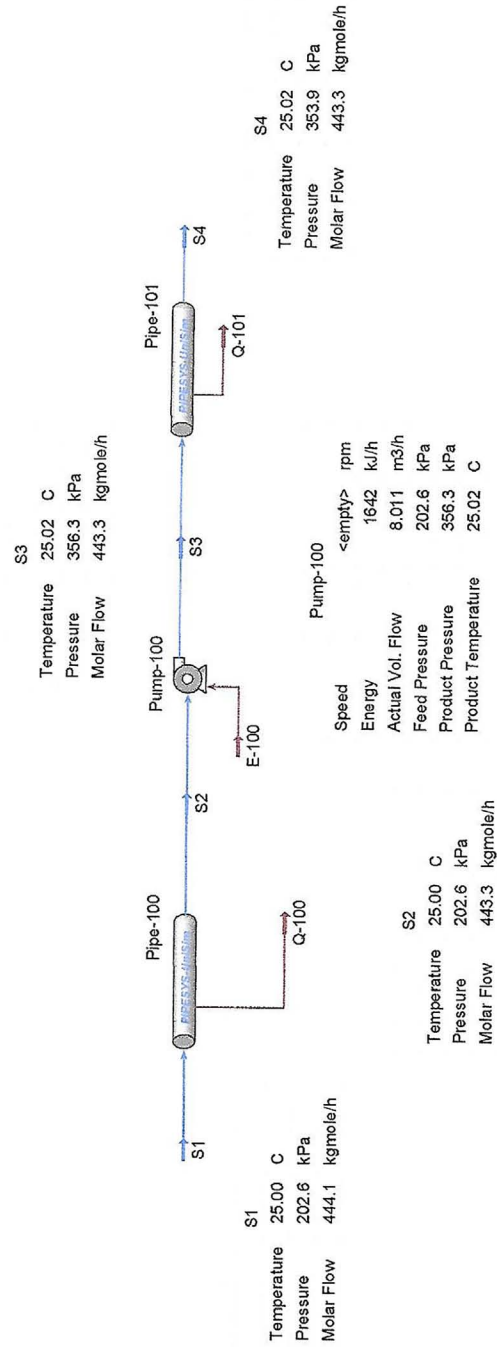



# Appendix E





1			Case Name: C:\Users\del\Desktop\Pipeline-deltaP.usc	
2	<b>Honeywell</b>	Company Name Not Available		Unit Set: SI
3		Calgary, Alberta		Date/Time: Monday Dec 25 2017, 21:41:05
4		CANADA		
5				
6	<b>Schlumberger PIPESYS-UniSim v201</b>		<b>Pipeline-deltaP.usc</b>	
7	<b>Pipe-100</b>			
8	<b>Connections</b>			
9	<b>Inlet</b>		<b>Outlet</b>	
10	<b>Energy</b>			
11	<b>NAME</b>	<b>FROM OPER</b>	<b>NAME</b>	<b>TO OPER</b>
12	S1		S2	Pump: Pump-100
13				Q-100
14	<b>Calculation Procedures</b>			
15	<b>Multiphase Horizontal Flow</b>		<b>Multiphase Vertical Upflow</b>	
16	Overall Selection: Beggs and Brill (1973) *		Overall Selection: Aziz, Govier and Fogarasi *	
17	Flow Regime Prediction: Beggs and Brill *		Flow Regime Prediction: Govier, and Aziz *	
18	Liquid Holdup: Beggs and Brill *		Liquid Holdup: Aziz, Govier, and Fogarasi *	
19	Frictional Pressure Loss: Beggs and Brill *		Frictional Pressure Loss: Aziz, Govier and Fogarasi *	
20	Uphill Correction: Beggs and Brill Liquid Holdup Correctio *			
21	Downhill Recovery: Recovery Based on Mixture Density *		<b>Multiphase Vertical Downflow</b>	
22	<b>Single Phase Flow</b>		Overall Selection: Beggs and Brill Revised (1977) *	
23	Overall Selection: Fanning Equation *		Flow Regime Prediction: Beggs and Brill Revised *	
24			Liquid Holdup: Beggs and Brill Revised *	
25			Frictional Pressure Loss: Beggs and Brill *	
26	<b>Stepsizes and Tolerances</b>			
27	<b>Pipe Lengths</b>		<b>Pressure Convergence</b>	
28	Initial stepsize: 30.48 m *		Initial dP Guess: -68.95 kPa *	
29	Minimum stepsize: 0.030 m *		Minimum dP/step: 20.68 kPa *	
30	Maximum stepsize: -- *		Maximum dP/step: 68.95 kPa *	
31			Convergence Tolerance: 0.069 kPa *	
32	<b>Temperature Convergence</b>		<b>Enthalpy Convergence</b>	
33	Initial dT Guess: -1.11 C *		Minimum dH/step: 1.40 kJ/kg *	
34	Minimum dT/step: 0.83 C *		Maximum dH/step: 4.65 kJ/kg *	
35	Maximum dT/step: 2.78 C *		Convergence Tolerance: 0.023 kJ/kg *	
36	Convergence Tolerance: 0.028 C *			
