

Fairbanks Pipeline Company

PROJECT DESCRIPTION:

Pipeline from Pump Station 1 to Terminus

Case Number: 1059
Pipeline data file: Case 2A CS1 to CI 18in.TOT

Pressure drop formula: General Flow Equation
Pipeline efficiency: 1.00
Compressibility Factor Method: Standing-Katz

Inlet Gas Gravity(Air=1.0): 0.65000
Inlet Gas Viscosity: 0.0000080(lb/ft-sec)
Gas specific heat ratio: 1.29

Calculations Based on Specified Thermal Conductivities of Pipe, Soil and Insulation

Base temperature: 60.00(degF)
Base pressure: 14.70(psia)

Origin suction temperature: 60.00(degF)
Origin suction pressure: 2400.00(psig)
Pipeline Terminus Delivery pressure: 500.10(psig)
Minimum pressure: 100.0(psig)
Maximum gas velocity: 50.00(ft/sec)

Inlet Flow rate: 250.00(MMSCFD)
Outlet Flow rate: 198.00(MMSCFD)

CALCULATION OPTIONS:

Branch pipe calculations: NO
Loop pipe calculations: NO
Compressor Fuel Calculated: NO
Joule Thompson effect included : NO
Customized Output: NO
Holding Delivery Pressure at terminus

ALL PRESSURES ARE GAUGE PRESSURES, UNLESS OTHERWISE SPECIFIED AS ABSOLUTE PRESSURES

PIPELINE PROFILE DATA

Distance (mi)	Elevation (ft)	Diameter (in)	Thickness (in)	Roughness (in)
0.00	39.00	18.000	0.375	0.000700
57.60	602.00	18.000	0.375	0.000700
104.27	1383.00	18.000	0.375	0.000700
144.05	2763.00	18.000	0.375	0.000700
167.00	4752.00	18.000	0.375	0.000700
170.40	3352.20	18.000	0.375	0.000700
197.54	1568.10	18.000	0.375	0.000700
222.54	1244.50	18.000	0.375	0.000700
242.13	1250.30	18.000	0.375	0.000700
274.82	1250.30	18.000	0.375	0.000700
355.00	139.00	18.000	0.375	0.000700
397.50	443.50	18.000	0.375	0.000700
410.00	443.50	18.000	0.375	0.000700
738.00	100.00	18.000	0.375	0.000700

THERMAL CONDUCTIVITY AND INSULATION DATA

Distance (mi)	Cover (in)	Thermal Conductivity (Btu/hr/ft/degF)			Insul.Thk (in)	Soil Temp (degF)
		Pipe	Soil	Insulation		
0.000	36.000	29.000	0.800	0.020	0.000	29.00
57.600	36.000	29.000	0.800	0.020	0.000	29.00
104.270	36.000	29.000	0.800	0.020	0.000	29.00
144.050	36.000	29.000	0.800	0.020	0.000	29.00
167.000	36.000	29.000	0.800	0.020	0.000	29.00
170.400	36.000	29.000	0.800	0.020	0.000	29.00
197.540	36.000	29.000	0.800	0.020	0.000	29.00
222.540	36.000	29.000	0.800	0.020	0.000	29.00
242.130	36.000	29.000	0.800	0.020	0.000	29.00
274.820	36.000	29.000	0.800	0.020	0.000	29.00
355.000	36.000	29.000	0.800	0.020	0.000	29.00
397.500	36.000	29.000	0.800	0.020	0.000	29.00
410.000	36.000	29.000	0.800	0.020	0.000	29.00
738.000	36.000	29.000	0.800	0.020	0.000	29.00

LOCATIONS AND FLOW RATES

Location	Distance (mi)	Flow in/out (MMSCFD)	Gravity	Viscosity (lb/ft-sec)	Pressure (psig)	GasTemp. (degF)
CS-1	0.00	250.0000	0.6500	0.00000800	2400.00	60.00
Livengood	410.00	-52.0000	0.6500	0.00000800	1696.27	29.00
NP	738.00	-198.6000	0.6500	0.00000800	500.10	29.00

COMPRESSOR STATION DATA

FLOW RATES, PRESSURES AND TEMPERATURES:

Name	Flow	Suct.	Disch.	Compr.	Suct.	Disch.	Suct.	Disch.	MaxPipe
Name	Flow	Suct.	Disch.	Compr.	Suct.	Disch.	Suct.	Disch.	MaxPipe
	Rate	Press.	Press.	Ratio	Loss.	Loss.	Temp.	Temp	Temp
	(MMSCFD)	(psig)	(psig)		(psia)	(psia)	(degF)	(degF)	(degF)
Livengood	198.00	613.43	1696.27	2.7239	0.00	0.00	29.00	183.44	140.00

Gas Cooling required at compressor station: Livengood to limit station discharge temperature to 140 (degF)

COMPRESSOR EFFICIENCY, HP AND FUEL USED

Name	Distance	Compr	Mech.	Overall	Horse	Fuel	Fuel	Installed
	(mi)	Effy.	Effy.	Effy.	Power	Factor	Used	(HP)
		(%)	(%)	(%)	(MCF/day/HP)		(MMSCFD)	
Livengood	410.00	80.00	98.00	78.40	10,169.38	0.2000	-----	5000

Total Compressor Station Horsepower: 10,169.38 5,000.

