

### Rule-16 Evaluation of the application

- (a) The technical, administrative and financial capabilities of the applicant in relation to the regulated activity for which the licence is sought. **Enclosed as Annexure-H**
- (b) the viability of the sources of supply of natural gas. **Enclosed as Annexure-H**
- (c) **If applicable, the effects of the proposed project on other transmission, distribution or storage facilities;**

MPCL (Mari Petroleum Company Limited) will deliver the Raw Natural Gas at MPCL Central Manifold-2 at Mari, Daharki, Sindh. From Custody Transfer Point (CTP) of MPCL, raw gas will be transmitted to the processing facility located at a distance of ~1 KM thru dedicated lines having no impact on any other system. At processing facility, raw gas will be treated to achieve acceptable specification for injection into SNGPL transmission network. After which treated gas will be transmitted from processing facility to SNGPL Muhammadpur valve assembly (QV-2) located at a distance of ~24 KM thru independent pipeline. At Muhammadpur, treated gas will be injected into SNGPL network and equivalent quantity in terms of BTUs will be drawn-off from SNGPL network at downstream e.g. Pakarab Fertilizers Limited, Multan for consumption by the Applicant.

There are no impacts envisaged on other distribution or storage facilities.

- (d) **The methods and procedures proposed to be adopted for operating and maintaining the transmission, distribution or other related facilities;**

Applicant follows world best practices of DuPont Process Safety management (PSM). Process safety management is about recognizing hazards and the associated risks. We believe that Process safety principles and systems not only help manage risks, but they effectively increase the safety of our operation while also improving productivity, cost efficiency and quality.

Based on decades of experience of managing hazardous substances in our own Fertilizer facilities and natural gas pipeline (Fatima Fertilizer Company Limited – Sister Company), our expert employees have a thorough understanding of the means through which a process safety management system can be built, and sustained. Based on this vast operational & maintenance experience, we have refined our system, procedures and adopted world best practices and achieved Excellence level in the Process Safety management. Our approach to managing operational risk and preventing process-related injuries and incidents addresses both the cultural and technical aspects of our organization.

Our employees have a proven ability to prevent major process-related disaster incidents, while also preserving business continuity, capitalization, right to operation, and – most importantly – to protect precious lives.

The DuPont process safety management systems are designed to bring about a cultural transformation within the company to achieve excellence in process safety.

DuPont's safety management system consists of globally recognized HSE Best Practices comprised of the following 22 elements:

1. Management Commitment
2. Policies & Principles
3. Integrated Organization Structure
4. Line Management

27-8-2018

Record By hand

5. Accountability & Responsibility
6. Goals, Objectives, & Plans
7. Safety Personnel
8. Procedures & Performance Standards
9. Training & Development
10. Effective Communication
11. Motivation & Awareness
12. Audits & Observations
13. Incident Investigation
14. Management of Change – Personnel
15. Contractor Safety Management
16. Quality Assurance
17. Pre-start-up Safety Reviews
18. Mechanical Integrity
19. Management of Change – Facilities
20. Process Safety Information
21. Management of Change -Technology
22. Risk Assessment and Process Hazards Analysis
23. Emergency Preparedness and Contingency Planning

**(e) The technical specifications of the proposed transmission, distribution or other related facilities;**

**Transmission:**

Summary of Pipeline Design Specifications is as follows:

Sr. No.	Description	Shallow Feeder Pipeline	Deep Feeder Pipeline	HRL Feeder Pipeline	Main Gas Pipeline
1	Design Pressure, psig	1100	1375	330	1375
2	Design Temperature, °F	175	175	175	175
3	Pipeline Material	API 5L	API 5L	API 5L	API 5L
4	Material Grade	Grade B	Grade B	Grade B	X46 & X70
5	Size, inch	NPS 12	NPS 14	NPS 12	NPS 16
6	Length, meters	870	870	870	22,800
7	Thickness	API 5L Grade B, Location Class 3: 15 MM	API 5L Grade B, Location Class 3: 15 MM	API 5L Grade B, Locations Class 3: 8.74 MM	i. API 5L Grade X70, Location Class 1: 7.92MM ii. API 5L Grade X70, Location Class 2: 8.74MM iii. API 5L Grade X46, Location Class 2: 12.95MM

					iv. API 5L Grade X46, Location Class 3: 17.65MM
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Detailed Technical Specifications of Transmission facilities are provided in following attached documents:

- (a) Annexure-1: Main Gas Pipeline Design Package
- (b) Annexure-2: Feeder Pipeline Design Package

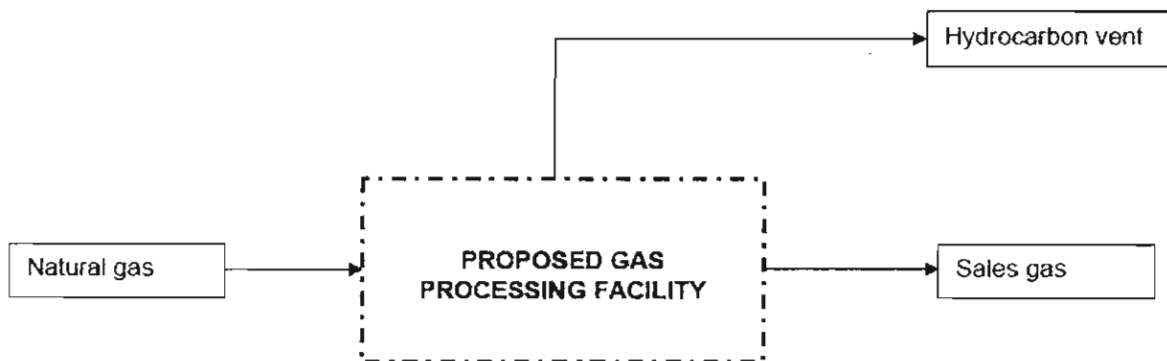
**Processing Facility:**

Gas processing facility for treatment of high CO<sub>2</sub> Natural Gas is planned to be installed near MPCL CMF-2, Daharki field in phased approach which includes Gas compression, Membrane Separation unit, Amine Sweetening Unit, Gas Dehydration unit & Metering unit.

Brief Technical Specifications of major equipments are provided in following attached documents:

- (a) Annexure-3: Technical Specification- Gas Compressors
- (b) Annexure-4: Technical Specification- Membrane Separation unit
- (c) Annexure-5: Technical Specification- Amine Sweetening Unit
- (d) Annexure-6: Technical Specification- Gas Dehydration unit
- (e) Annexure-7: Technical Specification- Metering unit

**Material Flow Chart:**



**(f) The basis for potential demand for the transmission, distribution or sale of natural gas:**

The Economic Coordination Committee (ECC) of the Federal Cabinet of Government of Pakistan has approved on May 17, 2018; a proposal to allocate 35 MMCFD Mari Shallow Gas and 40 MMCFD of Mari Deep Gas to Pakarab Fertilizers Limited (PFL) in order to optimally utilize its available installed capacity, encourage indigenous production of fertilizers and to lessen the reliance on imported Fertilizer.

Pakarab Fertilizers Limited (PFL) has responded to this development and plans to setup a gas Processing facility at Mari and lay about 24 km natural gas line from Mari Gas Company Limited (MPCL) custody transfer point to SNGPL tie-in point near Muhammad-pur.