37	<b>Overall Settings</b>		<b>Overall Pipeline Pressure Convergence</b>	
38	Stepsize and Tolerances: Set to Program Defaults *		Minimum allowed pressure: 101.008 kPa *	
39	Force Enthalpy Convergence: Disabled *		Downstream press. conv. tolerance: 0.689 kPa *	
40	Optimize Stepsize: Enabled *			
41	<b>Emulsion</b>			
42	Emulsion Viscosity Option: Normal blended viscosity calculation			

1			Case Name: C:\Users\dell\Desktop\Pipeline-deltaP.usc				
2	<b>Honeywell</b>	Company Name Not Available		Unit Set: SI			
3		Calgary, Alberta					
4		CANADA		Date/Time: Monday Dec 25 2017, 21:41:05			
5							
6	<b>Schlumberger PIPESYS-UniSim v201</b>			<b>Pipeline-deltaP.usc</b>			
7							
8							
9							
10	<b>Pipe-100</b>						
11							
12	<b>Pipeline Units Profile</b>						
13							
14							
15	Distance at Pipeline Origin: 0.00 m			Elevation at Pipeline Origin: 0.00 m			
16							
17	Pipeline unit	Distance (m)	Elevation (m)	Run (m)	Rise (m)	Length (m)	Angle (deg)
18							Label
19	Pipe	10.00	0.00	10.00	0.00	10.00	0.000
20							
21	<b>Surroundings Temperature Profile</b>						
22							
23	Surroundings Temperature at Pipeline Origin: 25.00 C						
24							
25	Distance (m)	Elevation (m)	Cum. Length (m)	Label	Surroundings T (C)	Surroundings Type	
26							
27	10.00	0.00	10.00	Pipe-100	25.00	Above Ground	
28							
29	<b>Pipe Dimensions at Pipeline Origin</b>						
30							
31	<b>Name: Pipe-100</b>						
32							
33	<b>Unit Location</b>						
34							
35	Distance: 0.00 m		Elevation: 0.00 m		Distance From Origin: 0.00 m		
36							
37							
38	Nominal Diameter: 4 Inches				Outside Diameter: 114.300 mm		
39	Pipe Schedule: 40				Wall Thickness: 6.020 mm		
40							
41							
42	Default Roughnesses: User Specified						
43							
44	Absolute Roughness: 0.00000 mm				Relative Roughness: 0.000000		
45							
46							
47							
48							
49							
50							
51							
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1	 Company Name Not Available Calgary, Alberta CANADA		Case Name: C:\Users\dell\Desktop\Pipeline-deltaP.usc