REYNOLD'S NUMBER AND HEAT TRANSFER COEFFICIENT

Distance (mi)	Reynold'sNum.	FrictFactor (Darcy)	Transmission Factor	HeatTransCoeff (Btu/hr/ft2/degF)	CompressibilityFactor (Standing-Katz)
0.000	15,905,027.	0.0102	19.84	0.4634	0.6339
57.600	15,905,027.	0.0102	19.84	0.4634	0.6424
104.270	15,905,027.	0.0102	19.84	0.4634	0.6444
144.050	15,905,027.	0.0102	19.84	0.4634	0.6571
167.000	15,905,027.	0.0102	19.84	0.4634	0.6637
170.400	15,905,027.	0.0102	19.84	0.4634	0.6589
197.540	15,905,027.	0.0102	19.84	0.4634	0.6611
222.540	15,905,027.	0.0102	19.84	0.4634	0.6685
242.130	15,905,027.	0.0102	19.84	0.4634	0.6815
274.820	15,905,027.	0.0102	19.84	0.4634	0.7195
355.000	15,905,027.	0.0102	19.84	0.4634	0.7871
397.500	15,905,027.	0.0102	19.84	0.4634	0.8397
410.000	12,596,782.	0.0102	19.84	0.4631	0.7392
738.000	12,596,782.	0.0102	19.84	0.4631	0.7392

PIPELINE TEMPERATURE AND PRESSURE PROFILE

Distance (mi)	Diameter (in)	Flow (MMSCFD)	Velocity (ft/sec)	Press. (psig)	GasTemp. (degF)	SoilTemp. (degF)	MAOP (psig)	Location
0.00	18.000	250.0000	10.87	2400.00	0.00	29.00	2400.00	CS-1
57.60	18.000	250.0000	11.79	2211.61	28.49	29.00	2400.00	PS-2
104.27	18.000	250.0000	12.88	2023.43	28.98	29.00	2400.00	PS-3
144.05	18.000	250.0000	14.44	1803.49	29.00	29.00	2400.00	PS-4
167.00	18.000	250.0000	16.29	1596.57	29.00	29.00	2400.00	Crest
170.40	18.000	250.0000	15.57	1671.23	29.00	29.00	2400.00	RGV-31
197.54	18.000	250.0000	15.37	1693.17	29.00	29.00	2400.00	RGV-36
222.54	18.000	250.0000	15.99	1626.92	29.00	29.00	2400.00	RGV-40
242.13	18.000	250.0000	16.73	1554.93	29.00	29.00	2400.00	RGV-45
274.82	18.000	250.0000	18.24	1424.85	29.00	29.00	2400.00	PS-5
355.00	18.000	250.0000	24.13	1073.16	29.00	29.00	2400.00	PS-6
397.50	18.000	250.0000	34.51	746.19	29.00	29.00	2400.00	RGV-65
410.00	18.000	250.0000	33.10	613.43	29.00	29.00	2400.00	Livengood
410.00	18.000	198.0000	12.15	1696.27	140.00	29.00	2400.00	Livengood
738.00	18.000	198.0000	40.39	500.10	29.00	29.00	2400.00	CI

LINE PACK VOLUMES AND PRESSURES

Distance (mi)	Pressure (psig)	Line Pack (million std.cu.ft)
0.00	945.23	0.0000
0.00	2400.00	0.0000
57.60	2211.61	137.9138
104.27	2023.43	96.2228
144.05	1803.49	73.9045
167.00	1596.57	37.1912
170.40	1671.23	5.2393
197.54	1693.17	43.3531
222.54	1626.92	39.2921
242.13	1554.93	29.1888
274.82	1424.85	44.7927
355.00	1073.16	87.9174
397.50	746.19	31.2825
410.00	613.43	6.4319
738.00	500.10	115.1845

Total line pack in main pipeline = 747.9146 million standard cubic feet

End of Simulation

Pipeline data file: C:\Documents and Settings\schen\My Documents\Gasmod\Case 2A CS1 to CI 18in.TOT