Technical Specifications (Shallow Gas Compressor)							
Project		Pakrab Gas Processing Facility (PGPF)					
<b>Site Conditions</b>							
Location		Mari, Daharki, Sindh, Pakistan					
Ambient Temperature (Max./Min.)		°F			125 / 36		
Maximum Wind Speed		km/hr			160.1		
Seismic Zone		--			2A		
Rainfall (Max./Min.)		mm/ year			51 / Traces		
Dust Load (Dust Storm/ Typical)		mg/m <sup>3</sup>			400 / 10		
Relative Humidity (Max./Min.)		%			60 / 20		
Elevation		ft.			240 ft above Sea Level		
Barometric Pressure		psia			14.6		
Electrical Classification		--			Class 1 Div 2 Group D		
Base Conditions For Flow Rates		--			14.65 PSIA @ 60 °F		
<b>Process Conditions</b>							
		Inlet			Outlet		
Fluid		Natural Gas					
Pressure	PSIG	Min	Normal	Max	Min	Normal	Max
		250	300	400	950	1100	1300
Temperature	°F	≤ 125			≤ 145		
Flow Rate	MMSCFD	35					
<b>Inlet Gas Composition</b>							
		HHV (Min.)		HHV (Normal)		HHV (Max.)	
Methane	mol %	77.224		80.04		81.99	
Ethane		0.994		1.03		1.05	
Propane		0.261		0.27		0.26	
I-Butane		0.068		0.07		0.07	
N-Butane		0.068		0.07		0.07	
I-Pentane		0.096		0.1		0.03	
N-Pentane		0.000		0		0.02	
Hexane		0.000		0		0.04	
Heptane +		0.000		0		0.00	
Carbon dioxide		8.061		5.08		3.17	
Nitrogen	13.228		13.34		13.30		
Hydrogen Sulphide	ppmv	0 - 15					
Water Content	Lb/ MMSCF	Fully Saturated					

Annex-4  
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Project		Gas Processing Facility-Membrane Unit			
Process Conditions					
Fluid		Natural Gas			
		Inlet			Outlet
Pressure	PSIG	Min	Normal	Maximum	*
		800	1000	1200	*
Temperature	°F	≤ 125			*
CO2 contents	mol %	40	45	50	≤ 20
H2S	ppm	≤ 20			≤ 3.0
Flow Rate	MMSCFD	40	40	110**	*
Inlet Gas Composition					
		Feed (Deep Gas)			
		Design	Operating		
Methane	mol %	35.46	38.87		
Ethane		1.75	1.92		
Propane		0.32	0.36		
I-Butane		0.17	0.18		
N-Butane		0.13	0.16		
I-Pentane		0.09	0.10		
N-Pentane		0.05	0.05		
Hexane		0.03	0.03		
Heptane +		0.02	0.01		
Carbon dioxide		50.09	45.32		
Nitrogen		11.65	12.76		
water		0.258 (saturated)	0.25 (saturated)		
Hydrogen Sulphide		ppmv	20.00	0.00	
Notes:					
1. * To be specified by Vendor.					
2. **Currently, Feed Flow rate is 40 MMSCFD with the future potential of total 110 MMSCFD.					

Project		Gas Processing Facility-Amine Unit			
Process Conditions					
Fluid		Natural Gas			
		Inlet			Outlet
Pressure	PSIG	Min	Normal	Max	*
Carbon dioxide	mol %	15	15	20	≤ 1.5
Hydrogen Sulphide	ppmv	≤ 20			≤ 3.0
Temperature	°F	≤ 145			*
		Case-1 (Upstream Membrane Outlet)^	Case-2 (Membrane Outlet + Raw Feed)^^		
Flow Rate	MMSCFD	25	57 (max 102)**		
Methane	mol %	57.13	64.83		
Ethane		2.82	1.35		
Propane		0.52	0.23		
I-Butane		0.27	0.12		
N-Butane		0.23	0.10		
I-Pentane		0.15	0.07		
N-Pentane		0.07	0.03		
Hexane		0.04	0.02		
Heptane +		0.02	0.01		
Carbon dioxide		20.00	15.04 ( 17.1)**		
Nitrogen		18.73	18.08		
water		0.01	0.12		

**Notes:**

- \*Vendor To Specify
- \*\*Currently, Feed Flow rate is 57 MMSCFD with the future potential of total 102 MMSCFD with inlet CO<sub>2</sub> content of 17.1 mol%.
- ^ Offered Amine Sweetening Unit will be part of Hybrid Acid Gas removal system with upstream Membrane system reducing the CO<sub>2</sub> content of raw Feed from 45 mol% to 20 mol%.
- ^^ Facility is being designed to Treat raw gas from different sources. Accordingly, Feed to offered amine unit will be commingled upstream Membrane system outlet & Raw Compressed Gas.

Annex-6  
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Project		Gas Processing Facility-Dehydration Unit				
Process Conditions						
Fluid		Natural Gas				
		Inlet			Outlet	
Pressure	PSIG	Min	Normal	Max	*	
		800	1000	1200	*	
Water contents	lbs/MMSCF	100	200	500	< 6	
Temperature	°F	≤ 145			*	
		Case-1 (Minimum Flow)	Case-2 (Normal Operating)	Case-3 (Maximum Flow)		
Flow Rate	MMSCFD	35	54	87 (max 127)**		
Methane	mol %	80.04	76.85	77.39		
Ethane		1.03	2.05	1.29		
Propane		0.27	0.43	0.25		
I-Butane		0.07	0.18	0.11		
N-Butane		0.07	0.15	0.10		
I-Pentane		0.10	0.14	0.06		
N-Pentane		0.00	0.04	0.03		
Hexane		0.00	0.02	0.03		
Heptane +		0.00	0.01	0.01		
Carbon dioxide		5.08	2.63	2.73		
Nitrogen		13.34	17.51	17.84		
water		Saturated at Op. Temp & Pressure				

Notes:  
 1. \*Vendor to specify  
 2. \*\*Currently, maximum Feed Flow rate is 87 MMSCFD with the future potential of total 127 MMSCFD.

Technical Specifications (Custody Transfer Metering Skid)				
Project		Gas Processing Facility (GPF)		
<b>Site Conditions</b>				
Location		Mari, Daharki, Sindh, Pakistan		
Ambient Temperature (Max./Min.)		°F	125 / 36	
Maximum Wind Speed		km/hr	160.1	
Seismic Zone		--	2A	
Rainfall (Max./Min.)		mm/ year	51 / Traces	
Dust Load (Dust Storm/ Typical)		mg/m <sup>3</sup>	400 / 10	
Relative Humidity (Max./Min.)		%	60 / 20	
Elevation		ft.	240 ft above Sea Level	
Barometric Pressure		psia	14.6	
Electrical Classification		--	Class 1 Div 2 Group D	
Base Conditions For Flow Rates		--	14.65 PSIA @ 60 °F	
<b>Process Conditions</b>				
		<b>Inlet</b>		
Fluid		Natural Gas		
Pressure	PSIG	<b>Min</b>	<b>Normal</b>	<b>Max</b>
		900	1100	1250
Temperature	°F	≤ 125		
Flow Rate	MMSCFD	35	60	130
<b>Inlet Gas Composition</b>				
		<b>HHV (Min.)</b>	<b>HHV (Normal)</b>	<b>HHV (Max.)</b>
Methane	mol %	77.350	80.04	77.62
Ethane		0.770	1.03	2.01
Propane		0.190	0.27	0.42
I-Butane		0.050	0.07	0.17
N-Butane		0.050	0.07	0.16
I-Pentane		0.070	0.1	0.10
N-Pentane		0.000	0	0.05
Hexane		0.000	0	0.04
Heptane +		0.000	0	0.01
Carbon dioxide		6.870	5.08	2.51
Nitrogen		14.640	13.34	16.89
Hydrogen Sulphide		ppmv	0 - 15	
Water Content	Lb/ MMSCF	≤ 7		



PFL/OGRA/2018-  
 August 30, 2018

The Registrar  
 Oil and Gas Regulatory Authority (OGRA)  
 1st Floor, 54-B, Fazal-e-Haq Road  
 Islamabad

**Subject: INFORMATION TO BE ATTACHED TO THE APPLICATION FOR SHIPPER LICENSE AND THE APPLICABLE FEE UNDER OGRA GAS (THIRD PARTY ACCESS) RULES 2018**

Dear Sir,

ECC of the Cabinet in its meeting held on May 17, 2018 allocated 75 mmcf/d gas along with supporting dedication of reserves from Mari Gas Fields to Pakarab Fertilizers Limited (PFL) exclusively for self use.

Subsequent to the ECC decision, PFL submitted an application to OGRA for issuance of Transmission License under Natural Gas Regulatory Authority (Licensing) Rules 2002 for construction and operation of pipeline from point of delivery of Mari field gate to SNGPL's injection point at Muhammad Pur Ghotki along with ancillary/connected facilities. SNGPL will transport the gas from injection point to PFL plant at Multan under a mutually agreed gas transportation agreement.

OGRA Gas (Third Party Access) Rules 2018 specifies in Rule 3 that "No person shall operate as a transporter or shipper unless a license has been issued in his favour by the authority to undertake such activity and which is in force" and defines Shipper in Serial (X) of Rule 2 as "a person holding a valid license issued by the authority for transmission, distribution or sale of gas through an access arrangement for transportation of gas by utilizing capacity of gas pipeline transportation system above such thresholds as may be specified in the Network code"

However the rules are silent about the Form of Application, information to be attached and the applicable fee for the issuance of License to operate as Shipper.

