

Annexure-II

SCHEDULE A

Format for furnishing information regarding determining capacity of Natural Gas Pipeline

S. No.	Description	GAIL Submission/ Remarks
1.	Name of Entity	GAIL (India) Ltd.
2.	Address and contact details of Entity	GAIL Bhawan, 16, Bhikaiji Cama Place, R.K. Puram, New Delhi - 110066
3.	Name of Natural Gas Pipeline	KG Basin NG Pipeline Network
4.	Name of Software package used	Pipeline Studio TNet (ver. 4.2)
5.	Approved Flow equation used (mention name of flow equation)	Panhandle – A for $\leq 24''$ \varnothing pipelines Panhandle – B for $> 24''$ \varnothing pipelines (As per PNGRB Guidelines)
6.	Details of Injection/Entry Points Details of Delivery/Exit Points	As in Annexure I&II
7.	Composition of Natural gas	As in Annexure II
8.	Entity agrees to have considered the technical standards, specifications and safety standards as specified by the board	YES
9.	Entity agrees to have considered the relevant provisions of Petroleum and Natural Gas Regulatory Board regulations	YES
10.	Constant and variable parameters used under steady state conditions for determining capacity of pipelines	As in Annexure I&II
11.	Capacity of the pipeline under existing operating conditions	5.70 MMSCMD
12.	Maximum achievable capacity of the pipeline under steady state conditions as determined under section 5 of these regulations	5.70 MMSCMD
13.	Section-wise maximum achievable capacity of the pipeline as determined under section 5 of these regulations	5.70 MMSCMD
14.	Expected addition of entry points and exit points scheduled in near future	Future entry and exit points will be informed as and when these are finalized

