

modelo ideal

PPPP	III	PPPP	EEEE	PPPP	H	H	A	SSS	EEEE (R)
P P	I	P P	E	P P	H	H	A A	S S	E
P P	I	P P	E	P P	H	H	A A	S	E
PPPP	I	PPPP	EEEE	PPPP	HHHH	A	A	SSS	EEEE
P	I	P	E	P	H	H	AAAA	S	E
P	I	P	E	P	H	H	A A	S S	E
P	III	P	EEEE	P	H	H	A A	SSS	EEEE

VERSION 9.1

```

*****
*
*          SUPPORT CENTERS, INVENSYS, SIMSCI-ESSCOR
*          =====
*
*          For support center information refer to website
*
*          http://www.simsci-esscor.com
*          http://www.invensys.com
*
*          NORTH AMERICA
*          USA/Canada
*
*          LATIN AMERICA
*          Argentina, Chile, Peru, Boliia, Paraguay, Uruguay
*          Brasil
*          Colombia
*          Mexico
*          Venezuela
*
*          EUROPE, MIDDLE EAST, AFRICA
*          United Kingdom
*          Germany, Austria, Switzerland
*          Italy, Greece
*          Middle East
*
*          ASIA PACIFIC
*          Asia
*          Australia & New Zealand
*          India
*          Japan
*          Korea
*          P.R. China
*
*
*
*
*****

```

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```

                                modelo ideal
$ SIMSCI PIPEPHASE Version 9.1 keyword file...
$
$ General Data Section
$
TITLE DATE=07/15/12
$
$
DIMENSION RATE(GV)=CFD
$
CALCULATION NETWORK, GAS, PRANDTL
$
DEFAULT IDPIPE=4.026, IDTUBING=4.026, IDRISER=4.026, *
IDANNULUS=6.065, HAUSEN
$
PRINT INPUT=FULL, DEVICE=FULL, PLOT=FULL, *
PROPERTY=FULL, MAP=TAITEL, MERGESUB, *
DATABASE=FULL, SIMULATOR=PART
$
SEGMENT AUTO=OFF, DLHORIZ(FT)=2000, DLVERT(FT)=500
$
$ Network Data Section
$
NETWORK DATA
$
SOLUTION PBALANCE, FLOWAL=2, STEP=1
$
TOLERANCE PRESSURE=0.1
$
$ PVT Data Section
$
PVT PROPERTY DATA
$
SET SETNO=1, GRAV(SPGR)=0.6785, CPRATIO=1.3, *
GHV=1141.80005, WOBBE=1032.90002
$
$ Structure Data Section
$
STRUCTURE DATA
$
SOURCE NAME=CORRALES1-1, IDNAME=COR1, PRIORITY=0, *
SETNO=1, PRES(ESTI)=1000, TEMP=100, *
RATE=3, XCORD=-370, YCORD=510
$
SOURCE NAME=CORRALES3, IDNAME=COR2, PRIORITY=0, *
SETNO=1, PRES(ESTI)=1800, TEMP=100, *
RATE=12, XCORD=2065, YCORD=1215
$
SOURCE NAME=CORRALES2, IDNAME=COR3, PRIORITY=0, *
SETNO=1, PRES(ESTI)=1000, TEMP=100, *
RATE=1, XCORD=470, YCORD=1155
$
SOURCE NAME=CORRALES1D, IDNAME=CORR, PRIORITY=0, *
SETNO=1, PRES=1300, TEMP=100, *
RATE(ESTI)=3, XCORD=37, YCORD=-209
$
SINK NAME=PLANTACOMP, IDNAME=PLAN, PRES(ESTI)=2000, *

```

```

R
PIPEPHASE Version 9.1          MACHINE IBMPC          INPUT LISTING - PAGE 2
=====

```

```

RATE=21, XCORD=2585, YCORD=290
$
JUNCTION NAME=NODO2, IDNAME=NOD1, PRES(ESTI)= 1500, *

```

```

                                modelo ideal
TROCK=62.6, XCORD=1335, YCORD=460
JUNCTION NAME=NODO1, IDNAME=NODO, PRES(ESTI)= 1500, *
TROCK=62.6, XCORD=585, YCORD=465
$
$
LINK NAME=LINEA1-1, FROM=CORRALES1-1, TO=NODO1, *
  IDNAME=LIN1, IDFROM=COR1, IDTO=NODO
PIPE NAME=P001, LENGTH=500, ID=3, *
  AIR, TAMB=62.6
$
LINK NAME=LINEA2, FROM=CORRALES2, TO=NODO1, *
  IDNAME=LIN2, IDFROM=COR3, IDTO=NODO
PIPE NAME=P002, LENGTH=820.20001, ID=3, *
  AIR, TAMB=62.6
$
LINK NAME=LINEA3, FROM=CORRALES3, TO=NODO2, *
  IDNAME=LIN3, IDFROM=COR2, IDTO=NOD1
PIPE NAME=P003, LENGTH=1804.45996, ID=6, *
  AIR, TAMB=62.6
$
LINK NAME=LINEA4, FROM=NODO1, TO=NODO2, *
  IDNAME=LIN4, IDFROM=NODO, IDTO=NOD1
PIPE NAME=P005, LENGTH=50, ID=4, *
  AIR, TAMB=62.6
$
LINK NAME=LINEAPROD, FROM=NODO2, TO=PLANTACOMP, *
  IDNAME=LIN5, IDFROM=NOD1, IDTO=PLAN
PIPE NAME=P004, LENGTH=590.54999, ID=6, *
  AIR, TAMB=62.6
$
LINK NAME=LINEA1D, FROM=CORRALES1D, TO=NODO1, *
  IDNAME=LINE, IDFROM=CORR, IDTO=NODO
PIPE NAME=P000, LENGTH=328.84, ID=3, *
  AIR, TAMB=62.6
$
$ End of keyword file...
$
END

```