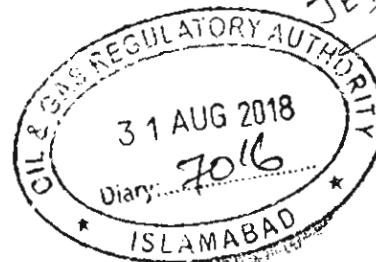
We would request OGRA to guide us for the submission of the application and the applicable fee for the issuance of above referred License to operate as Shipper enabling us to proceed further on fast track basis.

We are available to meet and discuss the modalities of the application.

Thanking you,

Yours faithfully,  
 For PAKARAB FERTILIZERS LIMITED

  
 SAQIB AZIZ  
 (Department Manager Business Development)



ED (Gas) --- HML 4/19/18  
 JED (F-1) 4/19/18  
 AED

OGRA-6(1)-NG(PFL)/2018

November 07, 2018

Mr. Saqib Aziz,  
Department Manager Business Development,  
Pakarab Fertilizers Limited,  
E-110, Khayaban-e-Jinnah Road,  
**LAHORE**

**Subject: PAKARAB FERTILIZERS LIMITED - APPLICATION FOR CONSTRUCTION & OPERATION OF PIPELINE FOR TRANSMISSION OF NATURAL GAS**

Dear Sir,

*سید سعید*

Please refer to your letter No. PFL/OGRA/2018 256 BH dated August 20, 2018 on the subject noted above.

2. It is to inform that the information/data provided vide subject application has been examined by the concerned deptts. under the statutory requirement of Rule 4(3) & (5) of NGRA (Licencing) Rules, 2002 wherein the following deficient documents/information have not been provided:-

- i. Status of GTA with SNGPL,
- ii. Hydraulic / simulation study alongwith recommendations of the proposed pipeline,
- iii. Three different gathering lines are proposed whereas ECC has allocated gas from Mari Shallow and Mari Deep only,
- iv. SNGPL's project acceptance letter for construction of subject transmission pipeline,
- v. Breakup of Capital Cost / Project Cost,
- vi. Source of Financing.

3. In view of above, you are advised to furnish the above mentioned information / documents in order to proceed further in the matter, please.

Best Regards,



*o/e*

*Abdul Basit Qureshi*  
(Abdul Basit Qureshi)  
Registrar  
(For & on behalf of the Authority)

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PFL/OGRA/2018-  
November 09, 2018

The Registrar  
Oil and Gas Regulatory Authority (OGRA)  
1st Floor, 54-B, Fazal-e-Haq Road  
Islamabad

Subject: PAKARAB FERTILIZERS LIMITED – APPLICATION FOR CONSTRUCTION & OPERATION OF PIPELINE FOR TRANSMISSION OF NATURAL GAS

Reference: Your letter No. OGRA-6(1)-NG(PFL)/2018 dated 07 November, 2018

Dear Sir,

Please find below the point wise response to your queries raised via above referred letter.

- i. ECC of the Cabinet in its meeting held on May 17, 2018 has directed SNGPL to transport these gases through its existing network. GTA with SNGPL will be finalized after Network Code Approval by OGRA.  
(Annex-A - DG Gas letter No. NG (I)-7(158)/18-F-Pt dated 31<sup>st</sup> May, 2018)
- ii. Hydraulic / simulation study along with recommendations of the proposed pipeline (Annex-B)
- iii. Third line is for future prospects and for intermittent availability of HRL (Habib Rahi Limestone) gas during shutdown/turnarounds of other fertilizer plants on Mari Network.
- iv. SNGPL's offer letter No. P&D/02-12204 dated 10<sup>th</sup> September, 2018 for construction of subject transmission pipeline (Annex-C)
- v. Total project cost estimated at US\$ 70 million.
- vi. Internal group resources and debt financing

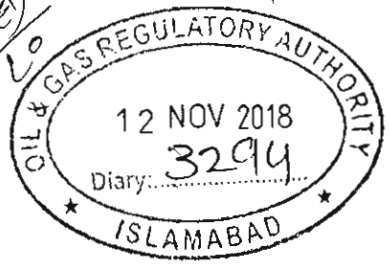
We are available to meet and provide additional information or clarification if required.

Thanking you,

Yours faithfully,  
For PAKARAB FERTILIZERS LIMITED

SAQIB AZIZ  
(Department Manager Business Development)

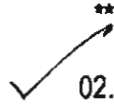
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*Ahmed Usin*  
*12/11/18*



No. NG (I)-7(158)/18-F-Pt  
 Government of Pakistan  
 Ministry of Energy - - Petroleum Division  
 (Policy Wing)  
 Directorate General of Gas  
 First Floor, Petroleum House, Ataturk Avenue G-5/2

Islamabad, the 31<sup>st</sup> May, 2018

01. **The Managing Director,**  
 M/s Mari Petroleum Company Ltd,  
Islamabad



02. **The Chief Executive Officer,**  
 Pak Arab Fertilizers Ltd,  
Lahore

03. **The Managing Director,**  
 M/s Sui Northern Gas Pipelines Ltd,  
Lahore

Subject: **ALLOCATION OF ADDITIONAL GAS PRODUCTION FROM MPCL'S EXISTING RESERVOIRS TO PAKARAB FERTILIZERS LTD**

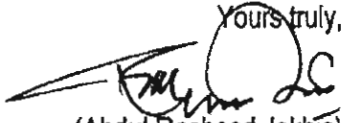
Dear Sir (s),

I am directed to inform that ECC of the Cabinet in its meeting held on 17.05.2018 vide case No. ECC-43/10/2018 dated 17.05.2018 while considering a summary submitted by Petroleum Division on the subject approved the proposals contained in para-6 of the summary as under:

- (i) 35 MMCFD Mari shallow gas along with supporting reserves may be allocated to M/s Pakarab Fertilizers Ltd (PFL) which will require dehydration and transportation by PFL at its own cost for injection into M/s SNGPL's system and M/s SNGPL would be required to induct this gas into its system soon after completion of the required infrastructure.
- (ii) 40 MMCFD of Mari Deep gas along with supporting reserves may be allocated to M/s Pakarab Fertilizers Ltd which will be processed by PFL at its own cost for injection into SNGPL's system as a comingled stream along with shallow gas.
- (iii) MPCL will be required to have necessary regulatory approvals for production of these gases from its existing reservoirs.
- (iv) Subject to availability of adequate system gas volumes, M/s SNGPL would supply the minimum gas required along with Mari shallow gas to M/s PFL enabling the plant to operate. This arrangement would be for the interim period i.e. till full flow of comingled processed Mari gases.
- (v) The allocated gases are to be transported by M/s SNGPL through its system for supply to M/s PFL plant at Multan under a mutually agreed gas transportation arrangements and M/s PFL would be required to pay a tolling fee to M/s SNGPL against transportation of these gases.

2. You are requested to take further necessary action in the implementation of above ECC decision under intimation to this office at the earliest.

Yours truly,

  
 (Abdul Rasheed Jokhio)  
 Director (Tech.)

**C.C:**

- (i) PS to Secretary Petroleum Division
- (ii) PS to Additional Secretary (P) Petroleum Division
- (iii) PA to DG(Gas) Petroleum Division
- (iv) PA to DG (PC) Petroleum Division



# PAK-ARAB FETILIZERS LIMITED

## HYDRAULIC STUDY REPORT FOR FLOWLINES OF PFL GAS PROCESSING FACILITY

3109-PR-RP-0001



**PETROCHEMICAL ENGINEERING CONSULTANTS**

C-2, BLOCK NO 17, Gulshan-e-Iqbal, Karachi-

75300, Pakistan. Tel.: +92 (21) 34827780, 34961088 Fax.: +92 (21) 34961089



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REV.	DESCRIPTION	PREPARED BY	CHECKED BY	APPROVED BY	CLIENT APPROVAL	DATE
A	Interdisciplinary Check	BA	Adeel	Adeel	-----	MAY 21, 2018
0	Issued for Review	BA	Adeel	Adeel	-----	MAY 31, 2018

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 <b>pakarab</b> PETROCHEMICAL CONSULTANTS	<b>FEEDER LINE HYDRAULICS</b>			 <b>PC</b> Petrochemical Consultants
	<b>Document Title:</b>	<b>Hydraulic Study Report</b>		
	<b>Document No:</b>	<b>3109-PR-RP-0001</b>	<b>Rev-0</b>	<b>Sheet 3 of 13</b>

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	<b>FEEDER LINE HYDRAULICS</b>			
	Document Title:	Hydraulic Study Report		
	Document No:	3109-PR-RP-0001	Rev-0	Sheet 4 of 13

**1.0 SUMMARY**

MPCL (Mari Petroleum Company Limited) will deliver the Raw Natural Gas at MPCL Central Manifold-2 at Mari, Daharki, Sindh. Accordingly, raw gas transmission from Custody Transfer Point (CTP) to processing facility located at a distance of ~1 KM & then treated gas transmission from processing facility to SNGPL Muhammadpur valve assembly located at a distance of ~24 KM would be Fatima's responsibility.