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6.	Details of Injection/Entry Points Details of Delivery/Exit Points	As in Annexure I&II
7.	Composition of Natural gas	As in Annexure II
8.	Entity agrees to have considered the technical standards, specifications and safety standards as specified by the board	YES
9.	Entity agrees to have considered the relevant provisions of Petroleum and Natural Gas Regulatory Board regulations	YES
10.	Constant and variable parameters used under steady state conditions for determining capacity of pipelines	As in Annexure I&II
11.	Capacity of the pipeline under existing operating conditions	-
12.	Maximum achievable capacity of the pipeline under steady state conditions as determined under section 5 of these regulations	9.58 MMSCMD
13.	Section-wise maximum achievable capacity of the pipeline as determined under section 5 of these regulations	9.58 MMSCMD
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7.	Composition of Natural gas	As in Annexure II
8.	Entity agrees to have considered the technical standards, specifications and safety standards as specified by the board	YES
9.	Entity agrees to have considered the relevant provisions of Petroleum and Natural Gas Regulatory Board regulations	YES
10.	Constant and variable parameters used under steady state conditions for determining capacity of pipelines	As in Annexure I&II
11.	Capacity of the pipeline under existing operating conditions	5.36 MMSCMD
12.	Maximum achievable capacity of the pipeline under steady state conditions as determined under section 5 of these regulations	8.15 MMSCMD
13.	Section-wise maximum achievable capacity of the pipeline as determined under section 5 of these regulations	8.15 MMSCMD
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6.	Details of Injection/Entry Points Details of Delivery/Exit Points	As in Annexure I&II
7.	Composition of Natural gas	As in Annexure II
8.	Entity agrees to have considered the technical standards, specifications and safety standards as specified by the board	YES
9.	Entity agrees to have considered the relevant provisions of Petroleum and Natural Gas Regulatory Board regulations	YES
10.	Constant and variable parameters used under steady state conditions for determining capacity of pipelines	As in Annexure I&II
11.	Capacity of the pipeline under existing operating conditions	5.13 MMSCMD
12.	Maximum achievable capacity of the pipeline under steady state conditions as determined under section 5 of these regulations	8.77 MMSCMD
13.	Section-wise maximum achievable capacity of the pipeline as determined under section 5 of these regulations	8.77 MMSCMD
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6.	Details of Injection/Entry Points Details of Delivery/Exit Points	As in Annexure I&II
7.	Composition of Natural gas	As in Annexure II
8.	Entity agrees to have considered the technical standards, specifications and safety standards as specified by the board	YES
9.	Entity agrees to have considered the relevant provisions of Petroleum and Natural Gas Regulatory Board regulations	YES
10.	Constant and variable parameters used under steady state conditions for determining capacity of pipelines	As in Annexure I&II
11.	Capacity of the pipeline under existing operating conditions	4.58 MMSCMD
12.	Maximum achievable capacity of the pipeline under steady state conditions as determined under section 5 of these regulations	8.09 MMSCMD
13.	Section-wise maximum achievable capacity of the pipeline as determined under section 5 of these regulations	8.09 MMSCMD
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6.	Details of Injection/Entry Points Details of Delivery/Exit Points	As in Annexure I&II
7.	Composition of Natural gas	As in Annexure II
8.	Entity agrees to have considered the technical standards, specifications and safety standards as specified by the board	YES
9.	Entity agrees to have considered the relevant provisions of Petroleum and Natural Gas Regulatory Board regulations	YES
10.	Constant and variable parameters used under steady state conditions for determining capacity of pipelines	As in Annexure I&II
11.	Capacity of the pipeline under existing operating conditions	4.41 MMSCMD
12.	Maximum achievable capacity of the pipeline under steady state conditions as determined under section 5 of these regulations	8.41 MMSCMD
13.	Section-wise maximum achievable capacity of the pipeline as determined under section 5 of these regulations	8.41 MMSCMD
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4.	Name of Software package used	Pipeline Studio TNet (ver. 4.2)
5.	Approved Flow equation used (mention name of flow equation)	Panhandle – A for $\leq 24''$ \varnothing pipelines (As per PNGRB Guidelines)
6.	Details of Injection/Entry Points Details of Delivery/Exit Points	As in Annexure I&II
7.	Composition of Natural gas	As in Annexure II
8.	Entity agrees to have considered the technical standards, specifications and safety standards as specified by the board	YES
9.	Entity agrees to have considered the relevant provisions of Petroleum and Natural Gas Regulatory Board regulations	YES
10.	Constant and variable parameters used under steady state conditions for determining capacity of pipelines	As in Annexure I&II
11.	Capacity of the pipeline under existing operating conditions	4.41 MMSCMD
12.	Maximum achievable capacity of the pipeline under steady state conditions as determined under section 5 of these regulations	8.41 MMSCMD
13.	Section-wise maximum achievable capacity of the pipeline as determined under section 5 of these regulations	8.41 MMSCMD
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5.	Approved Flow equation used (mention name of flow equation)	Panhandle – A for $\leq 24'' \text{ } \varnothing$ pipelines Panhandle – B for $> 24'' \text{ } \varnothing$ pipelines (As per PNGRB Regulations)
6.	Details of Injection/Entry Points Details of Delivery/Exit Points	As in Annexure I & II
7.	Composition of Natural gas	As in Annexure II
8.	Entity agrees to have considered the technical standards, specifications and safety standards as specified by the board	YES
9.	Entity agrees to have considered the relevant provisions of Petroleum and Natural Gas Regulatory Board regulations	YES
10.	Constant and variable parameters used under steady state conditions for determining capacity of pipelines	As in Annexure I & II
11.	Capacity of the pipeline under existing operating conditions	3.46 MMSCMD
12.	Maximum achievable capacity of the pipeline under steady state conditions as determined under section 5 of these regulations	7.44 MMSCMD
13.	Section-wise maximum achievable capacity of the pipeline as determined under section 5 of these regulations	7.44 MMSCMD
14.	Expected addition of entry points and exit points scheduled in near future	Future entry and exit points will be informed as and when these are finalized

SCHEDULE A

Format for furnishing information regarding determining capacity of Natural Gas Pipeline (Financial Year: 2023-24)

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3.	Name of Natural Gas Pipeline	KG Basin Network
4.	Name of Software package used	Pipeline Studio TNet (ver. 4.2)
5.	Approved Flow equation used (mention name of flow equation)	Panhandle – A for $\leq 24''$ \varnothing pipelines Panhandle – B for $> 24''$ \varnothing pipelines (As per PNGRB Regulations)
6.	Details of Injection/Entry Points Details of Delivery/Exit Points	As in Annexure I&II
7.	Composition of Natural gas	As in Annexure II
8.	Entity agrees to have considered the technical standards, specifications and safety standards as specified by the board	YES
9.	Entity agrees to have considered the relevant provisions of Petroleum and Natural Gas Regulatory Board regulations	YES
10.	Constant and variable parameters used under steady state conditions for determining capacity of pipelines	As in Annexure I&II
11.	Capacity of the pipeline under existing operating conditions	4.00
12.	Maximum achievable capacity of the pipeline under steady state conditions as determined under regulation 5 of these regulations	6.97 MMSCMD
13.	Section-wise maximum achievable capacity of the pipeline as determined under regulation 5 of these regulations	
14.	Expected addition of entry points and exit points scheduled in near future	Future entry and exit points will be informed as and when these are finalized