```

END OF PRE-PROCESSING -- NO ERRORS
                      -- NO WARNINGS

```

```

R
PIPEPHASE Version 9.1      INPUT PROCESSOR DIRECTORY

```

```

=====
PROJECT                USER
PROBLEM                 DATE 07/15/12

```

```

PAGE                CONTENTS
-----
1  GENERAL DATA
3  PVT DATA
3  CORRELATION SET DATA
   METHODS DATA
4  SOLUTION METHODS/TOLERANCES
   SOURCE DATA
5  SOURCE CORRALES1-1
5  SOURCE CORRALES3
5  SOURCE CORRALES2
5  SOURCE CORRALES1D
   STRUCTURE DATA
6  LINK LINEA1-1

```

modelo ideal

- 6 LINK LINEA2
- 7 LINK LINEA3
- 7 LINK LINEA4
- 8 LINK LINEAPROD
- 8 LINK LINEA1D
- 9 JUNCTIONS AND SINKS
- 10 NETWORK CONNECTIVITY
- 11 ERROR SUMMARY

\*\*\* WARNING \*\*\*\*\*

PRESS: ESTIMATE AND FLOW DIRECTION INCONSISTENT FOR FOLLOWING LINKS

LINK	FROM	NODE	PRESSURE	TO NODE	PRESSURE
1	CORR		1014.7	NODO	1514.7
2	CORR		1014.7	NODO	1514.7
5	NODO		1514.7	PLAN	2014.7
6	CORR		1314.7	NODO	1514.7

VERSION 9.1

R

SIMULATION SCIENCES, INC.

PIPEPHASE

PAGE 1

PROJECT

INPUT

PROBLEM

GENERAL DATA

07/15/12

CALCULATION OPTIONS

RUN TYPE..... NETWORK  
FLUID TYPE..... GAS

DIMENSIONAL UNITS - PETROLEUM

TEMPERATURE.....	DEG F	PRESSURE.....	PSIG
MOLAR RATE.....	MOLE/HR	WEIGHT RATE.....	LB/HR
LIQUID RATE.....	BBL/DAY	VAPOR RATE.....	MM FT3/DAY
COARSE LENGTH...	FT	FINE LENGTH.....	IN
DENSITY/GRAVITY.	DEG API	VISCOSITY.....	CP
DUTY.....	MM BTU/HR	POWER.....	HP
VELOCITY.....	MPH		

DEFAULTS

FLOW EFFICIENCY.....	100.00	PERCENT
HAZEN-WILLIAMS COEFF.....	150.00	
ROUGHNESS.....	0.00180	IN
AMBIENT TEMPERATURE.....	80.00	DEG F
TEMPERATURE GRADIENT.....	1.00	DEG F/100 FT
PIPE U-FACTOR.....	1.000	BTU/HR-FT2-F
RISER U-FACTOR.....	1.000	BTU/HR-FT2-F
TUBING U-FACTOR.....	1.000	BTU/HR-FT2-F
ANNULUS U-FACTOR.....	1.000	BTU/HR-FT2-F
INSIDE DIAMETER - PIPE.....	4.026	IN
INSIDE DIAMETER - RISER....	4.026	IN
INSIDE DIAMETER - TUBING...	4.026	IN
INSIDE DIAMETER - ANNULUS..	6.065	IN
LAMINAR INSIDE FILM COEFF..	HAUSEN	

FLOW CODES

PIPE	FLOW CODE IS MOODY	
	REYNOLDS NUMBER(LAMINAR).....	3000.0000
RISER	FLOW CODE IS MOODY	
TUBING	FLOW CODE IS MOODY	
ANNULUS	FLOW CODE IS MOODY	

modelo ideal

BASE CONDITIONS

STANDARD TEMPERATURE..... 60.00 DEG F
STANDARD PRESSURE..... 0.000 PSIG

PRINT OPTIONS

INPUT..... GENERAL ASSAY COMPONENT
PVT FLOW TABLE METHOD
SOURCE STRUCTURE W ANALYSIS
GAS LIFT CASE STUDY
CONNECT..... PLOT
PVTGEN..... NONE
SUMMARY..... BOTH
DEVICE..... FULL
MAP..... TAITEL-DUKLER-BARNEA
PROPERTY..... FULL
MERGED SUBNETWORKS REQUESTED

VERSION 9.1 R
SIMULATION SCIENCES, INC. PIPEPHASE PAGE 2
PROJECT INPUT
PROBLEM GENERAL DATA 07/15/12

SEGMENTATION OPTIONS

LENGTH CHANGE - HORIZONTAL..... 2000.0 FT
VERTICAL..... 500.0 FT
MAXIMUM NUMBER OF SEGMENTS..... 20

VERSION 9.1 R
SIMULATION SCIENCES, INC. PIPEPHASE PAGE 3
PROJECT INPUT
PROBLEM PVT DATA 07/15/12

PVT DATA SUMMARY

1 CORRELATION DATA SETS 0 ERRORS 0 WARNINGS

DEFAULT PVT METHODS OPTIONS

Z FACTOR METHOD..... STANDING
GAS VISCOSITY METHOD..... LEE

CORRELATION SET DATA

CORRELATION SET NUMBER 1

GRAVITY OF GAS..... 0.6785 SPGR
SPECIFIC HEAT RATIO OF GAS 1.3000 CP/CV

VERSION 9.1 R
SIMULATION SCIENCES, INC. PIPEPHASE PAGE 4
PROJECT INPUT
PROBLEM METHODS DATA 07/15/12

modelo ideal

NETWORK SOLUTION METHOD IS PBAL  
 MAXIMUM ITERATIONS..... 20  
 MAXIMUM NUMBER OF INTERVAL HALVINGS.... 3  
 ABSOLUTE PRESSURE TOLERANCE..... 0.100 PSIG  
 RATE PERTURBATION..... 0.010000  
 METHOD OF INITIAL SOLUTION ESTIMATION.. FLOW = 2  
 ZERO FLOW IN CHECK VALVES..... OFF  
 CHOKE CRITICAL FLOW MODEL (FORTUNATI) . EXPONENTIAL  
 NEW ACCELERATION OPTION IS..... OFF

VERSION 9.1 R  
 SIMULATION SCIENCES, INC. PIPEPHASE PAGE 5  
 PROJECT INPUT  
 PROBLEM SOURCE DATA 07/15/12

SOURCE CORRALES1-1

(COR1)  
 THIS SOURCE IS ON  
 RATE..... 3.0000 MM FT3/DAY  
 ESTIMATED PRESSURE..... 1000.0041 PSIG  
 TEMPERATURE..... 100.00 DEG F

SOURCE CORRALES3

(COR2)  
 THIS SOURCE IS ON  
 RATE..... 12.0000 MM FT3/DAY  
 ESTIMATED PRESSURE..... 1800.0041 PSIG  
 TEMPERATURE..... 100.00 DEG F

SOURCE CORRALES2

(COR3)  
 THIS SOURCE IS ON  
 RATE..... 1.0000 MM FT3/DAY  
 ESTIMATED PRESSURE..... 1000.0041 PSIG  
 TEMPERATURE..... 100.00 DEG F

SOURCE CORRALES1D

(CORR)  
 THIS SOURCE IS ON  
 ESTIMATED RATE..... 3.0000 MM FT3/DAY  
 PRESSURE..... 1300.0041 PSIG  
 TEMPERATURE..... 100.00 DEG F

VERSION 9.1 R  
 SIMULATION SCIENCES, INC. PIPEPHASE PAGE 6  
 PROJECT INPUT  
 PROBLEM STRUCTURE DATA 07/15/12

LINK LINEA1-1

LINK IS FROM "CORRALES1-1 " TO "NODO1 "  
 "LIN1" FROM "COR1" TO "NODO"

DEVICE SA001, P001, IS A PIPE  
 FLOW CODE IS MOODY  
 INSIDE DIAMETER..... 3.0000 IN  
 LENGTH..... 500.0 FT

modelo ideal

ELEVATION CHANGE..... 0.0 FT  
FLOW EFFICIENCY..... 100.00 PERCENT  
ROUGHNESS..... 0.00180 IN  
AMBIENT TEMPERATURE..... 62.60 DEG F  
WALL THICKNESS..... 0.3125 IN  
INSULATION THICKNESS..... 0.0000 IN  
THERMAL COND. OF PIPE..... 29.000 BTU/HR-FT-F  
THERMAL COND. OF INSULATION.. 0.0150 BTU/HR-FT-F  
THERMAL COND. OF SOIL..... 0.800 BTU/HR-FT-F  
VELOCITY OF AIR..... 10.000 MPH  
DENSITY OF AIR..... 1.0000 SPGR  
VISCOSITY OF AIR..... 0.0200000 CP  
THERMAL COND. OF AIR..... 0.0150 BTU/HR-FT-F  
EFF. OUTSIDE HEAT TRANS COEFF 4.852 BTU/HR-FT2-F  
(RELATIVE TO PIPE OUTSIDE DIAMETER)

LINK LINEA2

LINK IS FROM "CORRALES2" TO "NODO1"  
"LIN2" FROM "COR3" TO "NODO"

DEVICE SA002, P002, IS A PIPE

FLOW CODE IS MOODY  
INSIDE DIAMETER..... 3.0000 IN  
LENGTH..... 820.2 FT  
ELEVATION CHANGE..... 0.0 FT  
FLOW EFFICIENCY..... 100.00 PERCENT  
ROUGHNESS..... 0.00180 IN  
AMBIENT TEMPERATURE..... 62.60 DEG F  
WALL THICKNESS..... 0.3125 IN  
INSULATION THICKNESS..... 0.0000 IN  
THERMAL COND. OF PIPE..... 29.000 BTU/HR-FT-F  
THERMAL COND. OF INSULATION.. 0.0150 BTU/HR-FT-F  
THERMAL COND. OF SOIL..... 0.800 BTU/HR-FT-F  
VELOCITY OF AIR..... 10.000 MPH  
DENSITY OF AIR..... 1.0000 SPGR  
VISCOSITY OF AIR..... 0.0200000 CP  
THERMAL COND. OF AIR..... 0.0150 BTU/HR-FT-F  
EFF. OUTSIDE HEAT TRANS COEFF 4.852 BTU/HR-FT2-F  
(RELATIVE TO PIPE OUTSIDE DIAMETER)

VERSION 9.1

R

SIMULATION SCIENCES, INC.  
PROJECT  
PROBLEM

PIPEPHASE  
INPUT  
STRUCTURE DATA

PAGE 7  
07/15/12

LINK LINEA3

LINK IS FROM "CORRALES3" TO "NODO2"  
"LIN3" FROM "COR2" TO "NOD1"

DEVICE SA003, P003, IS A PIPE

FLOW CODE IS MOODY  
INSIDE DIAMETER..... 6.0000 IN  
LENGTH..... 1804.5 FT  
ELEVATION CHANGE..... 0.0 FT  
FLOW EFFICIENCY..... 100.00 PERCENT  
ROUGHNESS..... 0.00180 IN  
AMBIENT TEMPERATURE..... 62.60 DEG F  
WALL THICKNESS..... 0.3125 IN  
INSULATION THICKNESS..... 0.0000 IN  
THERMAL COND. OF PIPE..... 29.000 BTU/HR-FT-F  
THERMAL COND. OF INSULATION.. 0.0150 BTU/HR-FT-F

```

                    modelo ideal
THERMAL COND. OF SOIL..... 0.800 BTU/HR-FT-F
VELOCITY OF AIR..... 10.000 MPH
DENSITY OF AIR..... 1.0000 SPGR
VISCOSITY OF AIR..... 0.0200000 CP
THERMAL COND. OF AIR..... 0.0150 BTU/HR-FT-F
EFF. OUTSIDE HEAT TRANS COEFF 3.898 BTU/HR-FT2-F
(RELATIVE TO PIPE OUTSIDE DIAMETER)

```

LINK LINEA4

```

LINK IS FROM "NODO1"      " TO "NODO2"      "
"LIN4" FROM "NODO"      TO "NOD1"

```

```

DEVICE SA004, P005, IS A PIPE
FLOW CODE IS MOODY
INSIDE DIAMETER..... 4.0000 IN
LENGTH..... 50.0 FT
ELEVATION CHANGE..... 0.0 FT
FLOW EFFICIENCY..... 100.00 PERCENT
ROUGHNESS..... 0.00180 IN
AMBIENT TEMPERATURE..... 62.60 DEG F
WALL THICKNESS..... 0.3125 IN
INSULATION THICKNESS..... 0.0000 IN
THERMAL COND. OF PIPE..... 29.000 BTU/HR-FT-F
THERMAL COND. OF INSULATION.. 0.0150 BTU/HR-FT-F
THERMAL COND. OF SOIL..... 0.800 BTU/HR-FT-F
VELOCITY OF AIR..... 10.000 MPH
DENSITY OF AIR..... 1.0000 SPGR
VISCOSITY OF AIR..... 0.0200000 CP
THERMAL COND. OF AIR..... 0.0150 BTU/HR-FT-F
EFF. OUTSIDE HEAT TRANS COEFF 4.437 BTU/HR-FT2-F
(RELATIVE TO PIPE OUTSIDE DIAMETER)

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VERSION 9.1
SIMULATION SCIENCES, INC.          PIPEPHASE          R          PAGE 8
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PROBLEM          STRUCTURE DATA          07/15/12
=====

```

LINK LINEAPROD