For the above mentioned purpose, PFL acquired services of Petrochemical Engineering Consultants (PEC) for hydraulic analysis of above described flow lines.

The Study includes the calculation of pressure drop, velocities and flow pattern in the flow lines in order to estimate the reception pressure of proposed gas processing facility.

Each flow line is sized at worst case scenario i-e maximum gas flow rate and minimum operating pressure which results in following design cases:



	Gas flow rate MMSCFD	Inlet Pressure PSIG
<b>Shallow Feeder Pipeline</b>	35	100
<b>Deep Feeder Pipeline</b>	110	700
<b>HRL Feeder Pipeline</b>	44	100
		<b>Outlet Pressure @ Muhammad Pur</b>
<b>Main Gas Pipeline</b>	126	1000 psig

Following line sizes are opted from hydraulic study based on above mentioned design basis:

1. For Shallow feeder line: NPS 12-inch
2. For Deep feeder line: NPS 12-inch
3. For HRL feeder line: NPS 12-inch
4. For Main gas line: NPS 16-inch

Following results are obtained when operating flow line at worst case scenario:



	<b>FEEDER LINE HYDRAULICS</b>			 Petrochemical Consultants
	Document Title:	Hydraulic Study Report		
	Document No:	3109-PR-RP-0001	Rev-0	Sheet 5 of 13

	Shallow Feeder Pipeline	Deep Feeder Pipeline	HRL feeder line	Main Gas Pipeline
Flow line size, inches	12	12	12	16
Velocity, ft/sec	97.60	37.0096	103.9	16.26
Pressure drop, psi/100ft	0.3614	0.8181	0.52	0.1092
Flow Regime	SP-Turbulent	SP-Turbulent	SP-Turbulent	SP-Turbulent

## 2.0 STUDY BASIS

Hydraulic Analysis of flow line has been carried out using process software tool PIPESYS an extension of HYSYS software.



Data considered for Hydraulic Analysis is described below:

## 2.1 COMPOSITION

### • SHALLOW GAS

The gas composition used in hydraulic analysis for Shallow feeder pipeline is presented here under:

SHALLOW GAS	
COMPONENT	Mole%
C <sub>1</sub>	81.564
C <sub>2</sub>	1.055
C <sub>3</sub>	0.259
i-C <sub>4</sub>	0.070
n-C <sub>4</sub>	0.080
i-C <sub>5</sub>	0.040
n-C <sub>5</sub>	0.030
C <sub>6+</sub>	0.040
CO <sub>2</sub>	3.185
N <sub>2</sub>	13.231

	<b>FEEDER LINE HYDRAULICS</b>			
	Document Title:	Hydraulic Study Report		
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Water	0.448
H <sub>2</sub> S	0.00

• **DEEP GAS**



The gas composition taken in hydraulic analysis for Deep feeder pipeline is presented here under:

DEEP GAS	
COMPONENT	Mole%
C <sub>1</sub>	38.871
C <sub>2</sub>	1.919
C <sub>3</sub>	0.356
i-C <sub>4</sub>	0.184
n-C <sub>4</sub>	0.156
i-C <sub>5</sub>	0.103
n-C <sub>5</sub>	0.048
C <sub>6</sub> +	0.041
CO <sub>2</sub>	45.32
N <sub>2</sub>	12.75
Water	0.246
H <sub>2</sub> S	0.00

• **HRL GAS**

The gas composition taken in hydraulic analysis for HRL feeder pipeline is presented here under:

DEEP GAS	
COMPONENT	Mole%
C <sub>1</sub>	70.55



	<b>FEEDER LINE HYDRAULICS</b>			
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C <sub>2</sub>	0.169
C <sub>3</sub>	0.00
i-C <sub>4</sub>	0.00
n-C <sub>4</sub>	0.00
i-C <sub>5</sub>	0.00
n-C <sub>5</sub>	0.00
C <sub>6</sub> +	0.00
CO <sub>2</sub>	10.99
N <sub>2</sub>	17.45
Water	0.82
H <sub>2</sub> S	0.00

• **MAIN GAS**

The gas composition taken in hydraulic analysis for main gas flow line is presented here under:

MAIN GAS	
COMPONENT	Mole%
C <sub>1</sub>	77.56
C <sub>2</sub>	1.32
C <sub>3</sub>	0.26
i-C <sub>4</sub>	0.11
n-C <sub>4</sub>	0.10
i-C <sub>5</sub>	0.06
n-C <sub>5</sub>	0.03
C <sub>6</sub> +	0.03
CO <sub>2</sub>	2.71

	<b>FEEDER LINE HYDRAULICS</b>			 Petrochemical Engineering Consultants
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N <sub>2</sub>	17.79
Water	0.01
H <sub>2</sub> S	0.00

## 2.2 CASES

Different cases have been made in view of the pressure & flow variation in the future. Comparison based on pressure (Shallow, Deep & HRL) and volume (Main gas) is tabulated below.

### SHALLOW GAS



No.	Cases	Gas Flow Rate MMSCFD	Inlet Pressure, psig
1	Maximum	35	300
2	Minimum		100

### DEEP GAS

No.	Cases	Gas Flow Rate	Reception Pressure, psig
1	Maximum	110 MMSCFD	1200
2	Minimum		700

### HRL Gas

No.	Cases	Reception pressure @ Muhammad Pur	Gas Flow rate MMSCFD
1	Maximum	44 MMSCFD	150
2	Minimum		100

	<b>FEEDER LINE HYDRAULICS</b>			 Petrochemical Engineering Consultants
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**MAIN Gas**

No.	Cases	Reception pressure @ Muhammad Pur	Gas Flow rate MMSCFD
1	Maximum	1000 PSIG	126
2	Minimum		35



**3.0 FLOW LINE RESULTS**

• **SHALLOW GAS**

NPS (inch)	Pressure at CMF-II (psig)	Pressure at Facility (psig)	Pressure Drop (psi/100 ft)
10"	300	285	0.3153
	100	52.55	0.8851
12"	300	294	0.1290
	100	82.02	0.3614

Governing scenario for line sizing will be at low pressure i.e. 100 psig Reception/ inlet pressure. Due to greater Pressure loss at 10 inch line size, 12" line size is selected for shallow gas feeder line.

Case	Gas Flow Rate	Line Size	Velocity	Flow Pattern
Case-1	35 MMSCFD	12"	19.62	SP-Turbulent
Case-2			97.60	SP-Turbulent

	<b>FEEDER LINE HYDRAULICS</b>			 Petrochemical Engineering Consultants
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• **DEEP GAS**



NPS (inch)	Pressure at CMF-II (psig)	Pressure at Facility (psig)	Pressure Drop (psi/100 ft)
10"	1200	1149	1.094
	700	600.8	2.013
12"	1200	1179	0.4448
	700	661	0.8181

Governing scenario for line sizing will be at low pressure i.e. 700 Psig Reception pressure. As there is less pressure loses in 12" deep feeder line that's why 12" line size is selected.

Case	Gas Flow Rate	Line Size	Flow Pattern	Velocity
Case-1	110 MMSCFD	12"	SP-Turbulent	20.096
Case-2			SP-Turbulent	37.0096

• **HRL GAS**

NPS (inch)	Pressure at CMF-II (psig)	Pressure at Facility (psig)	Pressure Drop (psi/100 ft)
10"	150	124.4	0.90
	100	57.6	1.48
12"	150	140.2	0.34
	100	85.2	0.52

	<b>FEEDER LINE HYDRAULICS</b>			 Petrochemical Engineering & Project Consultants
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Governing scenario for line sizing will be at low pressure i.e. 100 Psig Reception pressure. At low pressure scenario, pressure drop exceeds the allowable limit i.e. 1 psi/100ft. Moreover, velocity in 10-inch flow line also exceeds the allowable limit. It is suggested to opt. 12-inch flow line for transferring HRL gas to PFL facility.