Annexure II

KG Basin pipeline network

1	TG networking sheets for capacity working of this pipeline network along-with soft copy	Attached at Annexure 1 – Capacity 6.97 MMSCMD
2	Diameter and length of each section of pipeline including that for each customer.	Table 1 below
3	Basis for the assumptions for future deliveries (if any) i.e. pressure and flow assumed as well as copy of contracts in support of same	For Future deliveries, free flow has been envisaged at the end of existing pipeline at critical customer NFCL which requires pressure at least 40 kg/cm ² g. (~4 kg/cm ² g has been assumed as terminal drop). Odalarevu source flow has been considered as unlimited source at 49 kg/cm ² g to allow all other domestic source evacuation possible at their available pressures and maximum volume taken from present volume-pressure profile. Evacuation of sources considered based on typical available pressures at each source.
4	Terminal Drop	Terminal drop of 4 kg/cm ² g is considered

I. CONSTANT PARAMETERS

Table 1: CONSTANT PARAMETER - SECTION CONFIGURATION

Pipe Name	Length (Km)	Diameter (I.D.) in inch	Thickness (mm)	Roughness (Micron)
75	6.7	3.996	6.4	45
74	4.3	3.996	6.4	45
78	9	3.996	6.4	45
79	9	3.996	6.4	45
81	0.7	3.996	6.4	45
76	0.02	3.996	6.4	45
77	0.6	3.996	6.4	45
73	2	3.996	6.4	45
70	14	6.122	6.4	45

68	9.8	8.122	6.4	45
67	5	8.122	6.4	45
66	5	8.122	6.4	45
57	10.9	8.122	6.4	45
65	26	8.122	6.4	45
61	12	8.122	6.4	45
60	42	8.122	6.4	45
63	17	8.122	6.4	45
64	12	8.122	6.4	45
62	10	8.122	6.4	45
59	6.7	8.122	6.4	45
58	6.3	8.122	6.4	45
55	1.1	10.248	6.4	45
54	4	10.248	6.4	45
53	4	10.248	6.4	45
50	10	12.193	7.1	45
49	17	12.193	7.1	45
46	8	12.193	7.1	45
48	13	12.193	7.1	45
52	12	12.193	7.1	45
444	8.95	12.193	7.1	45
41	26	12.193	7.1	45
40	9.5	13.315	8.7	45
39	20.5	15.315	8.7	45
38	9.8	15.315	8.7	45
37	20.5	15.315	8.7	45
35	3.5	15.496	6.4	45
36	6.3	15.496	6.4	45
34	8	17.242	9.5	45
33	8	17.242	9.5	45
21	2.1	17.243	9.5	45
20	2.1	17.243	9.5	45
26	2	17.243	9.5	45
23	8	17.243	9.5	45
32	17	17.243	9.5	45
31	5	17.243	9.5	45
30	15	17.243	9.5	45
28	19.2	17.243	9.5	45
29	9	17.243	9.5	45
25	7	17.243	9.5	45
24	7	17.243	9.5	45

27	9.5	17.243	9.5	45
22	2	17.243	9.5	45
19	52	17.244	9.5	45
17	35.5	17.244	9.5	45
18	9	17.244	9.5	45
16	35.5	17.244	9.5	45
14	39	17.244	9.5	45
15	15	17.244	9.5	45
5	15	23.189	9.5	15
9	17	23.189	9.5	15
8	19.2	23.189	9.5	15
10	9	23.189	9.5	15
7	13.6	23.189	9.5	15
6	9.5	23.189	9.5	15
4	5	23.189	9.5	15
3	12	23.205	10.3	15
2	1.5	23.205	10.3	15
1	5	23.205	10.3	45

Table 2: CONSTANT PARAMETER – FLOW OF CUSTOMER

Customer Name	Volume (MMSCMD)	Pressure (Kg/cm²g)
BGL-VIJWDA	0.056	33
Lingalacustomers	0.008	2
TGL	0.039	37
SAT	0.001	37
ASL	0.011	37
BGL Kkd	0.035	44
CIL	0.019	44
NFCL	2.492	44
BGL Hyd	0.199	33
MEIL	0.066	37
For Ramagundam	0.000	46
For TGPL	0.010	46
GGPL East Godavari	0.006	48
GGPL West Godavari	0.023	37
For HPCL GSPCL	0.181	46
For MEIL	0.058	46
For IOCL	0.011	46
For MNGL	0.002	46