```

LINK IS FROM "NODO2"      " TO "PLANTACOMP"  "
"LIN5" FROM "NOD1"      TO "PLAN"

```

```

DEVICE SA005, P004, IS A PIPE
FLOW CODE IS MOODY
INSIDE DIAMETER..... 6.0000 IN
LENGTH..... 590.5 FT
ELEVATION CHANGE..... 0.0 FT
FLOW EFFICIENCY..... 100.00 PERCENT
ROUGHNESS..... 0.00180 IN
AMBIENT TEMPERATURE..... 62.60 DEG F
WALL THICKNESS..... 0.3125 IN
INSULATION THICKNESS..... 0.0000 IN
THERMAL COND. OF PIPE..... 29.000 BTU/HR-FT-F
THERMAL COND. OF INSULATION.. 0.0150 BTU/HR-FT-F
THERMAL COND. OF SOIL..... 0.800 BTU/HR-FT-F
VELOCITY OF AIR..... 10.000 MPH
DENSITY OF AIR..... 1.0000 SPGR
VISCOSITY OF AIR..... 0.0200000 CP
THERMAL COND. OF AIR..... 0.0150 BTU/HR-FT-F
EFF. OUTSIDE HEAT TRANS COEFF 3.898 BTU/HR-FT2-F
(RELATIVE TO PIPE OUTSIDE DIAMETER)

```



modelo ideal  
LINK LINEA1D

LINK IS FROM "CORRALES1D " TO "NODO1 "  
"LINE" FROM "CORR" TO "NODO"

DEVICE SA006, P000, IS A PIPE  
FLOW CODE IS MOODY  
INSIDE DIAMETER..... 3.0000 IN  
LENGTH..... 328.8 FT  
ELEVATION CHANGE..... 0.0 FT  
FLOW EFFICIENCY..... 100.00 PERCENT  
ROUGHNESS..... 0.00180 IN  
AMBIENT TEMPERATURE..... 62.60 DEG F  
WALL THICKNESS..... 0.3125 IN  
INSULATION THICKNESS..... 0.0000 IN  
THERMAL COND. OF PIPE..... 29.000 BTU/HR-FT-F  
THERMAL COND. OF INSULATION.. 0.0150 BTU/HR-FT-F  
THERMAL COND. OF SOIL..... 0.800 BTU/HR-FT-F  
VELOCITY OF AIR..... 10.000 MPH  
DENSITY OF AIR..... 1.0000 SPGR  
VISCOSITY OF AIR..... 0.0200000 CP  
THERMAL COND. OF AIR..... 0.0150 BTU/HR-FT-F  
EFF. OUTSIDE HEAT TRANS COEFF 4.852 BTU/HR-FT2-F  
(RELATIVE TO PIPE OUTSIDE DIAMETER)

VERSION 9.1 R  
SIMULATION SCIENCES, INC. PIPEPHASE PAGE 9  
PROJECT INPUT  
PROBLEM STRUCTURE DATA 07/15/12

JUNCTIONS AND SINKS

JUNCTION NODO2  
(NOD1)  
ESTIMATED PRESSURE..... 1500.0041 PSIG  
  
JUNCTION NODO1  
(NODO)  
ESTIMATED PRESSURE..... 1500.0041 PSIG  
  
SINK PLANTACOMP  
(PLAN)  
RATE..... 21.0000 MM FT3/DAY  
ESTIMATED PRESSURE..... 2000.0041 PSIG

VERSION 9.1 R  
SIMULATION SCIENCES, INC. PIPEPHASE PAGE 10  
PROJECT INPUT  
PROBLEM NETWORK CONNECTIVITY 07/15/12

NODE CONNECTIONS

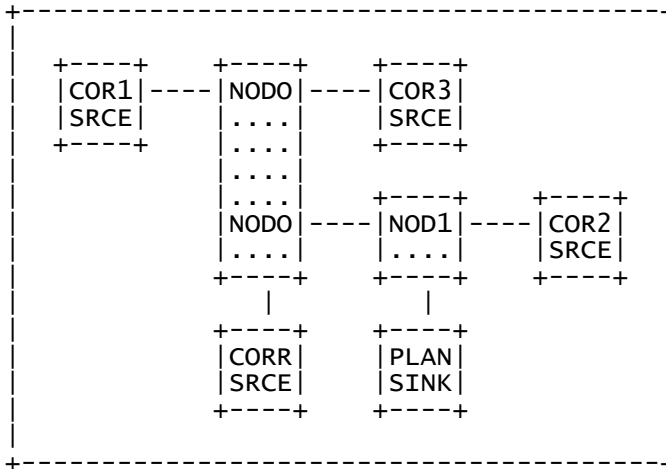
NODE	NODE NAME	NODE TYPE	TO NODE	VIA LINK
COR1	CORRALES1-1	SOURCE	NODO1	LINEA1-1
COR2	CORRALES3	SOURCE	NODO2	LINEA3
COR3	CORRALES2	SOURCE	NODO1	LINEA2
CORR	CORRALES1D	SOURCE	NODO1	LINEA1D
PLAN	PLANTACOMP	SINK	NODO2	LINEAPROD
NOD1	NODO2	JUNCTION	CORRALES3	LINEA3
			NODO1	LINEA4

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NODO	NODO1	JUNCTION	PLANTACOMP	LINEAPROD
			CORRALES1-1	LINEA1-1
			CORRALES2	LINEA2
			NODO2	LINEA4
			CORRALES1D	LINEA1D

LINK CONNECTIONS

LINK	LINK NAME	FROM NODE	TO NODE
LIN1	LINEA1-1	CORRALES1-1	NODO1
LIN2	LINEA2	CORRALES2	NODO1
LIN3	LINEA3	CORRALES3	NODO2
LIN4	LINEA4	NODO1	NODO2
LIN5	LINEAPROD	NODO2	PLANTACOMP
LINE	LINEA1D	CORRALES1D	NODO1



VERSION 9.1  
SIMULATION SCIENCES, INC.  
PROJECT  
PROBLEM

PIPEPHASE  
INPUT  
ERROR SUMMARY

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07/15/12

END OF INPUT PROCESSING -- NO ERRORS  
-- 1 WARNING

END OF INPUT CROSS-CHECKING -- NO ERRORS.

PIPEPHASE Version 9.1 NETWORK DIRECTORY

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1	SOLUTION DATA