Case	Gas Flow Rate	Line Size	Velocity	Flow Pattern
Case-1	44 MMSCFD	12"	66.71 ft/s	SP-Turbulent
Case-2			103.9ft/s	SP-Turbulent

#### • MAIN GAS

NPS (inch)	Pipe Schedule	Volume Flow rate	Pressure at PGPF Facility PSIG	Pressure Drop (psi/100 ft)
14"	40	35	1015	0.018
	40	126	1176	0.2176
16"	40	35	1010	0.009
	40	126	1100	0.1092

Governing scenario for line sizing will be at high flow rate i.e. 126 MMSCFD Volume flow rate. Both the line sizes are feasible but due to minor pressure drop in 16" line as compared to 14" line and expected future volumes, 16" line size is selected.

Case	Reception pressure at Muhammad Pur	Line Size	Flow Pattern	Velocity
Case-1	1000 PSIG	16"	SP-Turbulent	5.2 ft/s
Case-2			SP-Turbulent	16.26 ft/s



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Hydraulic Simulation of Sales Gas Pipeline			
Mari Well to Muhammad Pur SNGPL			
Phase-1 & Phase-2			
Fatmia Fertilizers Limited			
Eng	Chkd	Apvd	Date
SS	IA	SMS	24-03-18
			Project
			DC-001
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			0



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Hydraulic Simulation of Sales Gas Pipeli  
Mari Well to Muhammad Pur SNGPL  
Phase-1 & Phase-2  
Fatmia Fertilizers Limited

GENERAL

Current file name = H:\Fatima Fertilizers\Pipeline\Hydraulic\Hydraulic Analysis of Gas Pipeline-Phase-1.dat

Defaults : Compressible = Isothermal  
Two phase flow = Homogeneous  
Acceleration = Inverse  
Elevation den = Homogeneous  
Dukler hold-up = Dukler  
Atmospheric pres = 14.696 psi abs

To view/print : Font = Courier, Size 7-8  
Orientation = Landscape  
Margins = 1-2 cm.

Run message = Problem solution reached after 19 iterations.

NOTE - Close before running and viewing next results.

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Mari Well to Muhammad Pur SNGPL Phase-1 & Phase-2  
 Fatmia Fertilizers Limited

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PRESSURE PROFILE REPORT

Circuit Feed 1														
Number	Description	Flow t/h	Density lb/ft3	Visc cP	Dia in	Sch	Length m	dp/L psi/100ft	Velocity ft/s	Elev m	dPElev psi	dPin-out psi	Pin psig	Pout psig
SML/SUL	SML/SUL	53.12	4.62	0.0152	8	30	2,000	0.416	19.8	0	0	28.5	1,342	1,313
L1	Process line/pipe												1,342	1,313
T1	Tee piece									0			1,313	
Circuit Feed 2														
Number	Description	Flow t/h	Density lb/ft3	Visc cP	Dia in	Sch	Length m	dp/L psi/100ft	Velocity ft/s	Elev m	dPElev psi	dPin-out psi	Pin psig	Pout psig
Mari Wel	Mari Deep	66.36	4.6	0.0154	12	30	2,000	0.0801	11.1	0	0	5.65	1,319	1,314
L2	Process line/pipe												1,319	1,314
T1	Tee piece									0			1,314	
Circuit T-Piece 1 : 3														
Number	Description	Flow t/h	Density lb/ft3	Visc cP	Dia in	Sch	Length m	dp/L psi/100ft	Velocity ft/s	Elev m	dPElev psi	dPin-out psi	Pin psig	Pout psig
T1	Tee piece	119.5	4.58	0.0153	16	30	200	0.0777	12.6	0	0	0.875	1,314	1,314
L3	Process line/pipe												1,313	1,283
Plant	Plant P.D.									0-0	0	30.0	1,313	1,283
L4	Fuel Gas Supply Pipeline	119.5	4.36	0.0153	16	30	25,000	0.0842	13.2	0	0	67.2	1,283	1,215
Metering	Metering									0-0	0	14.5	1,215	1,201
L5	Process line/pipe	119.5	4.19	0.0153	16	30	200	0.0849	13.8	0	0	0.897	1,201	1,200
SNGPL	Mohd. Pur SNGPL									0	0	0	1,201	1,200

NOTES - (1) dPElev and dPin-out represent DRAWING Inlet - Outlet.  
 (2) dpfrictional + dpaccel = dPElev + dPin-out.  
 (3) Vessel/Tank dPElev represent effect of fluid levels inside vessel.  
 (4) Elev represent equipment or nozzle (vessel/tank) elevation.

Hydraulic Simulation of Sales Gas Pipeli  
 Mari Well to Muhammad Fur SNGPL  
 Phase-1 & Phase-2  
 Fatima Fertilizers Limited

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PIPE LINE REPORT

Line number Line name	L1 Process line/pipe		L2 Process line/pipe		L3 Process line/pipe		L4 Fuel Gas Supply Pipeline	
	AVG	OUT	AVG	OUT	AVG	OUT	AVG	OUT
PROCES DATA								
Temperature	54.4	54.4	54.4	54.4	54.4	54.4	54.4	54.4
Pressure	1,328	1,342	1,316	1,319	1,313	1,314	1,249	1,215
Liq Fraction	0	0	0	0	0	0	0	0
Total-Flow	53.12	4.57	66.36	4.59	119.5	4.58	119.5	4.48
Dens-NS	4.62	4.67	4.6	4.61	4.58	4.58	4.36	4.25
Elev	4.62		4.6		4.58		4.36	
Visc-NS	0.0152		0.0154		0.0153		0.0153	
CP	53.12		66.36		119.5		119.5	
Density	4.62		4.6		4.58		4.36	
lb/ft3	0.0152		0.0154		0.0153		0.0153	
Visc	19.4		19.6		19.5		19.5	
Mol wt	0.891		0.897		0.894		0.894	
Z	1.54		1.53		1.53		1.53	
Cp/Cv	0		0		0		0	
Liquid-Flow (wt)	0		0		0		0	
t/h	0		0		0		0	
Flow (vol)	62.4		62.4		62.4		62.4	
m3/h	1.0		1.0		1.0		1.0	
Density								
lb/ft3								
Visc								
CP								
PIPE DATA								
Size	8		12		16		16	
in	2,000		2,000		200		25,000	
Length	30		30		30		30	
Schedule	8.07		12.1		15.3		15.3	
ID	1.8		1.8		1.8		1.8	
Roughness (E-3)	1.0		1.0		1.0		1.0	
Safety factor	0		0		0		0	
Sum of elev's	19.8	19.6	11.1	11.1	12.6	12.6	12.9	13.6
ft/s	1,439	20.0	1,431	11.1	1,434	12.6	1,434	13.6
Velocity	1,160		1,158		1,158		1,158	
Sonic-Vapor adia								
ft/s								
Vapor isot								
ft/s								
PRESSURE DROP (In-Out)								
Overall	28.55		5.654		0.8747		67.23	
psi	28.55		5.654		0.8747		67.23	
Friction	0		0		0		0	
psi	0		0		0		0	
Accel'n	0		0		0		0	
psi	0.416		0.0801		0.0777		0.0842	
Static	0.999		0.999		0.999		0.999	
psi/100ft	328	0.984	328	0.984	328	0.984	328	0.984
dp/Length	45.8	3.81	45.9	3.82	45.9	3.83	47.1	3.92
psi/100ft	10	14	10	14	10	14	10	14
LINE SIZING	0.128	0	0.050	0.199	0.0427	0.16	0.0466	0.173
dp/Length	12.6	0	9.23	15.8	9.98	16.7	10.5	17.5
psi/100ft								
ft/s								
Velocity								
ft/s								

