of Interest(EOI) No. 01/2017-18

Indian Institute of Petroleum(I.I.P), Dehradun, an ISO 9001 Institute, is one of the leading constituent laboratories under Council of Scientific & Industrial Research (CSIR) engaged in R&D work in petroleum refining, natural gas and petro-chemicals and contributing towards creating of state of the art technology & products.

Expression of Interest (EOI) are hereby invited from reputed firms for procurement, installation & commissioning of the following :

1. Ref No. PUR/1/16-17/EOI/498/SD/SPD/PO:

"Detailed Engineering, Supply, Installation, Testing, Training & Commissioning of a Skid Mounted Two Column Pressure/Vacuum Swing Adsorption (PVSA)Pilot Scale Unit for Up-gradation of Raw Biogas to Pipeline Quality Fuel"

Last date for submission : **03.05.2017 by 2.30 pm**

Date of Opening : **03.05.2017 at 3.00 pm**

Interested bidders may download the details from our Website. **www.iip.res.in .**

(Stores & Purchase Officer)

Subject: Invitation for Expression of Interest (EOI) for "Detailed Engineering, Supply, Installation, Testing, Training & Commissioning of a Skid Mounted Two Column Pressure/Vacuum Swing Adsorption (PVSA)Pilot Scale Unit for Up-gradation of Raw Biogas to Pipeline Quality Fuel"

CSIR-Indian Institute of Petroleum (IIP), Dehradun, an ISO 9001 Institute, is one of the leading constituent laboratories under council of Scientific &Industrial Research (CSIR) engaged in R&D work in petroleum refining, natural gas and petro-chemicals and contributing towards creation of state of the art technology & products. CSIR-IIP has been working on several projects of national importance independently and also in collaboration with well-known Indian organizations.

EOI is invited from reputed engineering companies/ consultants/ firms for "Detailed Engineering, Supply, Installation, Testing, Training & Commissioning of a Skid Mounted Two Column Pressure/Vacuum Swing Adsorption (PVSA)Pilot Scale Unit for Up-gradation of Raw Biogas to Pipeline Quality Fuel" based on a process developed at CSIR-IIP. The unit will be fabricated on the basis of design parameters provided by CSIR-IIP for the aforementioned process.

Firms having done similar nature of work can apply along with the documentary evidence for the work done in the past. The firms should also meet the other parameters as given below and are required to submit following information along with their applications:

a) Name of the firm with their constitution/proprietorship/partnership detail, etc with the date of establishment/registration
b) List of similar works successfully completed in the last seven years as above with testimonials from department concerned and the details of contact persons.
c) The firm should not have incurred any loss in more than 2 years during the last 5 years ending 31st March 2016.
d) List of work in hand giving nature of work, department, cost, date of start and completion with present progress and the contact details of the clients.
e) Balance sheet of the firm for previous two years (2014-15 & 2015-16) must be enclosed with the offer certified by charted accountant evidencing turnover.
f) Please submit the article of association with offer to know the standing of the firm
g) **All Indian Agents of Foreign Principals have to compulsorily Registered with DGS&D, New Delhi**

Applications for Expression of Interest (EOI) as mentioned above along with all relevant documents should be submitted in sealed envelope duly super-scribing "**Expression of Interest (EOI) for "Detailed Engineering, Supply, Installation, Testing, Training & Commissioning of a Skid Mounted Two Column Pressure/Vacuum Swing Adsorption (PVSA) Pilot Scale Unit for Up-gradation of Raw Biogas to Pipeline Quality Fuel"** to **The Director, Indian Institute of Petroleum, Mohkampur, Haridwar Road, Dehradun-248005**. Positively by **03/05/2017 by 2.30 pm**. The offers shall be opened on the same day at 3.00 pm. Shortlisted firms shall be called for making a presentation at a later date.

If any information furnished by the applicant is found incorrect at a later stage, he shall be liable to be debarred from tendering/taking up of work in CSIR. CSIR-IIP reserves the right to verify the particulars furnished by the applicant, independently. CSIR-IIP reserves the right to reject any prospective application without assigning any reason.

Brief Details of this unit as per attached Annexure.

(Stores & Purchase Officer)

Detailed Technical Specification

1. Scope of the work:

The scope of the work is "Detailed Engineering, Supply, Installation, Testing, Training and Commissioning of a Skid Mounted Two Column Pressure/ Vacuum Swing Adsorption (PVSA) Pilot Scale Unit for up gradation of Raw Biogas to Pipeline Quality Fuel". The scope also includes pre-treatment section for raw biogas.

Interested firms are free to add any further scope of work meeting above objectives in their proposals.

2. Brief Process Description:

The skid mounted Pilot scale unit is to be designed and fabricated on the basis of a two column Pressure/ Vacuum Swing Adsorption (PVSA) process developed at CSIR-IIP. In this PVSA process, each adsorber column will undergo different steps in tandem. A schematic diagram of the pilot scale unit is given as **Figure-1**.