2	NETWORK REPORT
39	ERROR SUMMARY

VERSION 9.1  
SIMULATION SCIENCES, INC.  
PROJECT

PIPEPHASE  
OUTPUT  
Page 10

PAGE 1

\*\* WARNING \*\* NEW RATE ESTIMATES WERE CALCULATED

NODE	RATE ESTIMATE FROM INPUT	RATE EST. AFTER MASS BALANCE
-----	-----	-----
CORR	3000.000	5000.000

CONVERGENCE TOLERANCE 0.10 PSI PRESSURE IMBALANCE AT SELECTED NODES  
(RMS VALUE USED FOR STEP-SIZE SELECTION)

ITERATION NUMBER 0.0  
 MAX PRESSURE IMBALANCE = -500.926 PSI AT NODE NOD1  
 RMS AVERAGE PRESSURE IMBALANCE = 378.491 PSI

ITERATION NUMBER 1.0  
 MAX PRESSURE IMBALANCE = 0.148 PSI AT NODE NOD1  
 RMS AVERAGE PRESSURE IMBALANCE = 0.106 PSI

ITERATION NUMBER 2.0  
 MAX PRESSURE IMBALANCE = 0.000 PSI AT NODE NOD1  
 RMS AVERAGE PRESSURE IMBALANCE = 0.000 PSI

\*\*\*\*\*  
 PBAL SOLUTION CONVERGED AFTER 2 ITERATIONS  
 \*\*\*\*\*

\*\*\*\*\* PROBLEM SOLUTION REACHED \*\*\*\*\*

VERSION 9.1	R	
SIMULATION SCIENCES, INC.	PIPEPHASE	PAGE 2
PROJECT	OUTPUT	
PROBLEM	NETWORK REPORT	07/15/12

---

BASE CASE

LINK SUMMARY

RATE, PRESSURE AND TEMPERATURE SUMMARY

FROM(F) AND TO(T)	----ACTUAL FLOW RATES***--			PRESS:	---HOLDUP**---			
LINK NODE	GAS (MMCFD)	OIL (BPD)	WATER (BPD)	PRESS: (PSIG)	DROP (PSIG)	TEMP: (F)	GAS (MM SCF)	LIQ (STB)
-----	-----	-----	-----	-----	-----	-----	-----	-----
LINE CORR(F)	0.0484	0.0	0.0	1300.0*		100.0		

modelo ideal									
	NODO(T)	0.0465	0.0	0.0	1298.3	1.7	89.0	0.0017	0.0
LIN1	COR1(F)	0.0291	0.0	0.0	1299.2		100.0		
	NODO(T)	0.0267	0.0	0.0	1298.3	0.9	78.2	0.0027	0.0
LIN2	COR3(F)	0.0097	0.0	0.0	1298.5		100.0		
	NODO(T)	0.0084	0.0	0.0	1298.3	0.2	63.3	0.0046	0.0
LIN3	COR2(F)	0.1163	0.0	0.0	1299.5		100.0		
	NOD1(T)	0.1051	0.0	0.0	1298.1	1.4	74.1	0.0387	0.0
LIN4	NODO(F)	0.0817	0.0	0.0	1298.3		82.7		
	NOD1(T)	0.0815	0.0	0.0	1298.1	0.2	82.0	0.0005	0.0
LIN5	NOD1(F)	0.1866	0.0	0.0	1298.1		77.5		
	PLAN(T)	0.1845	0.0	0.0	1296.8	1.4	74.5	0.0131	0.0

\* - INDICATES KNOWN PRESSURE

\*\* VOLUME REPORTED AT USER STANDARD CONDITIONS

\*\*\* RATE REPORTED AT ACTUAL TEMPERATURE AND PRESSURE CONDITIONS

VERSION 9.1

R

SIMULATION SCIENCES, INC.

PIPEPHASE

PAGE 3

PROJECT

OUTPUT

PROBLEM

NETWORK REPORT

07/15/12

BASE CASE

NODE SUMMARY

NODE	PRES. (PSIG)	---STANDARD FLOW RATES ---**			TEMP. (F)
		GAS (MMCFD)	OIL (BPD)	WATER (BPD)	
CORR	1300.0*	5.0000	0.0	0.0	100.0
COR1	1299.2	3.0000*	0.0	0.0	100.0
COR3	1298.5	1.0000*	0.0	0.0	100.0
COR2	1299.5	12.0000*	0.0	0.0	100.0
NODO	1298.3	0.0000*	0.0	0.0	82.7
NOD1	1298.1	0.0000*	0.0	0.0	77.5
PLAN	1296.8	-21.0000*	0.0	0.0	74.5

\* INDICATES KNOWN PRESSURE OR FLOW

\*\* STANDARD FLOW RATES REPORTED AT USER STD CONDITION

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NODE CONTAMINANT AND GAS SUMMARY

NODE	N2 (%)	CO2 (%)	H2S (%)	WOBBE	
				BTU/STD FT3	GHV, BTU/STD FT3
CORR	0.0000	0.0000	0.0000	1032.9000	1141.8000
COR1	0.0000	0.0000	0.0000	1032.9000	1141.8000
COR3	0.0000	0.0000	0.0000	1032.9000	1141.8000
COR2	0.0000	0.0000	0.0000	1032.9000	1141.8000
NODO	0.0000	0.0000	0.0000	1032.9000	1141.8000
NOD1	0.0000	0.0000	0.0000	1032.9000	1141.8000
PLAN	0.0000	0.0000	0.0000	1032.9000	1141.8000

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DEVICE SUMMARY