2			Unit Set: SI
3			Date/Time: Monday Dec 25 2017, 21:41:05
4			
5			
6	<b>Schlumberger PIPESYS-UniSim v201</b>		<b>Pipeline-deltaP.usc</b>
7	<b>Pipe-100</b>		
8	<b>Heat Transfer Data at Pipeline Origin</b>		
9	Name: Pipe-100		
10	<b>Unit Location</b>		
11	Distance: 0.00 m	Elevation: 0.00 m	Distance From Origin: 0.00 m
12	<b>Heat Transfer Environment</b>		<b>Soil Parameters</b>
13	AboveGround	*	Centre Line Depth: ---
14	<b>Overall Heat Transfer Coefficient</b>		Buried Fraction: ---
15			Type: ---
16	Specified Coefficient: ---		Conductivity: ---
17	<b>Inside Film Coefficient</b>		<b>Water Parameters</b>
18			Density: ---
19	Type: Calculated	*	Viscosity: ---
20	Specified Coefficient: ---		Conductivity: ---
21	<b>Pipe Parameters</b>		Velocity: ---
22			Heat Capacity: ---
23	Default Conductivities: Default: Steel		<b>Air Parameters</b>
24	Pipe Conductivity: 48.461 W/m-K		Density: 1.217 kg/m3
25			Viscosity: 0.018 cP
26			Conductivity: 0.026 W/m-K
27			Velocity: 2.134 m/s
28	<b>Pipe Coatings Data at Pipeline Origin</b>		
29	Name: Pipe-100		
30	<b>Unit Location</b>		
31	Distance: 0.00 m	Elevation: 0.00 m	Distance From Origin: 0.00 m
32	Layer	Coating	Thickness (mm)
33	---	<empty>	---
34	<b>Calculation Messages</b>		
35	<b>Error Messages</b>		
36	No calculation errors encountered, PIPESYS-UniSim has converged.		
37	<b>Warning Messages</b>		



1	 Company Name Not Available Calgary, Alberta CANADA						Case Name: C:\Users\del\Desktop\Pipeline-deltaP.usc					
2							Unit Set: SI					
3							Date/Time: Monday Dec 25 2017, 21:41:05					
4												
5												
6												
7	<b>Schlumberger PIPESYS-UniSim v201</b>						<b>Pipeline-deltaP.usc</b>					
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1					Case Name: C:\Users\del\Desktop\Pipeline-deltaP.usc				
2	 Company Name Not Available Calgary, Alberta CANADA				Unit Set: SI				
3					Date/Time: Monday Dec 25 2017, 21:41:05				
4									
5									
6	<b>Schlumberger PIPESYS-UniSim v201</b>				<b>Pipeline-deltaP.usc</b>				
7									
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12									
13									
14									
15									
16	<b>Heat Transfer Parameters</b>				<b>Transient Cooldown Parameters</b>				
17	Overall Heat Transfer Coefficient: ---				Maximum Time Since Shutdown: ---				
18	Inside Film Coefficient: ---				First Intermediate Time: ---				
19	Thermal Conductivity of Fluid: ---				Second Intermediate Time: ---				
20	Heat Capacity of Pipe Material: ---				Third Intermediate Time: ---				
21	Density of Pipe Material: ---				Minimum Cooldown Temperature: ---				
22					Calculation Time Step: ---				
23									
24	<b>Results</b>								
25	Cumulative	Overall Heat	Inside	Fluid	First	Second	Third	Temperature for	Time to Reach
26	Length	Transfer	Film	Thermal	Intermediate	Intermediate	Intermediate	Max Time Since	Min Cooldown
27	(m)	Coefficient	Coefficient	Conductivity	Temperature	Temperature	Temperature	Shutdown	Temperature
28		(kJ/h-m2-C)	(kJ/h-m2-C)	(W/m-K)	(C)	(C)	(C)	(C)	(hours)
29									
