

Fairbanks Pipeline Company

PROJECT DESCRIPTION:

Pipeline from Pump Station 1 to Terminus

Case Number: 1045
Pipeline data file: Pump1_to_NP_12.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)

Pipeline Inlet temperature: 60 (degF)
Pipeline Inlet pressure: 1800.00(psig)
Pipeline Terminus Delivery pressure: 821.73(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	1800.00	60.00
Livengood	410.00	-11.4000	0.6500	0.00000800	1013.33	29.00
NP	514.50	-40.6000	0.6500	0.00000800	821.73	29.00

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	0.6592
57.600	5,072,643.	0.0110	19.10	0.6025	0.6641
104.270	5,072,643.	0.0110	19.10	0.6025	0.6795
144.050	5,072,643.	0.0110	19.10	0.6025	0.7005
167.000	5,072,643.	0.0110	19.10	0.6025	0.7073
170.400	5,072,643.	0.0110	19.10	0.6025	0.6989
197.540	5,072,643.	0.0110	19.10	0.6025	0.6978
222.540	5,072,643.	0.0110	19.10	0.6025	0.7029
242.130	5,072,643.	0.0110	19.10	0.6025	0.7111
274.820	5,072,643.	0.0110	19.10	0.6025	0.7271
355.000	5,072,643.	0.0110	19.10	0.6025	0.7492
397.500	5,072,643.	0.0110	19.10	0.6025	0.7639
410.000	3,960,564.	0.0110	19.10	0.6015	0.7695
414.800	3,960,564.	0.0110	19.10	0.6015	0.7843
485.000	3,960,564.	0.0110	19.10	0.6015	0.8029
514.500	3,960,564.	0.0110	19.10	0.6015	0.8029

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	7.08	1800.00	60.00	29.00	2000.00	CS-1
57.60	12.000	52.0000	7.30	1687.32	29.00	29.00	2000.00	PS-2
104.27	12.000	52.0000	7.80	1573.57	29.00	29.00	2000.00	PS-3
144.05	12.000	52.0000	8.45	1434.71	29.00	29.00	2000.00	PS-4
167.00	12.000	52.0000	9.29	1296.35	29.00	29.00	2000.00	Crest
170.40	12.000	52.0000	9.57	1356.26	29.00	29.00	2000.00	RGV-31
197.54	12.000	52.0000	9.23	1397.41	29.00	29.00	2000.00	RGV-36
222.54	12.000	52.0000	9.18	1370.22	29.00	29.00	2000.00	RGV-40
242.13	12.000	52.0000	9.39	1334.92	29.00	29.00	2000.00	RGV-45
274.82	12.000	52.0000	9.73	1273.66	29.00	29.00	2000.00	PS-5
355.00	12.000	52.0000	10.43	1155.71	29.00	29.00	2000.00	PS-6
397.50	12.000	52.0000	11.50	1045.13	29.00	29.00	2000.00	RGV-65
410.00	12.000	40.6000	12.30	1013.33	29.00	29.00	2000.00	Livengood
414.80	12.000	40.6000	9.86	990.46	29.00	29.00	2000.00	PS-7
485.00	12.000	40.6000	10.59	871.57	29.00	29.00	2000.00	FOx
514.50	12.000	40.6000	11.63	821.73	29.00	29.00	2000.00	NP

LINE PACK VOLUMES AND PRESSURES

Distance (mi)	Pressure (psig)	Line Pack (million std.cu.ft)
0.00	1800.00	0.0000
57.60	1687.32	37.3442
104.27	1573.57	30.5161
144.05	1434.71	23.4740
167.00	1296.35	11.9392
170.40	1356.26	1.7010
197.54	1397.41	14.2579
222.54	1370.22	13.2202
242.13	1334.92	10.0543
274.82	1273.66	16.0005
355.00	1155.71	35.7933
397.50	1045.13	16.7026
410.00	1013.33	4.5074
414.80	990.46	1.6730
485.00	871.57	22.3613
514.50	821.73	8.3520

Total line pack in main pipeline = 247.8870 million standard cubic feet

End of Simulation

Pipeline data file: C:\Documents and Settings\schen\My Documents\chen\Energia Cura\GASMOD\Pump1_to_NP_12.TOT