LINK NAME	DEVI NAME	DEVI TYPE	CORR	INSIDE DIAM (IN)	MEAS LENGTH (FT)	ELEV CHNG (FT)	INLET PRESS (PSIG)	OUTLET TEMP (F)	INSITU GLR (CFBBL)	AVG. LIQ HOLDUP
LINE	***SOURCE***				5.0000 (MMCFD)		1300.0	100.0		
	CORR						1300.0	100.0		
	P000	PIPE FF		3.000	328.8	0.0	1298.3	89.0		
	NODO**JUNCTION**						PRES= 1298.3 (PSIG)	TEMP= 82.7 (F)		
LIN1	***SOURCE***				3.0000 (MMCFD)		1299.2	100.0		
	COR1						1299.2	100.0		
	P001	PIPE FF		3.000	500.0	0.0	1298.3	78.2		
	NODO**JUNCTION**						PRES= 1298.3 (PSIG)	TEMP= 82.7 (F)		
LIN2	***SOURCE***				1.0000 (MMCFD)		1298.5	100.0		
	COR3						1298.5	100.0		
	P002	PIPE FF		3.000	820.2	0.0	1298.3	63.3		
	NODO**JUNCTION**						PRES= 1298.3 (PSIG)	TEMP= 82.7 (F)		
LIN3	***SOURCE***				12.0000 (MMCFD)		1299.5	100.0		
	COR2						1299.5	100.0		
	P003	PIPE FF		6.000	1804.5	0.0	1298.1	74.1		
	NOD1**JUNCTION**						PRES= 1298.1 (PSIG)	TEMP= 77.5 (F)		
LIN4	**JUNCTION**				9.0000 (MMCFD)		1298.3	82.7		
	NODO						1298.3	82.7		
	P005	PIPE FF		4.000	50.0	0.0	1298.1	82.0		
	NOD1**JUNCTION**						PRES= 1298.1 (PSIG)	TEMP= 77.5 (F)		
LIN5	**JUNCTION**				21.0000 (MMCFD)		1298.1	77.5		
	NOD1						1298.1	77.5		
	P004	PIPE FF		6.000	590.5	0.0	1296.8	74.5		
	PLAN *** SINK ***						PRES= 1296.8 (PSIG)	TEMP= 74.5 (F)		

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STRUCTURE DATA SUMMARY

LINK	DEVICE NAME	DEVICE TYPE	INLET DIA (NOM/ID) (IN)	OUTLET DIA (NOM/ID) (IN)	LENGTH (FT)	ELEVATION CHANGE (FT)	KMUL OR K FACTOR
LINE	P000	PIPE	3.000	3.000	328.8	0.0	
LIN1	P001	PIPE	3.000	3.000	500.0	0.0	
LIN2	P002	PIPE	3.000	3.000	820.2	0.0	
LIN3	P003	PIPE	6.000	6.000	1804.5	0.0	
LIN4	P005	PIPE	4.000	4.000	50.0	0.0	
LIN5	P004	PIPE	6.000	6.000	590.5	0.0	

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VELOCITY SUMMARY

LINK	DEVICE NAME	DEVICE TYPE	MIXTURE VELOCITY (INLET/OUTLET) (FPS)	VELOCITY (FPS)	CRITICAL VELOCITY (FPS)	PRESSURE GRADIENT (INLET/OUTLET) (PSIFT)	PRESSURE DROP (PSIG)
LINE	P000	PIPE	11.37	11.02	1259.74	-5.3E-3 -5.1E-3	-1.7
LIN1	P001	PIPE	6.77	6.35	1255.05	-1.9E-3 -1.8E-3	-0.9
LIN2	P002	PIPE	2.19	1.98	1235.41	-2.1E-4 -1.9E-4	-0.2
LIN3	P003	PIPE	6.74	6.25	1252.33	-8.1E-4 -7.6E-4	-1.4
LIN4	P005	PIPE	10.83	10.81	1221.33	-3.6E-3 -3.6E-3	-0.2
LIN5	P004	PIPE	10.98	10.89	1207.69	-2.3E-3 -2.3E-3	-1.4

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RESULTS SUMMARY

LINK	DEVICE NAME	DEVICE TYPE	MIXTURE FLOW RATE (MMCFD)	PRESSURE INLET/OUTLET (PSIG)	TEMPERATURE INLET/OUTLET (F)	QUALITY INLET/OUTLET (FRAC)
LINE	P000	PIPE	0.05	1300.0 1298.3	100.00 89.02	0.000 0.000
LIN1	P001	PIPE	0.03	1299.2 1298.3	100.00 78.24	0.000 0.000
LIN2	P002	PIPE	9.28079E-3	1298.5 1298.3	100.00 63.28	0.000 0.000
LIN3	P003	PIPE	0.11	1299.5 1298.1	100.00 74.11	0.000 0.000
LIN4	P005	PIPE	0.08	1298.3 1298.1	82.73 82.03	0.000 0.000
LIN5	P004	PIPE	0.19	1298.1 1296.8	77.54 74.47	0.000 0.000

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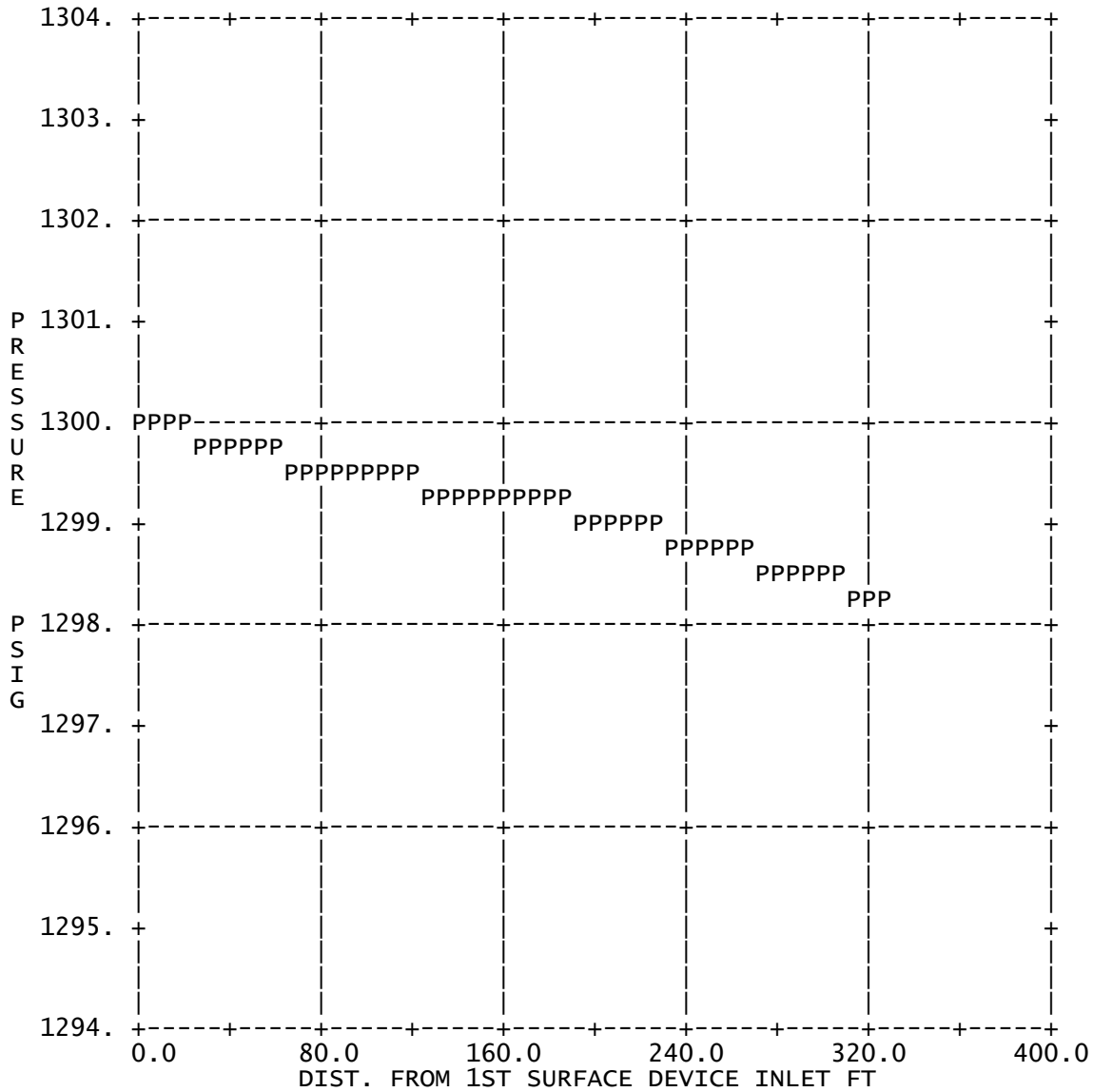
BASE CASE

LINK "LINE" DEVICE DETAIL REPORT

PRESSURE AND TEMPERATURE REPORT

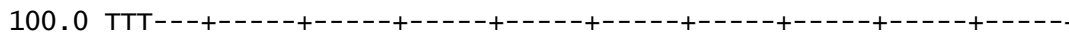
DEVICE NAME	SEGMENT NO	INSIDE DIAM. (IN)	MWD OR LENGTH FROM INLET (FT)	TVD OR ELEV CHNG (FT)	CALC PRESS (PSIG)	CALC TEMP (F)	OVERALL U-FACT (BTU/HRFT2F)	AMB TEMP (F)