30	<b>Inlet Properties : S1</b>								
31									
32									
33		Overall			Aqueous Phase				
34	Vapour/Phase Fraction	0.0000			1.0000				
35	Temperature: (C)	25.00 *			25.00				
36	Pressure: (kPa)	202.65 *			202.65				
37	Molar Flow (kgmole/h)	444.07			444.07				
38	Mass Flow (kg/h)	8000.00 *			8000.00				
39	Liquid Volume Flow (m3/h)	8.02			8.02				
40	Std Gas Flow (STD_m3/h)	10499.83			10499.83				
41	Molar Enthalpy (kJ/kgmole)	-2.850e+005			-2.850e+005				
42	Mass Enthalpy (kJ/kg)	-1.582e+004			-1.582e+004				
43	Heat Flow (kJ/h)	-1.266e+008			-1.266e+008				
44	Molar Density (kgmole/m3)	55.3388			55.3388				
45	Mass Density (kg/m3)	996.935			996.935				
46	Std Liquid Mass Density (kg/m3)	998.942			998.942				
47	Molar Heat Capacity (kJ/kgmole-C)	75.310			75.310				
48	Mass Heat Capacity (kJ/kg-C)	4.180			4.180				
49	Molar Entropy (kJ/kgmole-C)	6.613			6.613				
50	Mass Entropy (kJ/kg-C)	0.367			0.367				
51	Thermal Conductivity (W/m-K)	0.611			0.611				
52	Viscosity (cP)	0.890			0.890				
53	Surface Tension (dyne/cm)	72.100			72.100				
54	Molecular Weight	18.015			18.015				
55	Z Factor	0.001			0.001				
56									
57	<b>Outlet Properties : S2</b>								
58									
59		Overall			Aqueous Phase				
60	Vapour/Phase Fraction	0.0000			1.0000				
61	Temperature: (C)	25.00			25.00				
62	Pressure: (kPa)	202.57			202.57				
63	Molar Flow (kgmole/h)	443.32			443.32				
64	Mass Flow (kg/h)	7966.54			7966.54				
65	Liquid Volume Flow (m3/h)	8.00			8.00				
66	Std Gas Flow (STD_m3/h)	10482.16			10482.16				
67	Molar Enthalpy (kJ/kgmole)	-2.850e+005			-2.850e+005				
68	Mass Enthalpy (kJ/kg)	-1.582e+004			-1.582e+004				
69	Heat Flow (kJ/h)	-1.264e+008			-1.264e+008				
70	Molar Density (kgmole/m3)	55.3388			55.3388				


1			Case Name:	C:\Users\dell\Desktop\Pipeline-deltaP.usc
2	<b>Honeywell</b>	Company Name Not Available Calgary, Alberta CANADA	Unit Set:	SI
3			Date/Time:	Monday Dec 25 2017, 21:41:05
4				
5				
6				
7	<b>Schlumberger PIPESYS-UniSim v201</b>		<b>Pipeline-deltaP.usc</b>	
8				
9				
10				
11				
12				
13				
14				
15				
16	Mass Density (kg/m3)	Overall	Aqueous Phase	
17	Std Liquid Mass Density (kg/m3)	996.935	996.935	
18	Molar Heat Capacity (kJ/kgmole-C)	998.942	998.942	
19	Mass Heat Capacity	75.310	75.310	
20	Molar Entropy (kJ/kgmole-C)	4.180	4.180	
21	Mass Entropy (kJ/kg-C)	6.612	6.612	
22	ThermalConductivity (W/m-K)	0.367	0.367	
23	Viscosity (cP)	0.611	0.611	
24	Surface Tension (dyne/cm)	0.890	0.890	
25	Molecular Weight	72.100	72.100	
26	Z Factor	18.015	18.015	
27		0.001	0.001	
28	<b>Stream Compositions</b>			
29				
30	Component	Inlet Mole Fraction	Outlet Mole Fraction	
31	H2O	1.00000 *	1.00000 *	
32				
33	<b>Summary</b>			
34				
35				
36	Upstream Pressure: 202.65 kPa			
37	Upstream Temperature: 25.00 C			
38				
39	Downstream Pressure: 202.57 kPa			
40	Downstream Temperature: 25.00 C			
41				
42	Predicted Pressure Loss: 0.08 kPa			
43				
44	Friction Loss: 0.08 kPa			
45	Hydrostatic Loss: 0.00 kPa			
46	Kinetic Loss: 0.000 kPa			