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PIPE LINE REPORT

Line number Line name	L1 Process line/pipe		L2 Process line/pipe		L3 Process line/pipe		L4 Fuel Gas Supply Pipeline	
	TYPE	No	TYPE	No	TYPE	No	TYPE	No
LIQUID HOLDUP								
Liquid Fraction (vol)	0		0		0		0	
Liquid Holdup(gp) (vol)	0		0		0		0	
2-PHASE METHOD	Isothermal		Isothermal		Isothermal		Isothermal	
FLOW REGIME	-		-		-		-	
Horizontal	-		-		-		-	
Vertical-Up	-		-		-		-	
Vertical-Down	-		-		-		-	
HOMOGENEOUS/DUKLER								
Reynolds No	6.038E6		4.976E6		7.145E6		7.145E6	
Friction factor	0.0142		0.01321		0.01259		0.01259	
Friction factor (turb)	0.01403		0.01293		0.01236		0.01236	
Dukler-2phase factor	1.00		1.00		1.00		1.00	
density lb/ft3	0		0		0		0	
LOCKHART-M/CHENOWETH-M								
Liquid-Re	0		0		0		0	
f	0		0		0		0	
Psi/Psi^2	0		0		0		0	
Vapor-Re	0		0		0		0	
f	0		0		0		0	
Psi^2	0		0		0		0	
X factor	0		0		0		0	
FITTINGS								
	TYPE	No	L/D	K	TYPE	No	L/D	K
	Entrance	1	0	0.5	Entrance	1	0	0.5
	Exit	1	0	1	Exit	1	0	1
	Gate valve	4	8	0	Gate valve	4	8	0
	Globe valv	4	340	0	Globe valv	4	340	0
	Check	2	50	0	Check	2	50	0
	Stop-check	0	400	0	Stop-check	0	400	0
	Elbow	12	14	0	Elbow	12	14	0
	180 Bend	0	50	0	180 Bend	0	50	0
	T-Straight	2	20	0	T-Straight	2	20	0
	T-Branch	1	60	0	T-Branch	1	60	0
	Other	0	0	0	Other	0	0	0
Total K	1.5		1.5		1.5		1.5	
Total L/D	400		400		256		200	
Equiv Length	2,103		2,155		343		25,122	

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Fatima Fertilizers Limited

PIPE LINE REPORT

Line number	L5	Process line/pipe
PROCESS DATA		
Temperature	C	AVG IN OUT
Pressure	psig	54.4 54.4 54.4
Liq Fraction	wt	1,200 1,201 1,200
Total-Flow	t/h	0 0 0
Dens-NS	lb/ft3	119.5 4.2 4.19
Elev	lb/ft3	4.19
Visc-NS	CP	0.0153
Vapor-Flow	t/h	119.5
Density	lb/ft3	4.19
Visc	CP	0.0153
Mol wt		19.5
Z		0.894
Cp/Cv		1.53
Liquid-Flow (wt)	t/h	0
Flow (vol)	m3/h	0
Density	lb/ft3	62.4
Visc	CP	1.0
PIPE DATA		
Size	in	16
Length	m	200
Schedule		30
ID	in	15.3
Roughness (E-3)	in	1.8
Safety factor		1.0
Sum of elev's	m	0
VELOCITY		
Velocity	ft/s	13.8 13.7 13.8
Sonic-Vapor adia	ft/s	1,434
Vapor isot	ft/s	1,158
PRESSURE DROP (In-Out)		
Overall	psi	0.8966
Friction	psi	0.8966
Accel'n	psi	0
Static	psi	0
dp/Length	psi/100ft	0.0849
LINE SIZING		
dp/Length	psi/100ft	0.999
Velocity	ft/s	328
VelCoef	ft/s	48.0
Size-Larger/Small	in	18 14
dp/Length	psi/100ft	0.0467
Velocity	ft/s	10.9 18.2

Hydraulic Simulation of Sales Gas Pipeli Phase-1 & Phase-2  
 Mari Well to Muhammad Pur SNGPL  
 Fatmia Fertilizers Limited

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PIPE LINE REPORT

Line number	L5	Process line/pipe
LIQUID HOLDUP	0	
Liquid Fraction (vol)	0	
Liquid Holdup(dp) (vol)	0	Isothermal
2-PHASE METHOD		
FLOW REGIME		
Horizontal	-	
Vertical-Up	-	
Vertical-Down	-	
HOMOGENEOUS/DUKLER		
Reynolds No	7.145E6	
Friction factor	0.01259	
Friction factor (turb)	0.01236	
Dukler-2phase factor	1.00	
density lb/ft3	0	
LOCKHART-M/CHENOWETH-M		
Liquid-Re	0	
f	0	
Psi/Psi^2	0	
Vapor-Re	0	
f	0	
Psi^2	0	
X factor	0	
FITTINGS		
TYPE	No	L/D
Entrance	1	0
Exit	1	0
Gate valve	2	8
Globe valv	0	340
Check	0	50
Stop-check	0	400
Elbow	6	14
180 Bend	0	50
T-Straight	2	20
T-Branch	1	60
Other		0
Total K	1.5	
Total L/D	200	
Equiv Length	322	m

NOTES - (1) d<sub>overall</sub> = d<sub>frictional</sub> + d<sub>facel</sub> + d<sub>pstatic</sub>  
 (2) NS = NO slip or homogenous

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 FEED SUMMARY  
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 Hydraulic Simulation of Sales Gas Pipeli  
 Mari Well to Muhammad Pur SNGPL  
 Phase-1 & Phase-2  
 Fatmia Fertilizers Limited  
 =====

Number	Description	Elevation m	Density lb/ft3	Level m	Rel Elev m	Rel Pres psi	dP Level psi	dP Inlet psi	Pres psig
SML/SUL	SML/SUL	0	4.62	0	0	0	0	0	1,342
Mari Wel	Mari Deep	0	4.6	0	0	0	0	0	1,319

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Hydraulic Simulation of Sales Gas Pipeli
Mari Well to Muhammad Pur SNGPL
Phase-1 & Phase-2
Patmia Fertilizers Limited
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PRODUCT SUMMARY

Number	Description	Elevation m	Density lb/ft3	Level m	Rel Elev m	Rel Pres psi	dP Level psi	dP Inlet psi	Pres psig
SNGPL	Mohd. Pur SNGPL	0	4.19	0	0	-	0	0	1,200



Hydraulic Simulation of Sales Gas Pipeli  
 Mari Well to Muhammad Pur SNGPL  
 Phase-1 & Phase-2  
 Fatima Fertilizers Limited

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T-PIECE SUMMARY

Number	Description	Service	Line	Spacing L/ID	Kc	Q/Qc	A/AC	Pressure psig
T1	Tee piece	Combined Manifold Branch	L3 L1 L2	0	0.552 0.203	1.0 0.445 0.555	1.0 0.28 0.629	1,314 1,313 1,314

NOTES - (1) dP Inlet for Feed, Products and Vessels represent pressure to velocity conversion only, not friction.



# SUI NORTHERN GAS PIPELINES LIMITED

Ref: P&D /02- 12204

Dated: 10.09.2018

Mr. Ifkhar Balg,  
Director - Business Development,  
Pakrab Fertilizers Limited,  
Head Office E-110, Khayaban-e-Jinnah,  
Lahore Cantt.

## PROPOSAL FOR CONSTRUCTION OF PIPELINE FROM MPCL TO SNGPL NETWORK AT MUHAMMAD-PUR

Please refer to your letter ref. No. Nil dated 16.08.2018 and subsequent meeting held at Head Office Lahore on 17.08.2018 regarding the subject matter.

We are pleased to submit our offer against the scope of work of subject project which is enclosed as Annexure-A. Our following offer is exclusive of all taxes and shall be charged in addition to this cost if applicable.

Sr. No.	Description	Unit Rate (Rs. Million/KM)	Total Cost (Rs. Million)
01.	16"dia x 24 Km pipeline with 0.312"/ 0.344" / 0.510" / 0.695" WT from Gas Processing facility(GPF) at MPCL to Tie-in Point on SNGPL transmission network.	14	336
02.	02 Nos. 12"dia x 1.4 Km each with 0.590" / 0.394" WT Feeder pipelines MPCL Manifold to GPF	10	28
03.	01 No. 14"dia x 1.4 Km with 0.625" WT Feeder pipeline from MPCL Manifold to GPF	11	15.4
<b>Total Cost</b>			<b>379.4</b>


Above offer shall be valid up to 01.10.2018. Tentative completion time would be 90 days. In case of non completion of job within stipulated time of 90 days due to stoppages and hurdles by locals and non-clearance of ROW by M/s PFL due to community issues, SNGPL shall have the right to claim all such expenses of SNGPL's resources engaged at site from PFL beyond the stay of 90 days period. All the terms and conditions defined in the contract (to be signed after the acceptance of this offer letter) shall also remain enforced during the contract period.