P000 (PIPE)	0000	3.000	0.0	I 0.0	1300.0	100.0		62.6
	0001		82.2	0.0	1299.6	96.9	5.610	62.6
	0002		164.4	0.0	1299.1	94.1	5.609	62.6
	0003		246.6	0.0	1298.7	91.4	5.608	62.6

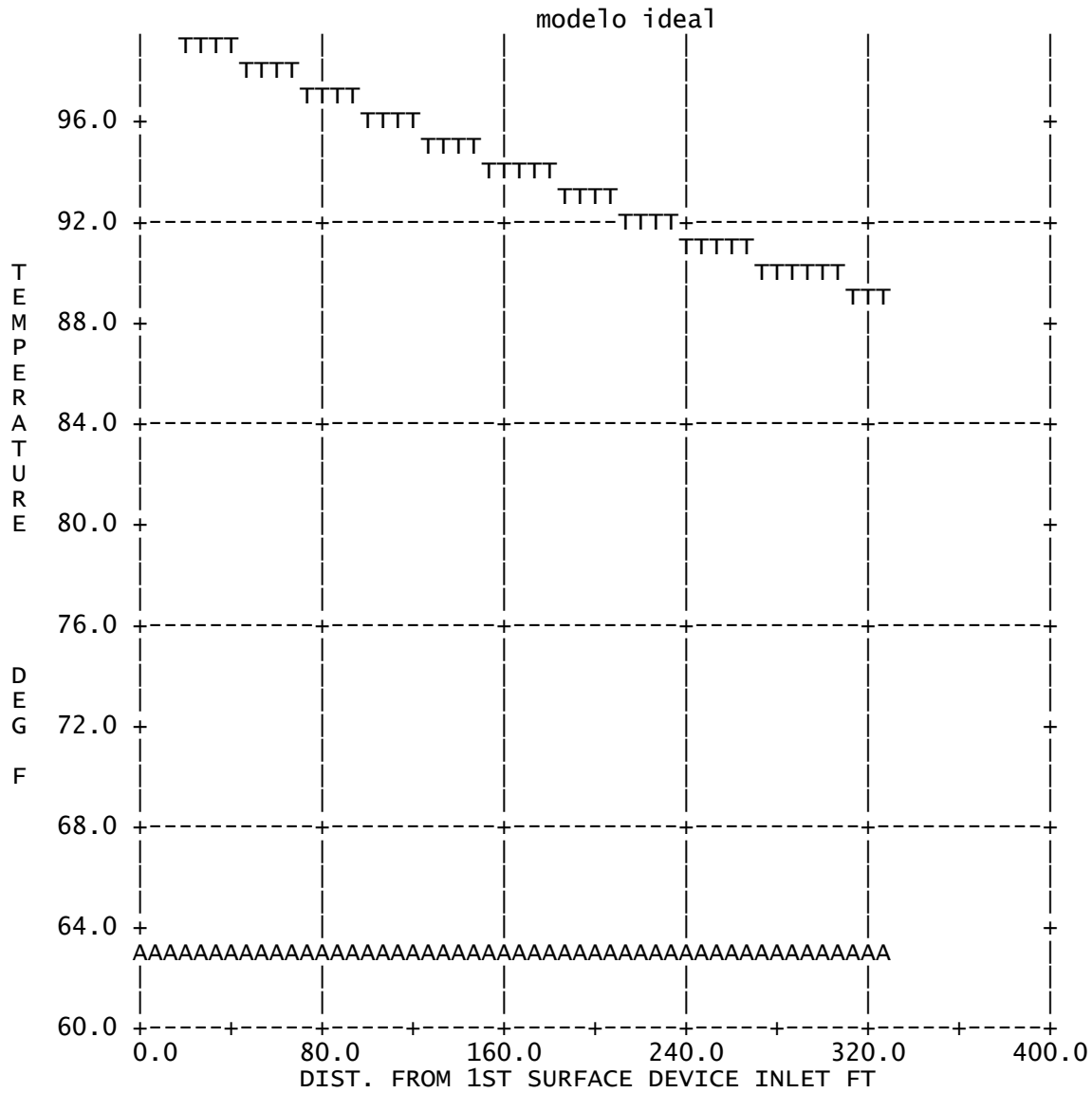
SURFACE PRESSURE PLOT FOR LINK



KEY... P - P - FLUID PRESS.

SURFACE TEMPERATURE PLOT FOR LINK





KEY... T - T - FLUID TEMP. A - A - AMB. TEMP.

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LINK "LINE" DEVICE DETAIL REPORT

HOLDUP AND VELOCITY DETAIL REPORT

DEVICE NAME	AND TYPE	SEG. NO.	---LIQUID HOLDUP---		SUPERFICIAL			T-D		SONIC
			SLIP	SLIP	LIQ VEL	GAS VEL	MIX . VEL	FLOW REGM	FLOW REGM	VEL
					(FPS)	(FPS)	(FPS)			(FPS)
				TOTAL (ABBL)						



modelo ideal

DEVICE NAME	SEGM NO	FRIC (PSIFT)	ELEV (PSIFT)	TOTAL (PSIFT)	FRIC (PSIG)	ELEV (PSIG)	PHASE	VALUE
P000 (PIPE)	0000	0.00	0.00	0.0	0.00	11.37	1-PH	1259.74
	0001	0.00	0.00	0.0	0.00	11.24	1-PH	1252.76
	0002	0.00	0.00	0.0	0.00	11.13	1-PH	1246.07
	0003	0.00	0.00	0.0	0.00	11.02	1-PH	1239.91

PRESSURE GRADIENT DETAIL REPORT

DEVICE NAME

AND TYPE	SEGM NO	FRIC (PSIFT)	ELEV (PSIFT)	TOTAL (PSIFT)	FRIC (PSIG)	ELEV (PSIG)
P000 (PIPE)	0000	-0.0053	0.0000	-0.0053	-0.4	0.0
	0001	-0.0052	0.0000	-0.0052	-0.4	0.0
	0002	-0.0052	0.0000	-0.0052	-0.4	0.0
	0003	-0.0051	0.0000	-0.0051	-0.4	0.0

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LINK "LINE" PROPERTY DETAIL REPORT

VISCOSITY AND DENSITY RESULTS

DEVICE NAME

AND TYPE	SEGM NO	OIL (CP)	LIQ (CP)	VAP (CP)	LIQ (LB/CF)	VAP (LB/CF)	SLIP (LB/CF)	NO-SLIP (LB/CF)
P000 (PIPE)	0000	0.000	0.000	0.014	0.000	5.376	5.376	5.376
	0001	0.000	0.000	0.014	0.000	5.434	5.434	5.434
	0002	0.000	0.000	0.014	0.000	5.491	5.491	5.491
	0003	0.000	0.000	0.014	0.000	5.544	5.544	5.544

FRICITION AND SURFACE TENSION RESULTS

DEVICE NAME

AND TYPE	SEGM NUM.	DENSITY (LB/CF)	VELO (FPS)	FRIC. ID. (IN)	FRIC. VISCOSITY (CP)	FRIC. FACTOR	REYNOLDS NUMBER	LIQ SURFACE TENSION (DN/CM)
P000 (PIPE)	0000	5.376	11.37	3.000	0.014	0.0177	1.6082E6	0.00
	0001	5.434	11.24	3.000	0.014	0.0177	1.6096E6	0.00
	0002	5.491	11.13	3.000	0.014	0.0177	1.6105E6	0.00
	0003	5.544	11.02	3.000	0.014	0.0177	1.6112E6	0.00

HEAT TRANSFER CALCULATIONS

DEVICE FLUID

modelo ideal

NAME AND (TYPE)	SEGM NO:	THERMAL CONDUCTIVITY (BTUFTF)	INSIDE FILM (HR-FT2-F/BTU)	PIPE (HR-FT2-F/BTU)	THERMAL RESISTANCE INSULATION (HR-FT2-F/BTU)	SURROUNDING (HR-FT2-F/BTU)
P000 (PIPE)	0000					
	0001	0.015	0.007	8.157E-4	0.000	0.171
	0002	0.015	0.007	8.157E-4	0.000	0.171
	0003	0.015	0.007	8.157E-4	0.000	0.171
	0004	0.015	0.007	8.157E-4	0.000	0.171

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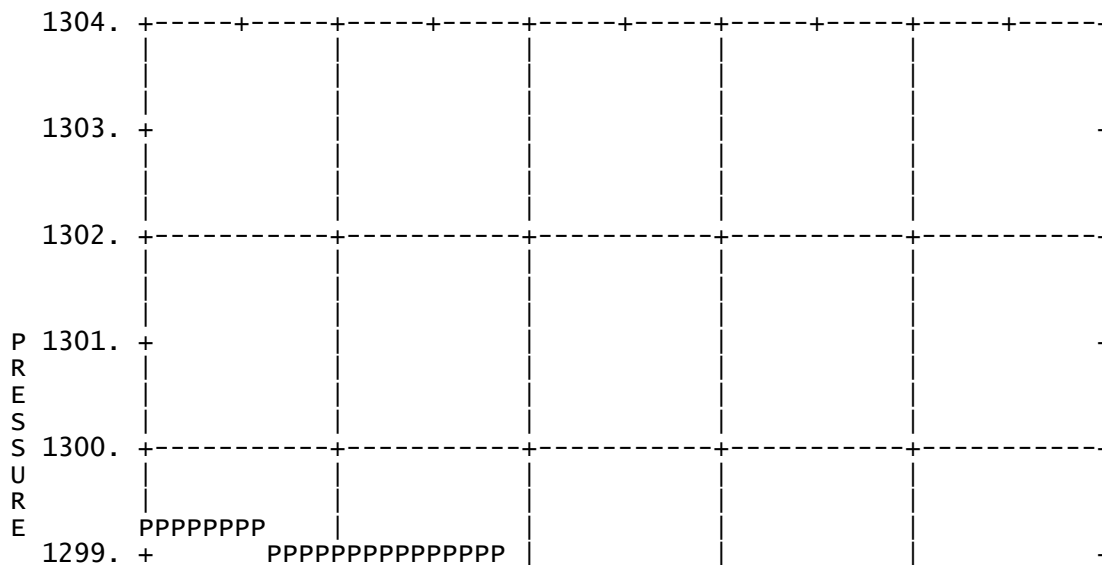
LINK "LIN1" DEVICE DETAIL REPORT

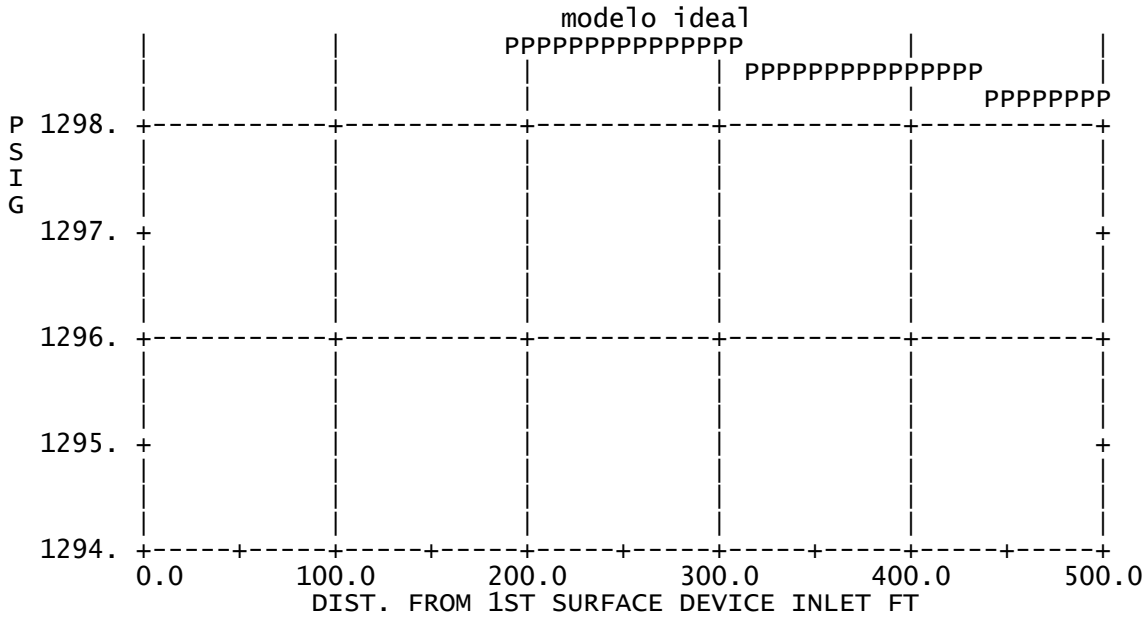
PRESSURE AND TEMPERATURE REPORT

DEVICE NAME AND TYPE	SEGM NO	INSIDE DIAM. (IN)	MWD OR LENGTH FROM INLET (FT)	I & O	TVD OR ELEV CHNG (FT)	CALC PRESS (PSIG)	CALC TEMP (F)	OVERALL U-FACT (BTU/HRFT2F)	AMB TEMP (F)
P001 (PIPE)	0000	3.000	0.0	I	0.0	1299.2	100.0		62.6
	0001		125.0		0.0	1299.0	92.8	5.484	62.6
	0002		250.0		0.0	1298.7	86.9	5.481	62.6
	0003		375.0		0.0	1298.5	82.1	5.478	62.6
	0004		500.0	O	0.0	1298.3	78.2	5.475	62.6