47	Inline Facilities Loss: 0.00 kPa			
48				
49	Average Pressure Gradient: -0.0084 kPa/m			
50				
51	Total Liquid Holdup: 0.1 m3			
52	Total Line Pack @STD: 0.0 m3			
53				
54	Pipe Volume: 0.1 m3			
55				
56	Net Heat Loss to the Surroundings: -8.162e-003 kJ/h			
57				
58	<b>STATUS</b>			
59	OK			
60				
61	<b>NOTES</b>			
62				
63				
64	<b>Description</b>			
65				
66				
67				
68				
69				
70				



1			Case Name: C:\Users\delld\Desktop\Pipeline-deltaP.usc	
2	<b>Honeywell</b>	Company Name Not Available		Unit Set: SI
3		Calgary, Alberta		Date/Time: Monday Dec 25 2017, 21:43:02
4		CANADA		
5				
6				
7	<b>Schlumberger PIPESYS-UniSim v201</b>		<b>Pipeline-deltaP.usc</b>	
8				
9				
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11				
12				
13				
14				
15				
16	<b>Inlet</b>		<b>Outlet</b>	
17	<b>NAME</b>	<b>FROM OPER</b>	<b>NAME</b>	<b>TO OPER</b>
18	S3	Pump: Pump-100	S4	Q-101
19				
20				
21				
22				
23				
24	<b>Multiphase Horizontal Flow</b>		<b>Multiphase Vertical Upflow</b>	
25				
26	Overall Selection:	Gas based default	Overall Selection:	Gas based default
27	Flow Regime Prediction:	Taitel and Dukler	Flow Regime Prediction:	Govier, and Aziz
28	Liquid Holdup:	Eaton et al	Liquid Holdup:	Aziz, Govier, and Fogarasi
29	Frictional Pressure Loss:	Oliemans	Frictional Pressure Loss:	Aziz, Govier and Fogarasi
30	Uphill Correction:	No Correction		
31	Downhill Recovery:	Recovery Based on Gas Density		
32				
33				
34				
35	<b>Single Phase Flow</b>		<b>Multiphase Vertical Downflow</b>	
36				
37	Overall Selection:	Fanning Equation	Overall Selection:	Gas based default
38			Flow Regime Prediction:	Beggs and Brill Revised
39			Liquid Holdup:	Beggs and Brill Revised
40			Frictional Pressure Loss:	Beggs and Brill
41				
42				
43				
44	<b>Pipe Lengths</b>		<b>Pressure Convergence</b>	
45				
46	Initial stepsize:	30.48 m	Initial dP Guess:	-68.95 kPa
47	Minimum stepsize:	0.030 m	Minimum dP/step:	20.68 kPa
48	Maximum stepsize:	---	Maximum dP/step:	68.95 kPa
49			Convergence Tolerance:	0.069 kPa
50				
51				
52	<b>Temperature Convergence</b>		<b>Enthalpy Convergence</b>	
53				
54	Initial dT Guess:	-1.11 C	Minimum dH/step:	1.40 kJ/kg
55	Minimum dT/step:	0.83 C	Maximum dH/step:	4.65 kJ/kg
56	Maximum dT/step:	2.78 C	Convergence Tolerance:	0.023 kJ/kg
57	Convergence Tolerance:	0.028 C		
58				
59				
60	<b>Overall Settings</b>		<b>Overall Pipeline Pressure Convergence</b>	
61				
62	Stepsize and Tolerances:	Set to Program Defaults	Minimum allowed pressure:	101.008 kPa
63	Force Enthalpy Convergence:	Disabled	Downstream press. conv. tolerance:	0.689 kPa
64	Optimize Stepsize:	Enabled		
65				
66				
67				
68				
69				
70				

**Emulsion**


Emulsion Viscosity Option: Normal blended viscosity calculation

1	 Company Name Not Available Calgary, Alberta CANADA		Case Name: C:\Users\dell\Desktop\Pipeline-deltaP.usc					
2			Unit Set: SI					
3			Date/Time: Monday Dec 25 2017, 21:43:02					
4								
5								
6								
7	<b>Schlumberger PIPESYS-UniSim v201</b>			<b>Pipeline-deltaP.usc</b>				