Please send us your concurrence on this offer to move further.

Regards,

Yours sincerely,

SUI NORTHERN GAS PIPELINES LTD

  
(Imran Yousaf Khan)  
General Manager (P&D)  
For Managing Director

Encl: As Above.

**SCOPE OF WORK**  
**CONSTRUCTION OF 01 SALE GAS PIPELINE AND 03 FEEDER PIPELINES**  
**FOR PAKARAB FERTILIZERS LIMITED (PFL)**

**A- CONSTRUCTION**

1. ROW preparation / Leveling / Grading
2. Unloading of pipe at storage yard
3. Excavation / Trenching
4. Construction and Laying of 01 No. Sale Gas Line (16"dia x 24 Km) and 03 Nos. Feeder Lines (02 Nos. of 12"dia x 1.4 Km & 14"dia x 1.4 Km).
5. Hydrostatic Testing
6. Radiography & QA
7. Crossings, Sleeving, coating repair, laying, backfilling etc.
8. Dewatering
9. Hook up and metering station at end point.
10. Testing & Commissioning
11. Civil Protective Works
12. As-Built mark ups

**B- CATHODIC PROTECTION**

1. Installation and testing of Cathodic Protection System.

**NOTE:**

1. M/s PFL will provide all the detailed pipeline design drawings / construction drawings along with BOQ lists and detailed route maps.
2. M/s PFL shall provide un encumbered corridor of land (permanent and temporary) for ROW as well as working strip.
3. M/s PFL shall provide the material such as coated line pipe (three layer PE coated), valves & fittings, factory bends, heat shrinkable sleeves along with compatible primers, coating patches, repair kit, insulating joints / flanges, corrosion monitoring system, all metering gadgets, civil material etc.
4. M/s PFL shall provide all the material required to install CP system along with detailed design drawings.
5. M/s PFL shall timely provide / arrange all approvals for crossings (Nullah/Canal/River) from the concerned departments. Payment of crossing fees shall be made by PFL.
6. M/s PFL shall arrange availability of dehydrated gas as per ECC decision for commissioning of pipelines ( for purging and packing) at their cost.
7. M/s PFL shall ensure the minimum requirement of following metering gadgets at CTP drawing according to which SNGPL will construct the CTP station.
  - 1)- Filter 0.5 Micron rating 2)- AGA-3 (latest edition) complaint orifice meter 3)- Flow computer 2 Nos. 4)- Gas Chromatograph 02 Nos. 5)- H2S analyzer 6)- Total Sulphur Analyzer 6)- Moisture Analyzer 7)- Oxygen Analyzer 8) - HCDP analyzer

OGRA-6(1)-NG(PFL)/2018

December 18, 2018

Mr. Saqib Aziz,  
Department Manager Business Development,  
Pakarab Fertilizers Limited,  
E-110, Khayaban-e-Jinnah Road,  
**LAHORE**

**Subject: PAKARAB FERTILIZERS LIMITED - APPLICATION FOR CONSTRUCTION & OPERATION OF PIPELINE FOR TRANSMISSION OF NATURAL GAS**

Dear Sir, *السلام علیکم*

Please refer to your letter No. PFL/OGRA/2018 dated November 09, 2018 on the subject noted above.

2. It is to inform that the information/data provided vide your subject letter has been examined by the concerned depts. However, your application is still devoid of the following data/information:-


- i. MoU/Letter of comfort/Non-disclosure Agreement with SNGPL
- ii. As per Hydraulic study report conducted on HYSYS Software the following pipelines has been recommended:-
  - a). Three 12" \* 870 meters long Pipelines from MPCL Custody Transfer point to processing Facility.
  - b). Main line 16" \* 24 Km long from processing Facility to SNGPL's Mahmudpur Valve Assembly.

You are required to provide a confirmation from the producer regarding construction and operation of the subject three gathering lines by them. It is to be noted that request for grant of license for construction and operation of 16" x 24 Km pipeline for transmission of natural Gas will be processed by OGRA.

- iii. Detailed break up of project cost as well as firm commitments of financing the said project from internal group and details of debt financing.
- iv. Copies of the agreement made with the financiers may also be provided.

3. In view of above, you are advised to furnish the above mentioned information / documents at an early stage, in order to proceed further in the matter, please.

Best Regards,

*for*  
  
(Abdul Basit Qureshi)  
Registrar  
(For & on behalf of the Authority)



*o/e*



# SUI NORTHERN GAS PIPELINES LIMITED

GAS HOUSE, 21 KASHMIR ROAD, P.O. BOX 56, LAHORE (PAKISTAN)

35

Ref. RA-TPA-02-19

January 09, 2019

Registrar,

Thru: Courier

Oil and Gas Regulatory Authority,  
54-Old ZTE Plaza, G-6/F-6,  
Near PIA Building, Fazal-e- Haq Road, Blue Area,  
Islamabad.

**Subject: ALLOCATION OF ADDITIONAL GAS PRODUCTION FROM MPCL'S EXISTING RESERVIORS TO PAK ARAB FERTILIZER LIMITED (PEL)**

Dear Sir,

السلام عليكم

Please find enclosed the Pakarab's letter No. PFL/SNGPL/2019 dated 05.01.2019 regarding the subject cited above; wherein PFL has requested SNGPL to issue a letter to OGRA stating that Gas Transportation Agreement (GTA) is being negotiated in order to issue the Transmission License.

In this context, it may please be noted that PFL has approached SNGPL for the purpose of Gas Transportation Agreement (GTA) for pipeline capacity allocation. It is highlighted that the first step for proceeding in respect of negotiation / finalization of GTA is the issuance of capacity allocation through First come First Serve basis, for which SOP has already been submitted to the Authority for approval vide our letter No. RA-TPA-01-19 dated 01-04-2019.

The definition of the Shipper in Third Party Access Rules (2018) is stated as below:

**Quote:**

"Shipper means a person holding a valid license issued by the Authority for transmission, distribution or sale of gas through an Access Arrangement for transportation of gas by utilizing capacity of gas pipeline transportation system above such threshold as may be specified in the Network Code".

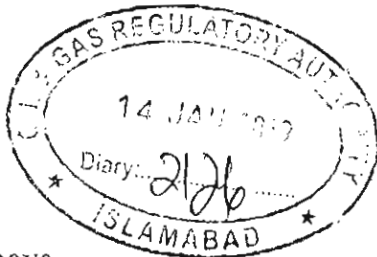
**Un-Quote**

We further understand that as per the above definition Access Arrangement / GTA can only be finalized once the PFL has a valid License issued by the Authority and capacity has been allocated to it as per TPA Rules.

Thanking you.

Yours Sincerely,  
SUI NORTHERN GAS PIPELINES LTD

(LIAQAT ALI)  
CHIEF OFFICER (RA)  
for MANAGING DIRECTOR



Encl: as above

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+92-42)99082006

Telephones: {(92-42) 9920 1483

Fax: (92-42)9920 442

www.sngpl.com.pk



Handwritten signatures and dates: 15/1/19

PFL/SNGPL/2019-  
January 05, 2019

The Managing Director  
Sui Northern Gas Pipelines Limited  
21-Kashmir Road  
Lahore

Subject: ALLOCATION OF ADDITIONAL GAS PRODUCTION FROM  
MPCL'S EXISTING RESERVOIRS TO PAKARAB FERTILIZERS  
LIMITED (PFL)

Reference: 1) ECC Decision dated 31.05.2018 Allocation of Additional Gas Production from MPCL's Existing Reservoirs to Pakarab Fertilizers Limited  
2) Our Letter Composition of MPCL Gas Fields (SML/SUL & Tipu) Allocated to Pakarab dated 10.07.2018  
3) Our Letter Gas Specification of SML/SUL & Goru B Wells and Pipeline Material NACE Compliance dated 28.09.2018  
4) DG Gas Letter Allocation of Additional Gas Production from MPCL's Existing Reservoir to Pakarab Fertilizers Ltd. dated 03.01.2019

Dear Sir,

We would refer to the meeting held under Chairmanship of Director General (Gas) on November 27, 2018 with representatives of PFL and SNGPL. PFL provided an update on the work completed including but not limited to the following:

- Managed all engineering and safety studies and reviews
- Managing extremely challenging ROW to expedite the construction
- Pipeline construction at PFL's own cost. Construction contract signed with SNGPL and work initiated
- Arrangement of 26 km pipeline and associated fittings / valves etc within very short period
- Managing all necessary approvals on fast-track including EIA, Railways, NHA etc

PFL has subsequently procured and installed necessary infrastructure facilities including compressors and dehydration plant etc.

