

Fairbanks Pipeline Company

PROJECT DESCRIPTION:

Pipeline from Pump Station 1 to Terminus

Case Number: 1046
Pipeline data file: Case1_12in_with_compressor.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: 600.00(psig)
Pipeline Terminus Delivery pressure: 500.16(psig)
Minimum pressure: 100.0(psig)
Maximum gas velocity: 50.00(ft/sec)

Inlet Flow rate: 52.00(MMSCFD)
Outlet Flow rate: 40.60(MMSCFD)

CALCULATION OPTIONS:

Branch pipe calculations: NO
Loop pipe calculations: 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	12.000	0.375	0.000700
57.60	602.00	12.000	0.375	0.000700
104.27	1383.00	12.000	0.375	0.000700
144.05	2763.00	12.000	0.375	0.000700
167.00	4752.00	12.000	0.375	0.000700
170.40	3352.20	12.000	0.375	0.000700
197.54	1568.10	12.000	0.375	0.000700
222.54	1244.50	12.000	0.375	0.000700
242.13	1250.30	12.000	0.375	0.000700
274.82	1250.30	12.000	0.375	0.000700
355.00	139.00	12.000	0.375	0.000700
397.50	443.50	12.000	0.375	0.000700
410.00	443.50	12.000	0.375	0.000700
414.80	904.00	12.000	0.375	0.000700
485.00	755.00	12.000	0.375	0.000700
514.50	440.00	12.000	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
414.800	36.000	29.000	0.800	0.020	0.000	29.00
485.000	36.000	29.000	0.800	0.020	0.000	29.00
514.500	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	52.0000	0.6500	0.00000800	600.00	60.00
Livengood	410.00	-11.4000	0.6500	0.00000800	790.24	29.00
NP	514.50	-40.6000	0.6500	0.00000800	500.16	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)
CS-1	52.00	600.00	1701.32	2.7916	0.00	0.00	60.00	228.74	140.00

Gas Cooling required at compressor station: CS-1 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)	
CS-1	0.00	80.00	98.00	78.40	3,024.12	0.2000	-----	5000

Total Compressor Station Horsepower: 3,024.12 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	5,072,643.	0.0110	19.10	0.6025	0.6849
57.600	5,072,643.	0.0110	19.10	0.6025	0.6766
104.270	5,072,643.	0.0110	19.10	0.6025	0.6951
144.050	5,072,643.	0.0110	19.10	0.6025	0.7181
167.000	5,072,643.	0.0110	19.10	0.6025	0.7257
170.400	5,072,643.	0.0110	19.10	0.6025	0.7186
197.540	5,072,643.	0.0110	19.10	0.6025	0.7194
222.540	5,072,643.	0.0110	19.10	0.6025	0.7262
242.130	5,072,643.	0.0110	19.10	0.6025	0.7367
274.820	5,072,643.	0.0110	19.10	0.6025	0.7593
355.000	5,072,643.	0.0110	19.10	0.6025	0.7907
397.500	5,072,643.	0.0110	19.10	0.6025	0.8106
410.000	3,960,564.	0.0110	19.10	0.6015	0.8178
414.800	3,960,564.	0.0110	19.10	0.6015	0.8392
485.000	3,960,564.	0.0110	19.10	0.6015	0.8703
514.500	3,960,564.	0.0110	19.10	0.6015	0.8703

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	12.000	52.0000	7.48	1701.32	140.00	29.00	2000.00	CS-1
57.60	12.000	52.0000	8.03	1583.79	29.00	29.00	2000.00	PS-2
104.27	12.000	52.0000	8.66	1468.17	29.00	29.00	2000.00	PS-3
144.05	12.000	52.0000	9.55	1330.10	29.00	29.00	2000.00	PS-4
167.00	12.000	52.0000	10.60	1196.86	29.00	29.00	2000.00	Crest
170.40	12.000	52.0000	10.16	1249.44	29.00	29.00	2000.00	RGV-31
197.54	12.000	52.0000	9.95	1275.35	29.00	29.00	2000.00	RGV-36
222.54	12.000	52.0000	10.23	1240.49	29.00	29.00	2000.00	RGV-40
242.13	12.000	52.0000	10.57	1200.20	29.00	29.00	2000.00	RGV-45
274.82	12.000	52.0000	11.22	1129.21	29.00	29.00	2000.00	PS-5
355.00	12.000	52.0000	13.05	969.26	29.00	29.00	2000.00	PS-6
397.50	12.000	52.0000	15.15	832.87	29.00	29.00	2000.00	RGV-65
410.00	12.000	40.6000	12.45	790.24	29.00	29.00	2000.00	Livengood
414.80	12.000	40.6000	12.80	768.62	29.00	29.00	2000.00	PS-7
485.00	12.000	40.6000	16.52	592.10	29.00	29.00	2000.00	FOx
514.50	12.000	40.6000	19.47	500.16	29.00	29.00	2000.00	NP

LINE PACK VOLUMES AND PRESSURES

Distance (mi)	Pressure (psig)	Line Pack (million std.cu.ft)
0.00	1701.32	0.0000
57.60	1583.79	28.9726
104.27	1468.17	28.0496
144.05	1330.10	21.3632
167.00	1196.86	10.7865
170.40	1249.44	1.5303
197.54	1275.35	12.7268
222.54	1240.49	11.6695
242.13	1200.20	8.7904
274.82	1129.21	13.8115
355.00	969.26	29.6951
397.50	832.87	13.0105
410.00	790.24	3.3621
414.80	768.62	1.2297
485.00	592.10	15.4204
514.50	500.16	5.0262

Total line pack in main pipeline = 205.4444 million standard cubic feet

End of Simulation

Pipeline data file: C:\Documents and Settings\schen\My Documents\chen\Energia Cura\GASMOD\FPC Simulation\Case1 12in with compr