8								
9								
10	<b>Pipe-101</b>							
11								
12	<b>Pipeline Units Profile</b>							
13								
14								
15	Distance at Pipeline Origin: 0.00 m			Elevation at Pipeline Origin: 0.00 m				
16								
17	Pipeline unit	Distance (m)	Elevation (m)	Run (m)	Rise (m)	Length (m)	Angle (deg)	Label
18	Pipe	10.00	0.00	10.00	0.00	10.00	0.000	Pipe #1
19								
20	<b>Surroundings Temperature Profile</b>							
21								
22								
23	Surroundings Temperature at Pipeline Origin: 25.00 C							
24								
25	Distance (m)	Elevation (m)	Cum. Length (m)	Label	Surroundings T (C)	Surroundings Type		
26	10.00	0.00	10.00	Pipe #1	25.00	Buried		
27								
28	<b>Pipe Dimensions at Pipeline Origin</b>							
29								
30								
31	<b>Name: Pipe #1</b>							
32								
33	<b>Unit Location</b>							
34								
35	Distance: 0.00 m		Elevation: 0.00 m		Distance From Origin: 0.00 m			
36								
37	Nominal Diameter: 2 Inches				Outside Diameter: 60.325 mm			
38	Pipe Schedule: 40				Wall Thickness: 3.912 mm			
39					Inside Diameter: 52.502 mm			
40								
41								
42	Default Roughnesses: Default: Steel (bare, average field conditions)							
43								
44	Absolute Roughness: 0.04572 mm				Relative Roughness: 0.000871			
45								
46								
47								
48								
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1			Case Name: C:\Users\dell\Desktop\Pipeline-deltaP.usc
2	<b>Honeywell</b>	Company Name Not Available Calgary, Alberta CANADA	Unit Set: SI
3			Date/Time: Monday Dec 25 2017, 21:43:02
4			
5			
6			
7	<b>Schlumberger PIPESYS-UniSim v201</b>		<b>Pipeline-deltaP.usc</b>
8			
9			
10	<b>Pipe-101</b>		
11			
12	<b>Heat Transfer Data at Pipeline Origin</b>		
13			
14			
15	Name: Pipe #1		
16			
17	<b>Unit Location</b>		
18			
19	Distance: 0.00 m	Elevation: 0.00 m	Distance From Origin: 0.00 m
20			
21	<b>Heat Transfer Environment</b>		<b>Soil Parameters</b>
22			
23	Buried		Centre Line Depth: 0.914 m
24			Buried Fraction: ---
25			Type: Default
26	<b>Overall Heat Transfer Coefficient</b>		Conductivity: 0.865 W/m-K
27			
28	Specified Coefficient: ---		<b>Water Parameters</b>
29			
30			
31	<b>Inside Film Coefficient</b>		Density: ---
32			Viscosity: ---
33	Type: Calculated		Conductivity: ---
34	Specified Coefficient: ---		Velocity: ---
35			Heat Capacity: ---
36			
37	<b>Pipe Parameters</b>		<b>Air Parameters</b>
38			
39	Default Conductivities: Default: Steel		Density: ---
40	Pipe Conductivity: 48.461 W/m-K		Viscosity: ---
41			Conductivity: ---
42			Velocity: ---
43			
44			
45			
46	<b>Pipe Coatings Data at Pipeline Origin</b>		
47			
48			
49	Name: Pipe #1		
50			
51	<b>Unit Location</b>		
52			
53	Distance: 0.00 m	Elevation: 0.00 m	Distance From Origin: 0.00 m
54			
55	Layer	Coating	Thickness (mm)
56			Conductivity (W/m-K)
57	---	<empty>	---
58			
59	<b>Calculation Messages</b>		
60			
61			
62	<b>Error Messages</b>		
63			
64			
65	No calculation errors encountered, PIPESYS-UniSim has converged.		
66			
67			
68	<b>Warning Messages</b>		
69			
70			