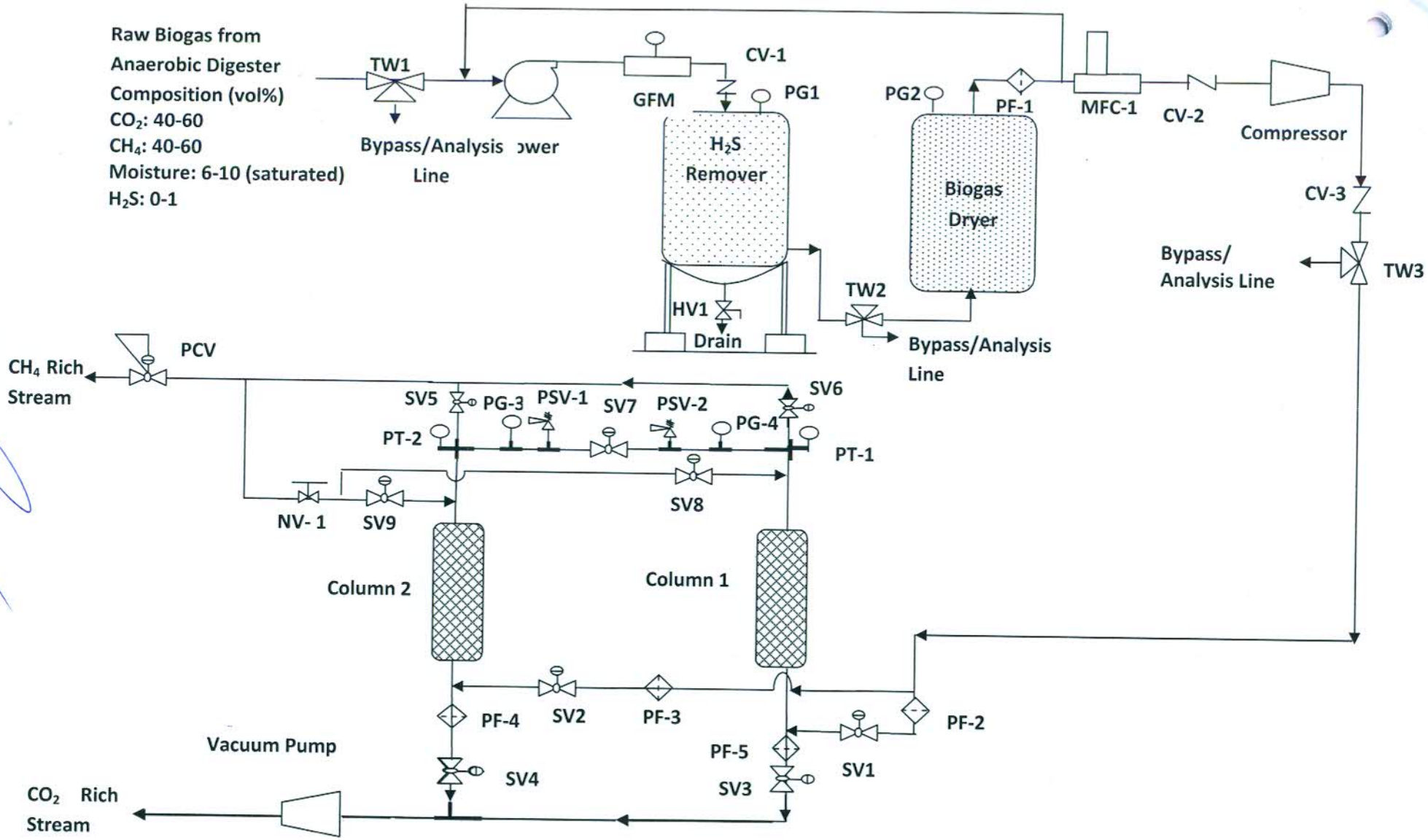

Figure-1: Schematic Diagram of the Skid Mounted Pilot Scale Unit

The legends associated with the **Figure-1** are described in **Table-1** below.

Table-1: Description of the Legends given in **Figure-1**

Sl. No.	Legend	Description
1.	SV	Solenoid Valves
2.	PCV	Pressure Control Valve
3.	HV	On/Off Hand Valve
4.	MFC	Mass Flow Controller
5.	PF	Particulate Filter
6.	CV	Check Valve (Non return)
7.	PSV	Pressure Safety Valve
8.	TW	Three Way Hand valve
9.	PG	Pressure Gauge
10.	PT	Pressure Transducer
11.	NV	Metering Needle Valve
12.	GFM	Gas Flow Meter

2.1 Description of the Skid Mounted pilot scale unit

The skid mounted unit can be divided in two sections namely Feed section, PVSA section.

- **The raw biogas pretreatment section:** This section consists of a blower that will feed the raw biogas from anaerobic digester at a flow rate of around 500 Nm^3/day to H_2S remover and biogas dryer vessels. These vessels will be filled with suitable H_2S removing and drying agents respectively, so that the gas exiting the biogas dryer is practically free from H_2S and moisture.
- **The PVSA section:** The VSA section shall have two adsorber interconnected by solenoids valves. This adsorber will undergo cyclic adsorption and regeneration mode in tandem to produce high purity biogas. In adsorption mode column pressure will be regulated by a manual pressure control valve (PCV) and during regeneration mode the column pressure will be reduced by applying vacuum through a vacuum Pump.

2.2 Description of the PVSA process

The CSIR-IIP has developed a cyclic two column PVSA process for biogas up gradation. The adsorber columns will be packed with a suitable CO_2 selective adsorbent. The step wise description of the process is given below:

2.2.1 Step 1: Adsorption

CH_4 rich gas stream will be produced in step

2.2.2 Step 2: Pressure Equalization (Depressurizing)

2.2.3 Step 3: Evacuation

CO_2 rich gas stream will be produced in step

2.2.4 Step 4: Pressure Equalization (Pressurizing)

2.2.5 Step 5: Rinse with CH_4 Rich Stream (Optional)