Oduru exit point customers	0.782	46
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II. VARIABLE PARAMETERS

Table 3: VARIABLE PARAMETERS -OPERATING PARAMETERS AT SOURCES

Sr. No.	Source Name	Flow (MMSCMD)	Pressure (Kg/cm ² g)	Temperature (Deg C)
1	NARSAPUR MP	0.061	37.00	25.00
2	mori	0.213	37.05	25.00
3	kESANAPALLI	0.032	48.43	25.00
4	Endamaru	0.111	46.37	25.00
5	Odalarevu	4.813	49.00	25.00
6	PASALPUDI	0.120	48.42	27.96
7	TATIPAKA MP	0.218	48.42	25.63
8	MANDAPETTA W + HP	0.779	47.60	25.00
9	KEI-RSOS	0.036	48.42	25.63
10	Lingala Kaikaluru	0.008	2.00	25.00
11	RSGDP	0.000	48.31	25.00
12	RAVVA1	0.266	48.31	25.00
13	RGTEL	0.312	46.32	28.64

Table 4: VARIABLE PARAMETER - GAS COMPOSITION AT SOURCE

Serial No.	SOURCE NAME	COMPOSITION (Mole %)
1	Narsapur MP	Methane: 94.23 Ethane: 2.38 Propane: 0.8 i-butane: 0.19 n-butane: 0.17 i-pentane : 0.07 n-pentane : 0.06 Hexane : 0.28 N ₂ : 0.13 CO ₂ : 1.69
2	Mori	Methane: 98.61 Ethane: 0.25 Propane: 0.19 n-pentane : 0.03 Hexane : 0.31 N ₂ : 0.12

		CO2 : 0.49
3	Kesanapalli	Methane: 83.61 Ethane: 4.94 Propane: 4.37 i-butane: 1.21 n-butane: 1.75 i-pentane : 0.72 n-pentane : 0.35 Hexane : 0.4 CO2 : 2.65
4	Endamaru	Methane: 92.4 Ethane: 2.93 Propane: 0.83 i-butane: 0.15 n-butane: 0.3 n-pentane : 0.08 Hexane : 0.41 N2: 0.37 CO2 : 2.53
5	Odalarevu	Methane: 94.67 Ethane: 1.06 Propane: 0.76 i-butane: 0.31 i-pentane : 0.12 n-pentane : 0.09 Hexane : 0.48 N2: 0.49 CO2 : 2.0
6	Pasalpudi	Methane: 89.4 Ethane: 3.2 Propane: 2.63 i-butane: 0.45 i-pentane : 0.12 n-pentane : 0.1 Hexane : 0.15 CO2 : 2.34 Nitrogen : 1.57
7	Tatipaka MP	Methane: 92.92 Ethane: 1.9 Propane: 1.1 i-butane: 0.33 n-butane: 0.39 i-pentane : 0.19 n-pentane : 0.1 Hexane : 0.39 N2: 0.08 CO2 : 2.6
8	Mandapetta	Methane: 87.24 Ethane: 6.46 Propane: 1.5 i-butane: 0.25

		i-pentane : 0.09 n-pentane : 0.08 N2: 0.12 CO2 : 4.24
9	Lingala Kaikaluru	Methane: 70.53 Ethane: 11.21 Propane: 7.92 i-butane : 1.4 n-butane : 2.4 i-pentane : 2.36 n-pentane : 0.43 Hexane : 0.31 Heptane+ : 0.3 N2: 0.23 CO2 : 2
10	RAVVA1	Methane: 90.02842 Ethane: 3.692807 Propane: 3.262479 i-butane: 0.6004563 n-butane: 0.9307073 i-pentane : 0.2001521 n-pentane : 0.1701293 Hexane : 0.09006845 N2: 0.1022777 CO2 : 0.9225011
11	RGTIL	Methane: 98.1821 Ethane: 0.721574 Propane: 0.300822 i-butane: 0.0579658 n-butane: 0.0799528 i-pentane : 0.0899469 n-pentane : 0.0279835 Hexane : 0.0489711 CO2 : 0.286831 N2 : 0.20388