1			Case Name: C:\Users\dell\Desktop\Pipeline-deltaP.usc								
2	<b>Honeywell</b>		Company Name Not Available								
3			Calgary, Alberta								
4			CANADA								
5			Unit Set: SI								
6			Date/Time: Monday Dec 25 2017, 21:43:02								
7	<b>Schlumberger PIPESYS-UniSim v201</b>					<b>Pipeline-deltaP.usc</b>					
8											
9											
10	<b>Pipe-101</b>										
11											
12	<b>Calculation Messages</b>										
13											
14											
15	<b>Warning Messages</b>										
16											
17	No calculation warnings encountered.										
18											
19											
20	<b>Pressure Temperature Summary</b>										
21											
22											
23	Pipeline Unit	Cum. Length (m)	Pressure (kPa)	Temperature (C)	DeltaP (kPa)	DeltaT (C)	Label				
24	Pipe	10.00	353.95	25.02	2.32	0.00	Pipe #1				
25											
26	<b>Pressure Temperature Profile</b>										
27											
28											
29	Cumulative Length (m)	Inside Diameter (mm)	Pressure (kPa)	Temperature (C)	DeltaP Friction (kPa)	DeltaP Head (kPa)	Liquid Volume Fraction	Pressure Gradient (kPa/m)			
30	10.00	52.502	353.95	25.02	2.32	0.00	1.0000	-0.2320			
31											
32											
33	<b>Fluid Transport Properties</b>										
34											
35											
36	Cumulative Length (m)	Iterations	Gas Density (kg/m3)	Liquid Density (kg/m3)	Gas Viscosity (cP)	Liquid Viscosity (cP)	Vsg (m/s)	Vsl (m/s)	Flow Pattern	Surface Tension (dyne/cm)	Vapour Mass Fraction
37	10.00	4	---	996.999	---	0.890	---	1.028	SP-Turbulent	---	0.0000
38											
39											
40	<b>Miscellaneous</b>										
41											
42											
43	Cumulative Length (m)	Cumulative Liquid Holdup (m3)	Cumulative Liquid Transit Time (hours)	Cumulative Line Pack @STD (m3)	Cumulative Gas Transit Time (hours)						
44	0.00	0.0	0.000	0.0	0.000						
45	10.00	0.0	0.003	0.0	0.000						
46											
47	<b>Heat Transfer</b>										
48											
49											
50	Cumulative Length (m)	Superficial Gas Reynold's Number	Superficial Liquid Reynold's Number	Mixture Reynold's Number	Inside Film Coefficient (kJ/h-m2-C)	Overall Heat Transfer Coefficient (kJ/h-m2-C)					
51	10.00	---	60442	60442	11755.8245	25.0867					
52											
53	<b>Cooldown</b>										
54											
55	<b>Option</b>										
56	No pipeline fluid cooldown calculations will be performed										
57											
58	<b>Basis</b>										
59	n/a										
60											
61	<b>Thermal Conductivity of Fluid</b>										
62	n/a										
63											
64											
65											
66											
67											
68											
69											
70											



1	 Company Name Not Available Calgary, Alberta CANADA				Case Name: C:\Users\delld\Desktop\Pipeline-deltaP.usc					
2					Unit Set: SI					
3					Date/Time: Monday Dec 25 2017, 21:43:02					
4										
5										
6										
7	<b>Schlumberger PIPESYS-UniSim v201</b>				<b>Pipeline-deltaP.usc</b>					
8										
9										
10	<b>Pipe-101</b>									
11										
12	<b>Cooldown</b>									
13										
14										
15	<b>Heat Transfer Parameters</b>			<b>Transient Cooldown Parameters</b>						
16	Overall Heat Transfer Coefficient: ---			Maximum Time Since Shutdown: ---						
17	Inside Film Coefficient: ---			First Intermediate Time: ---						
18	Thermal Conductivity of Fluid: ---			Second Intermediate Time: ---						
19	Heat Capacity of Pipe Material: ---			Third Intermediate Time: ---						
20	Density of Pipe Material: ---			Minimum Cooldown Temperature: ---						
21				Calculation Time Step: ---						
22										
23	<b>Results</b>									
24										
25	Cumulative	Overall Heat	Inside	Fluid	First	Second	Third	Temperature for	Time to Reach	