During the meeting, SNGPL management apprised that adequate pipeline capacity from MPCL to PFL in SNGPL's existing system is available to cater to PFL. SNGPL is also willing to execute GTA in accordance with the ECC decision to transport allocated gases. TAPI pipeline is expected to intersect at Qasba Maral, which is approximately 18-20 km short of PFL plant site. SNGPL Team suggested to PFL to undertake a dedicated pipeline for this segment at its own cost. PFL hereby gives its concurrence to construct pipeline from Qasba Maral to Multan at its own cost provided TAPI Pipeline project is built.

PFL also informed the meeting that it had filed a Transmission License application with OGRA and one of the requirements is the execution of a GTA, however, OGRA would accept a letter from SNGPL stating that GTA is being negotiated in order to issue the Transmission License.

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SNGPL Team agreed to comply with such OGRA requirement and also negotiate Terms once Network Code is notified. ECC decision could be used as basis for this letter.

ECC decision states that SNGPL would supply minimum gas required along with Mari Shallow gas enabling the plant to operate. This arrangement would be for the interim period i.e. till full flow of comingled processed Mari gases.

SNGPL has indicated gas supply constraints in which case PFL would accept RLNG along with 35 mmcf/d Mari Shallow gas until 40 mmcf/d Goru-B gas comes online (expected mid-2019). RLNG to be provided under the same modalities approved by GoP for other fertilizer plants on SNGPL network (Agritech & Fatimafert) to provide a level playing field.

Pakistan Gas Network Code has been notified by OGRA as such you are requested to allocate pipeline capacity for transportation of above gases to PFL. The information required for capacity allocation under Article 2.4 of Network Code is as follows

Shipper	Pakarab Fertilizers Limited
Entry Point	SNGPL Valve assembly QV-2 at Muhammad Pur district Ghotki
Exit Point	PFL's manufacturing plant at Khanewal Road, Multan
Capacity Start Date	January 15, 2019
Capacity End Date	January 14, 2029
Capacity Duration	10 Years
Capacity Applied (MMSCFD)	35 MMSCFD
Capacity Requested (MMSCFD)	Firm Capacity
Use of Capacity	Gas Transportation for self-consumption to run the PFL Plant and allied equipment

Your kind directions on issuance of letter to OGRA stating that GTA is being negotiated are requested. We look forward to early finalization of capacity allocation enabling PFL to restart operations to provide much needed fertilizers to the farmers.

Thanking you,

Yours faithfully

For PAKARAB FERTILIZERS LIMITED

  
IFTIKHAR MAHMOOD BAIG  
(Director Business Development)

General Manager RA,  
SNGPL,  
Lahore

Subject: **LICENSE FOR CONSTRUCTION AND OPERATION OF PIPELINE FOR TRANSMISSION OF NATURAL GAS BY PFL**

Dear Sir,

Please refer to your letter No. RA-TPA-02-19 dated 9<sup>th</sup> January 2019 regarding subject cited above.

2. It is informed that OGRA grants a one-year conditional license to prospective shippers on the basis of MoU/Letter of comforts from LNG Suppliers, Terminal Operator, Sui companies and consumers. During this period of one year these agreements are formally executed and as such this point of time neither GTA nor capacity allocation is required. However, an MoU or Letter of comfort regarding undergoing negotiation is pre requisite for grant of license. Furthermore, OGRA has already responded SNGPL regarding their request for amendment in NWC.

Yours truly,

  
Registrar





PFL/OGRA/2019-  
 February 12, 2019

The Registrar  
 Oil and Gas Regulatory Authority (OGRA)  
 1st Floor, 54-B, Fazal-e-Haq Road  
 Islamabad

**Subject: PAKARAB FERTILIZERS LIMITED - APPLICATION FOR CONSTRUCTION & OPERATION OF PIPELINE FOR TRANSMISSION OF NATURAL GAS**

**Reference: Your letter No. OGRA-6(1)-NG(PFL)/2018 dated 18 December, 2018**

**Dear Sir,**

Fatima Fertilizer Company Limited (FFL) an associated company of PFL would provide financial support to complete the project as and when required.

As requested at point iii & iv of your above referred letter, we are pleased to enclose herewith:

- Project Cost breakup. Annex-A
- FFL Board Resolution. Annex-B
- FFL 3<sup>rd</sup> Quarterly Report 2018. Annex-C
- FFL Annual Report 2017. Annex-D

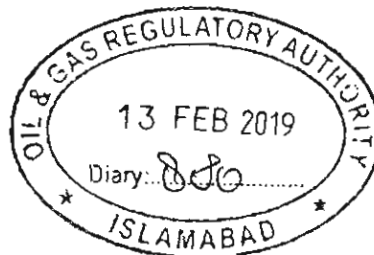
Should you require further information or clarification please contact us

**Thanking you,**

**Yours faithfully,  
 For PAKARAB FERTILIZERS LIMITED**



**SAQIB AZIZ  
 (Department Manager Business Development)**



*DR*  
*13/2/19*  
*13/2/19*  
*L.O*  
*13/2/19*

(Annex-A)

## Project Cost Breakup

S.No.	Costing Head	Cost (MM US\$)
<b>1.0</b>	<b>Phase-1: (35 MMSCFD Mari Shallow Gas; Compression + Dehydration)</b>	
1.1	Engineering (Pipeline + Facility)	0.30
1.2	Front End Compressors	5.40
1.3	Pipeline	14.40
1.4	Construction, Facility Development, Utilities, DHU	4.50
1.5	Land	0.23
1.6	Contingency (5%)	0.45
<b>1.7</b>	<b>Sub Total</b>	<b>25.28</b>
<b>2.0</b>	<b>Phase-2: CO2 Removal facility for 35MMSCFD Shallow + 40 MMSCFD Deep Gas</b>	
2.1	Engineering	1.00
2.2	Acid Gas Removal System	27.50
2.3	Mari Deep Pipeline (Feeder Line)	1.50
2.4	Utilities & Off-sites	4.50
2.5	Facility Development + Control System	5.20
2.6	Plant Construction	4.50
2.7	Scope Contingency (5%)	2.21
<b>2.8</b>	<b>Sub Total</b>	<b>46.41</b>
<b>3.0</b>	<b>Total (Phase-1 + Phase-2)</b>	<b>71.69</b>

**EXTRACT OF RESOLUTION THROUGH CIRCULATION PASSED BY THE BOARD OF DIRECTORS OF M/S FATIMA FERTILIZER COMPANY LIMITED (THE "COMPANY") ON FEBRUARY 6, 2019**

Whereas, pursuant to the decision of ECC of the Cabinet vide case No. ECC-43/10/2018 dated May 17, 2018 regarding allocation of additional gas production from Mari Petroleum Company Limited's existing reservoirs to Pakarab Fertilizers Limited, the associated company namely Pakarab Fertilizers Limited (PFL) has applied to Oil and Gas Regulatory Authority (OGRA) for construction and operation of pipeline for transmission of natural gas;

And whereas, OGRA has required PFL to provide information about source of financing of this project which PFL intends to arrange through internal group resources and debt financing (if required) and has requested Fatima Fertilizer Company Limited to confirm the same to OGRA as required;

**Now, Therefore, Be it Resolved**, that Board of Directors of Fatima Fertilizer Company Limited hereby confirms to provide financial support, as and when needed, for processing and transportation of natural gas from Mari Petroleum Company Limited to Pakarab Fertilizers Limited Multan as already approved by the ECC of the Cabinet.

**Resolved further**, that the Chief Executive Officer and Chief Financial Officer of the Company be and are each hereby authorized, directed and empowered singly to do all such acts as may be necessary for carrying out the purposes aforesaid and to give full effect to this resolution.

**CERTIFIED TRUE COPY**

I hereby certify that the above resolution was duly passed through circulation by the Board of Directors on February 6, 2019.

  
\_\_\_\_\_  
COMPANY SECRETARY  
Am