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SURFACE PRESSURE PLOT FOR LINK





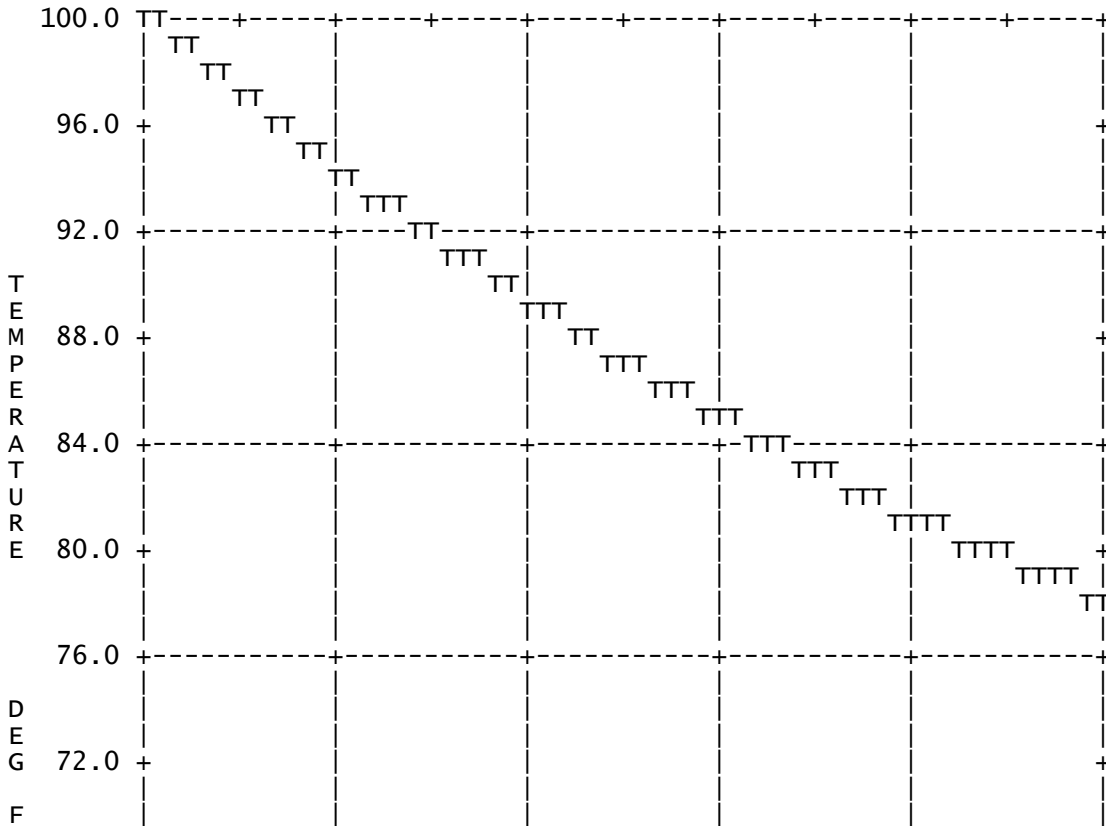
KEY... P - P - FLUID PRESS.  
R

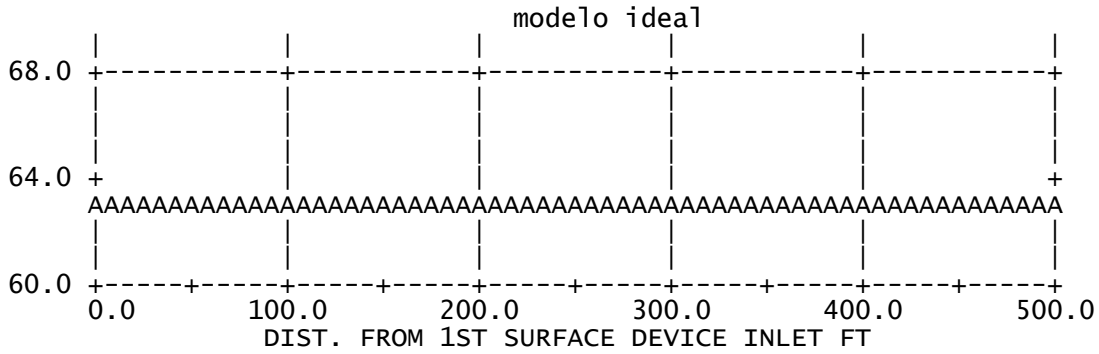
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SURFACE TEMPERATURE PLOT FOR LINK





KEY... T - T - FLUID TEMP. A - A - AMB. TEMP.  
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LINK "LIN1" DEVICE DETAIL REPORT

HOLDUP AND VELOCITY DETAIL REPORT

DEVICE NAME AND TYPE	SEG. NO.	---LIQUID HOLDUP---		SUPERFICIAL			MIX .	FLOW REGM	T-D FLOW REGM	SONIC VEL (FPS)
		NO SLIP	SLIP	LIQ VEL (FPS)	GAS VEL (FPS)	TOTAL (ABBL)				
P001 (PIPE)	0000									
	0001	0.00	0.00	0.0	0.00	6.77	6.77	----	1-PH	1255.05
	0002	0.00	0.00	0.0	0.00	6.60	6.60	----	1-PH	1238.95
	0003	0.00	0.00	0.0	0.00	6.46	6.46	----	1-PH	1225.86
	0004	0.00	0.00	0.0	0.00	6.35	6.35	----	1-PH	1215.23

PRESSURE GRADIENT DETAIL REPORT

DEVICE NAME AND TYPE	SEGM. NO:	--PRESSURE GRADIENT----			--PRESSURE CHANGE--	
		FRIC (PSIFT)	ELEV (PSIFT)	TOTAL (PSIFT)	FRIC (PSIG)	ELEV (PSIG)
P001 (PIPE)	0000					
	0001	-0.0019	0.0000	-0.0019	-0.2	0.0
	0002	-0.0019	0.0000	-0.0019	-0.2	0.0
	0003	-0.0018	0.0000	-0.0018	-0.2	0.0
	0004	-0.0018	0.0000	-0.0018	-0.2	0.0

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 LINK "LIN1" PROPERTY DETAIL REPORT

modelo ideal

VISCOSITY AND DENSITY RESULTS

DEVICE NAME		VISCOSITY			DENSITY			
AND TYPE	SEGM NO	OIL (CP)	LIQ (CP)	VAP (CP)	LIQ (LB/CF)	VAP (LB/CF)	SLIP (LB/CF)	NO-SLIP (LB/CF)
P001 (PIPE)	0000							
	0001	0.000	0.000	0.014	0.000	5.414	5.414	5.414
	0002	0.000	0.000	0.014	0.000	5.555	5.555	5.555
	0003	0.000	0.000	0.014	0.000	5.673	5.673	5.673
	0004	0.000	0.000	0.014	0.000	5.772	5.772	5.772

FRICITION AND SURFACE TENSION RESULTS

DEVICE NAME		FRICITION				FRIC. FACTOR	REYNOLDS NUMBER	LIQ SURFACE TENSION (DN/CM)
AND TYPE	SEGM NUM.	DENSITY (LB/CF)	VELO (FPS)	ID. (IN)	VISCOSITY (CP)			
P001 (PIPE)	0000							
	0001	5.414	6.77	3.000	0.014	0.0179	9.6567E5	0.00
	0002	5.555	6.60	3.000	0.014	0.0179	9.6670E5	0.00
	0003	5.673	6.46	3.000	0.014	0.0179	9.6721E5	0.00
	0004	5.772	6.35	3.000	0.014	0.0179	9.6739E5	0.00

HEAT TRANSFER CALCULATIONS

DEVICE NAME		FLUID THERMAL CONDUCTIVITY (BTUFTF)	INSIDE FILM (HR-FT2-F/BTU)	PIPE (HR-FT2-F/BTU)	INSULAT-ION (HR-FT2-F/BTU)	SURROUNDING (HR-FT2-F/BTU)
P001 (PIPE)	0000					
	0001	0.015	0.011	8.157E-4	0.000	0.171
	0002	0.015	0.011	8.157E-4	0.000	0.171
	0003	0.015	0.011	8.157E-4	0.000	0.171
	0004	0.015	0.011	8.157E-4	0.000	0.171

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LINK "LIN2" DEVICE DETAIL REPORT

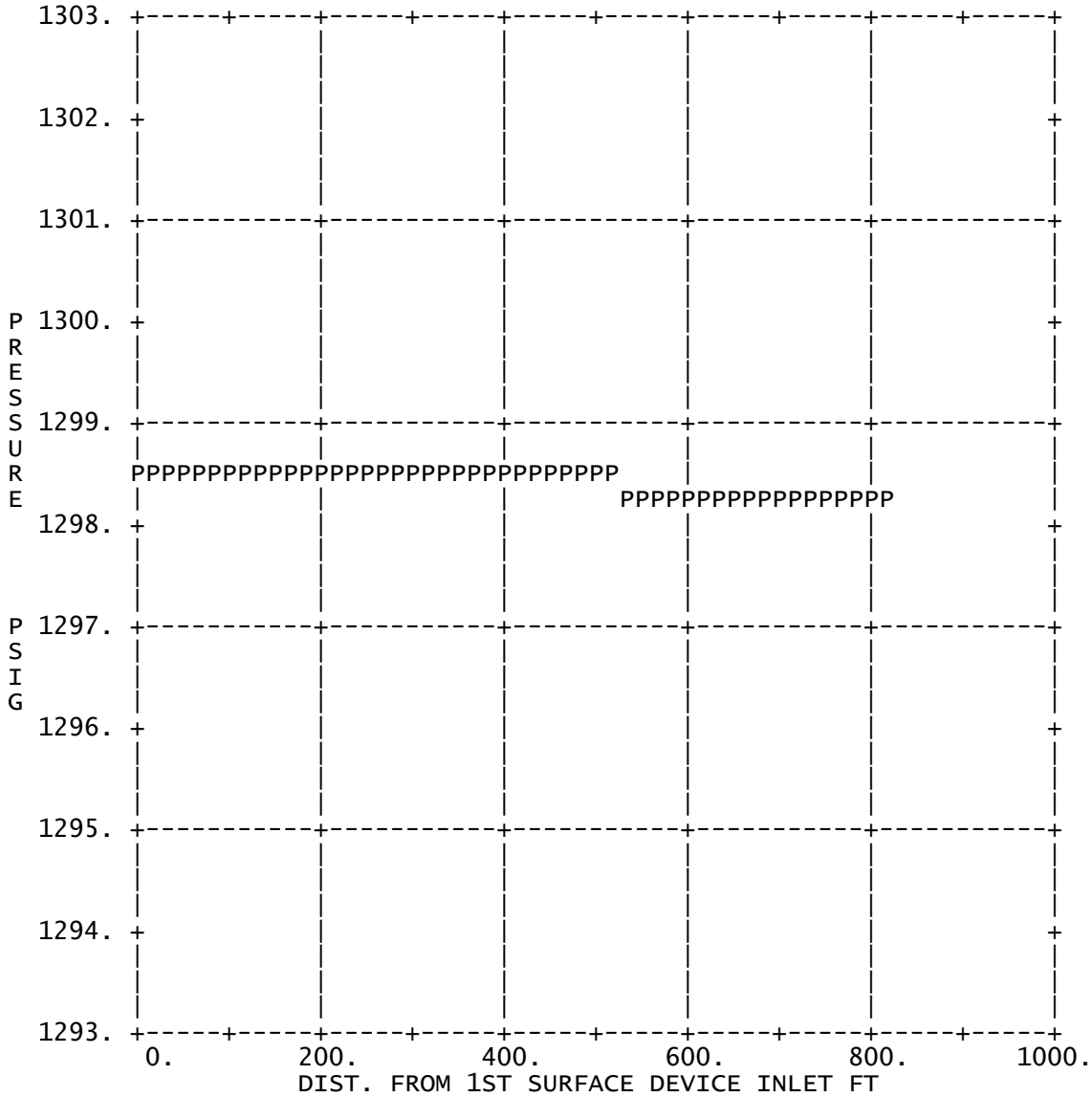
PRESSURE AND TEMPERATURE REPORT

DEVICE NAME	SEGM NO	INSIDE DIAM. (IN)	MWD OR LENGTH FROM INLET (FT)	I & O	TVD OR ELEV CHNG (FT)	CALC PRESS (PSIG)	CALC TEMP (F)	OVERALL U-FACT (BTU/HRFT2F)	AMB TEMP (F)
P002	0000	3.000	0.0	I	0.0	1298.5	100.0		62.6

(PIPE)	0001	205.1	0.0	1298.4	76.7	4.962	62.6
	0002	410.1	0.0	1298.4	67.8	4.949	62.6
	0003	615.2	0.0	1298.3	64.5	4.938	62.6
	0004	820.2	0.0	1298.3	63.3	4.934	62.6

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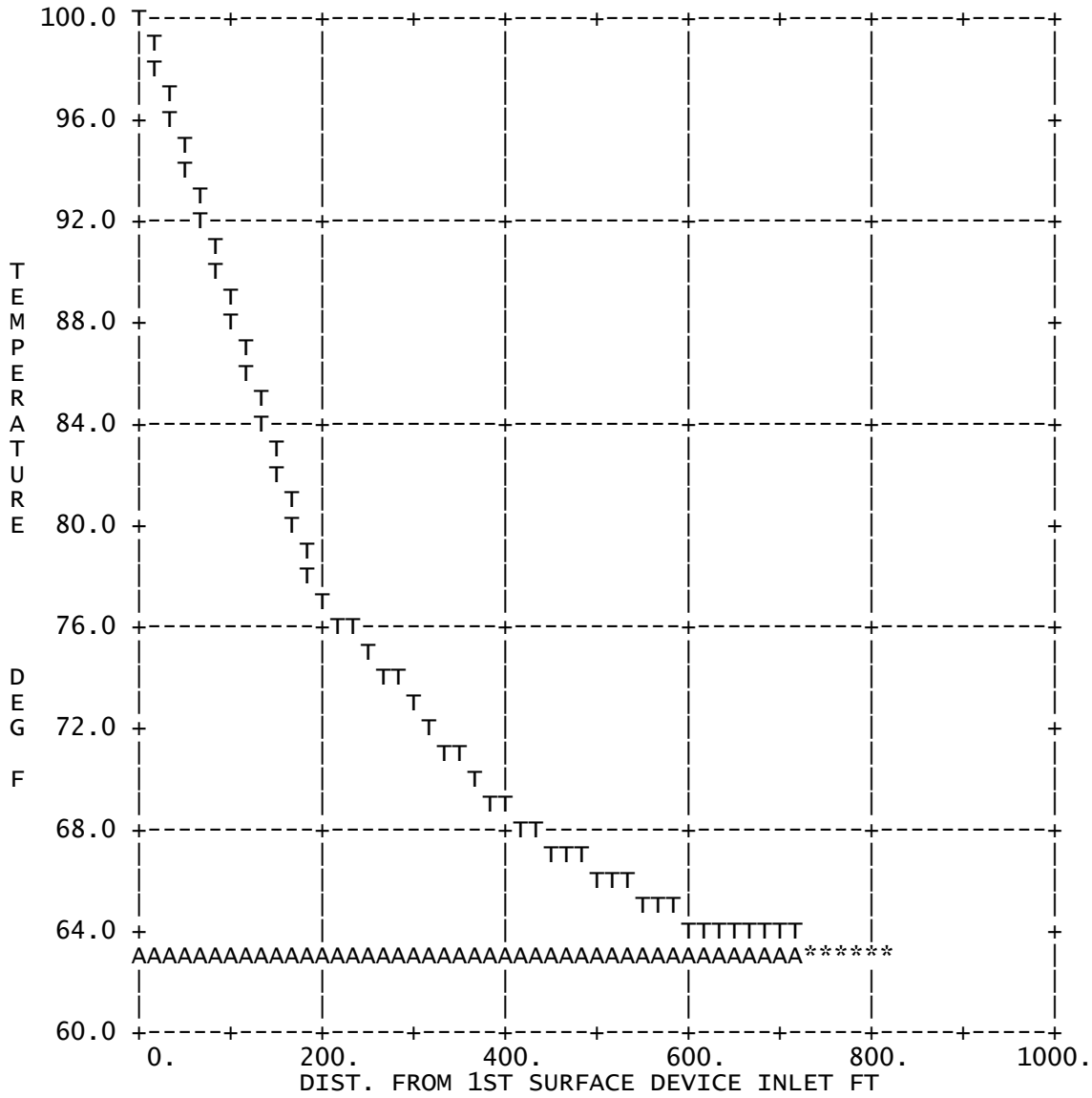
SURFACE PRESSURE PLOT FOR LINK