26	Length	Transfer	Film	Thermal	Intermediate	Intermediate	Intermediate	Max Time Since	Min Cooldown	
27	(m)	Coefficient	Coefficient	Conductivity	Temperature	Temperature	Temperature	Shutdown	Temperature	
28		(kJ/h-m2-C)	(kJ/h-m2-C)	(W/m-K)	(C)	(C)	(C)	(C)	(hours)	
29										
30	<b>Inlet Properties : S3</b>									
31										
32										
33		Overall		Aqueous Phase						
34	Vapour/Phase Fraction	0.0000		1.0000						
35	Temperature: (C)	25.02		25.02						
36	Pressure: (kPa)	356.27		356.27						
37	Molar Flow (kgmole/h)	443.32		443.32						
38	Mass Flow (kg/h)	7986.54		7986.54						
39	Liquid Volume Flow (m3/h)	8.00		8.00						
40	Std Gas Flow (STD_m3/h)	10482.16		10482.16						
41	Molar Enthalpy (kJ/kgmole)	-2.850e+005		-2.850e+005						
42	Mass Enthalpy (kJ/kg)	-1.582e+004		-1.582e+004						
43	Heat Flow (kJ/h)	-1.264e+008		-1.264e+008						
44	Molar Density (kgmole/m3)	55.3424		55.3424						
45	Mass Density (kg/m3)	997.000		997.000						
46	Std Liquid Mass Density (kg/m3)	998.942		998.942						
47	Molar Heat Capacity (kJ/kgmole-C)	75.301		75.301						
48	Mass Heat Capacity (kJ/kg-C)	4.180		4.180						
49	Molar Entropy (kJ/kgmole-C)	6.616		6.616						
50	Mass Entropy (kJ/kg-C)	0.367		0.367						
51	Thermal Conductivity (W/m-K)	0.611		0.611						
52	Viscosity (cP)	0.890		0.890						
53	Surface Tension (dyne/cm)	72.097		72.097						
54	Molecular Weight	18.015		18.015						
55	Z Factor	0.003		0.003						
56										
57	<b>Outlet Properties : S4</b>									
58										
59		Overall		Aqueous Phase						
60	Vapour/Phase Fraction	0.0000		1.0000						
61	Temperature: (C)	25.02		25.02						
62	Pressure: (kPa)	353.95		353.95						
63	Molar Flow (kgmole/h)	443.32		443.32						
64	Mass Flow (kg/h)	7987.00		7986.54						
65	Liquid Volume Flow (m3/h)	8.00		8.00						
66	Std Gas Flow (STD_m3/h)	10482.16		10482.16						
67	Molar Enthalpy (kJ/kgmole)	-2.850e+005		-2.850e+005						
68	Mass Enthalpy (kJ/kg)	-1.582e+004		-1.582e+004						
69	Heat Flow (kJ/h)	-1.264e+008		-1.264e+008						
70	Molar Density (kgmole/m3)	55.3424		55.3424						

1			Case Name: C:\Users\deli\Desktop\Pipeline-deltaP.usc
2	<b>Honeywell</b>	Company Name Not Available Calgary, Alberta CANADA	Unit Set: SI
3			Date/Time: Monday Dec 25 2017, 21:43:02
4			
5			
6			
7	<b>Schlumberger PIPESYS-UniSim v201</b>		<b>Pipeline-deltaP.usc</b>
8			
9			
10			
11			
12			
13			
14			
15			
16	Mass Density (kg/m3)	Overall	Aqueous Phase
17	Std Liquid Mass Density (kg/m3)	996.998	996.998
18	Molar Heat Capacity (kJ/kgmole-C)	998.942	998.942
19	Mass Heat Capacity	75.301	75.301
20	Molar Entropy (kJ/kgmole-C)	4.180	4.180
21	Mass Entropy (kJ/kg-C)	6.616	6.616
22	ThermalConductivity (W/m-K)	0.367	0.367
23	Viscosity (cP)	0.611	0.611
24	Surface Tension (dyne/cm)	0.890	0.890
25	Molecular Weight	72.097	72.097
26	Z Factor	18.015	18.015
27		0.003	0.003
28	<b>Stream Compositions</b>		
29			
30	Component	Inlet Mole Fraction	Outlet Mole Fraction
31	H2O	1.00000	1.00000
32			
33	<b>Summary</b>		
34			
35			
36	Upstream Pressure: 356.27 kPa		
37	Upstream Temperature: 25.02 C		
38			
39	Downstream Pressure: 353.95 kPa		
40	Downstream Temperature: 25.02 C		
41			
42	Predicted Pressure Loss: 2.32 kPa		
43			
44	Friction Loss: 2.32 kPa		
45	Hydrostatic Loss: 0.00 kPa		
46	Kinetic Loss: 0.000 kPa		
47	Inline Facilities Loss: 0.00 kPa		
48			
49	Average Pressure Gradient: -0.2320 kPa/m		
50			
51	Total Liquid Holdup: 0.0 m3		
52	Total Line Pack @STD: 0.0 m3		
53			
54	Pipe Volume: 0.0 m3		
55			
56	Net Heat Loss to the Surroundings: 0.7324 kJ/h		
57			
58	<b>STATUS</b>		
59	OK		
60			
61	<b>NOTES</b>		
62			
63			
64	<b>Description</b>		
65			
66			
67			
68			
69			
70			