

Fairbanks Pipeline Company

PROJECT DESCRIPTION:

Pipeline from Pump Station 1 to Terminus

Case Number: 1053
Pipeline data file: Case2_18in_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: 500.33(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	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
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	780.94	29.00
NP	514.50	-40.6000	0.6500	0.00000800	500.33	29.00

COMPRESSOR STATION DATA

FLOW RATES, PRESSURES AND TEMPERATURES:

Name	Flow	Suct.	Disch.	Compr.	Suct.	Disch.	Suct.	Disch.	MaxPipe
Name	Flow Rate (MMSCFD)	Suct. Press. (psig)	Disch. Press. (psig)	Compr. Ratio	Suct. Loss. (psia)	Disch. Loss. (psia)	Suct. Temp. (degF)	Disch. Temp (degF)	MaxPipe Temp (degF)
CS-1	52.00	600.00	945.23	1.5616	0.00	0.00	60.00	128.51	140.00

COMPRESSOR EFFICIENCY, HP AND FUEL USED

Name	Distance (mi)	Compr Effy. (%)	Mech. Effy. (%)	Overall Effy. (%)	Horse Power (MCF/day/HP)	Fuel Factor	Fuel Used (MMSCFD)	Installed (HP)
CS-1	0.00	80.00	98.00	78.40	1,227.77	0.2000	-----	5000

Total Compressor Station Horsepower: 1,227.77 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	3,308,246.	0.0102	19.84	0.4594	0.7949
57.600	3,308,246.	0.0102	19.84	0.4594	0.7931
104.270	3,308,246.	0.0102	19.84	0.4594	0.8029
144.050	3,308,246.	0.0102	19.84	0.4594	0.8149
167.000	3,308,246.	0.0102	19.84	0.4594	0.8178
170.400	3,308,246.	0.0102	19.84	0.4594	0.8102
197.540	3,308,246.	0.0102	19.84	0.4594	0.8064
222.540	3,308,246.	0.0102	19.84	0.4594	0.8072
242.130	3,308,246.	0.0102	19.84	0.4594	0.8094
274.820	3,308,246.	0.0102	19.84	0.4594	0.8109
355.000	3,308,246.	0.0102	19.84	0.4594	0.8137
397.500	3,308,246.	0.0102	19.84	0.4594	0.8169
410.000	2,582,976.	0.0102	19.84	0.4582	0.8188
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	5.69	945.23	140.00	128.51	2000.00	CS-1
57.60	12.000	52.0000	5.91	910.10	29.00	29.00	2000.00	PS-2
104.27	12.000	52.0000	6.16	872.33	29.00	29.00	2000.00	PS-3
144.05	12.000	52.0000	6.53	821.33	29.00	29.00	2000.00	PS-4
167.00	12.000	52.0000	7.02	763.38	29.00	29.00	2000.00	Crest
170.40	12.000	52.0000	6.74	795.94	29.00	29.00	2000.00	RGV-31
197.54	12.000	52.0000	6.46	831.31	29.00	29.00	2000.00	RGV-36
222.54	12.000	52.0000	6.46	830.70	29.00	29.00	2000.00	RGV-40
242.13	12.000	52.0000	6.52	823.41	29.00	29.00	2000.00	RGV-45
274.82	12.000	52.0000	6.61	811.33	29.00	29.00	2000.00	PS-5
355.00	12.000	52.0000	6.63	809.56	29.00	29.00	2000.00	PS-6
397.50	12.000	52.0000	6.82	785.81	29.00	29.00	2000.00	RGV-65
410.00	12.000	40.6000	5.36	780.94	29.00	29.00	2000.00	Livengood
414.80	12.000	40.6000	12.80	768.72	29.00	29.00	2000.00	PS-7
485.00	12.000	40.6000	16.52	592.23	29.00	29.00	2000.00	FOx
514.50	12.000	40.6000	19.46	500.33	29.00	29.00	2000.00	NP

LINE PACK VOLUMES AND PRESSURES

Distance (mi)	Pressure (psig)	Line Pack (million std.cu.ft)
0.00	945.23	0.0000
57.60	910.10	35.8619
104.27	872.33	33.0691
144.05	821.33	26.4864
167.00	763.38	14.1048
170.40	795.94	2.0489
197.54	831.31	17.2137
222.54	830.70	16.2633
242.13	823.41	12.6708
274.82	811.33	20.8455
355.00	809.56	50.6059
397.50	785.81	26.3195
410.00	780.94	7.5744
414.80	768.72	2.8708
485.00	592.23	15.4234
514.50	500.33	5.0278

Total line pack in main pipeline = 286.3862 million standard cubic feet

End of Simulation

Pipeline data file: C:\Documents and Settings\schen\My Documents\chen\Energia Cura\GASMOD\FPC Simulation\Case2 18in with compr