KEY... P - P - FLUID PRESS.

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SURFACE TEMPERATURE PLOT FOR LINK



KEY... T - T - FLUID TEMP. A - A - AMB. TEMP.  
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LINK "LIN2" DEVICE DETAIL REPORT

HOLDUP AND VELOCITY DETAIL REPORT

DEVICE  
NAME

---LIQUID HOLDUP---

SUPERFICIAL

T-D

AND TYPE	SEG. NO.	NO SLIP	SLIP	TOTAL (ABBL)	LIQ VEL (FPS)	GAS VEL (FPS)	MIX . VEL (FPS)	FLOW REGM	FLOW REGM	SONIC VEL (FPS)
P002 (PIPE)	0000									
	0001	0.00	0.00	0.0	0.00	2.19	2.19	----	1-PH	1235.41
	0002	0.00	0.00	0.0	0.00	2.05	2.05	----	1-PH	1195.68
	0003	0.00	0.00	0.0	0.00	2.00	2.00	----	1-PH	1180.50
	0004	0.00	0.00	0.0	0.00	1.98	1.98	----	1-PH	1174.88

PRESSURE GRADIENT DETAIL REPORT

AND TYPE	SEGM. NO:	--PRESSURE GRADIENT----			--PRESSURE CHANGE--	
		FRIC (PSIFT)	ELEV (PSIFT)	TOTAL (PSIFT)	FRIC (PSIG)	ELEV (PSIG)
P002 (PIPE)	0000					
	0001	-0.0002	0.0000	-0.0002	-4.41E-2	0.0
	0002	-0.0002	0.0000	-0.0002	-4.13E-2	0.0
	0003	-0.0002	0.0000	-0.0002	-4.03E-2	0.0
	0004	-0.0002	0.0000	-0.0002	-3.99E-2	0.0

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LINK "LIN2" PROPERTY DETAIL REPORT

VISCOSITY AND DENSITY RESULTS

AND TYPE	SEGM NO	-----VISCOSITY-----			-----DENSITY-----			
		OIL (CP)	LIQ (CP)	VAP (CP)	LIQ (LB/CF)	VAP (LB/CF)	SLIP (LB/CF)	NO-SLIP (LB/CF)
P002 (PIPE)	0000							
	0001	0.000	0.000	0.014	0.000	5.585	5.585	5.585
	0002	0.000	0.000	0.014	0.000	5.962	5.962	5.962
	0003	0.000	0.000	0.014	0.000	6.116	6.116	6.116
	0004	0.000	0.000	0.014	0.000	6.175	6.175	6.175

FRICITION AND SURFACE TENSION RESULTS

AND TYPE	SEGM NUM.	-----FRICITION-----				FRIC. FACTOR	REYNOLDS NUMBER	LIQ SURFACE TENSION (DN/CM)
		DENSITY (LB/CF)	VELO (FPS)	ID. (IN)	VISCOSITY (CP)			
P002 (PIPE)	0000							
	0001	5.585	2.19	3.000	0.014	0.0187	3.2232E5	0.00
	0002	5.962	2.05	3.000	0.014	0.0187	3.2230E5	0.00
	0003	6.116	2.00	3.000	0.014	0.0187	3.2198E5	0.00
	0004	6.175	1.98	3.000	0.014	0.0187	3.2182E5	0.00



modelo ideal

HEAT TRANSFER CALCULATIONS

DEVICE NAME AND (TYPE)	SEGM NO:	FLUID THERMAL CONDUCTIVITY (BTUFTF)	INSIDE FILM (HR-FT2-F/BTU)	PIPE (HR-FT2-F/BTU)	THERMAL RESISTANCE (HR-FT2-F/BTU)	INSULAT-ION (HR-FT2-F/BTU)	SURROUNDING (HR-FT2-F/BTU)
P002 (PIPE)	0000						
	0001	0.015	0.030	8.157E-4	0.000		0.171
	0002	0.015	0.031	8.157E-4	0.000		0.171
	0003	0.015	0.031	8.157E-4	0.000		0.171
	0004	0.015	0.031	8.157E-4	0.000		0.171

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BASE CASE

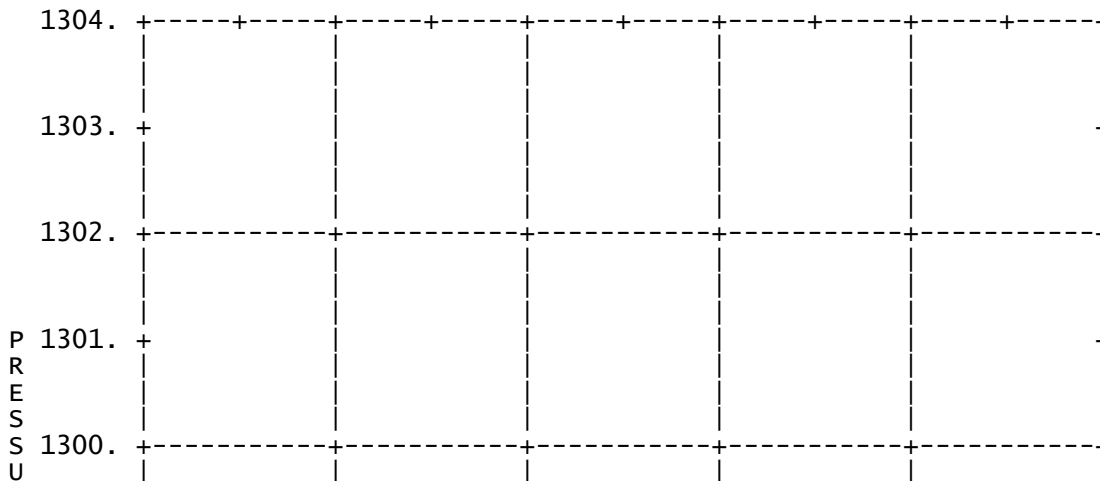
LINK "LIN3" DEVICE DETAIL REPORT

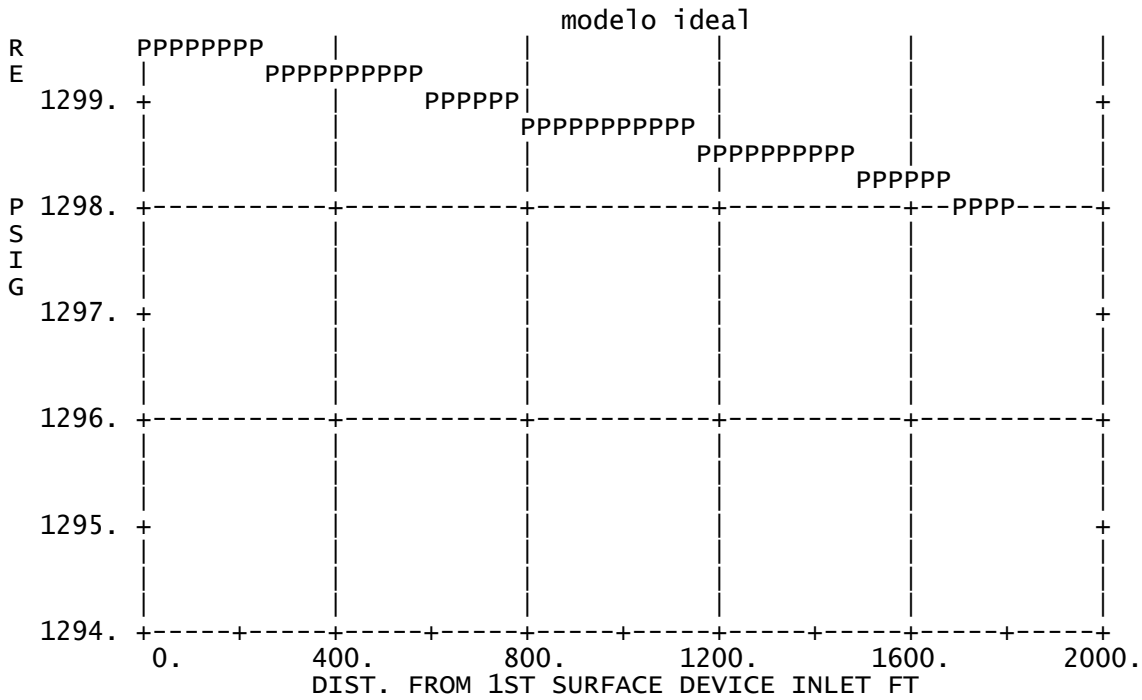
PRESSURE AND TEMPERATURE REPORT

DEVICE NAME AND TYPE	SEGM NO	INSIDE DIAM. (IN)	MWD OR LENGTH FROM INLET (FT)	I & O	TVD OR ELEV CHNG (FT)	CALC PRESS (PSIG)	CALC TEMP (F)	OVERALL U-FACT (BTU/HRFT2F)	AMB TEMP (F)
P003 (PIPE)	0000	6.000	0.0	I	0.0	1299.5	100.0		62.6
	0001		451.1		0.0	1299.2	90.6	4.085	62.6
	0002		902.2		0.0	1298.8	83.5	4.082	62.6
	0003		1353.3		0.0	1298.5	78.1	4.080	62.6
	0004		1804.5	O	0.0	1298.1	74.1	4.078	62.6

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SURFACE PRESSURE PLOT FOR LINK





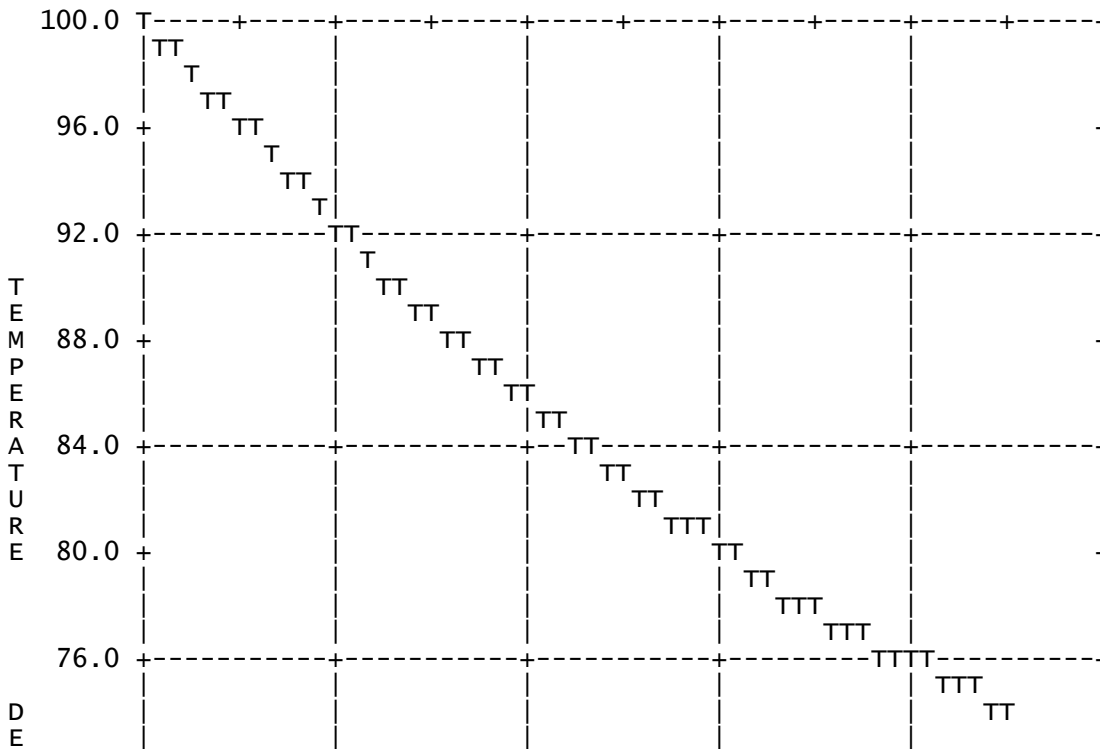
KEY... P - P - FLUID PRESS.

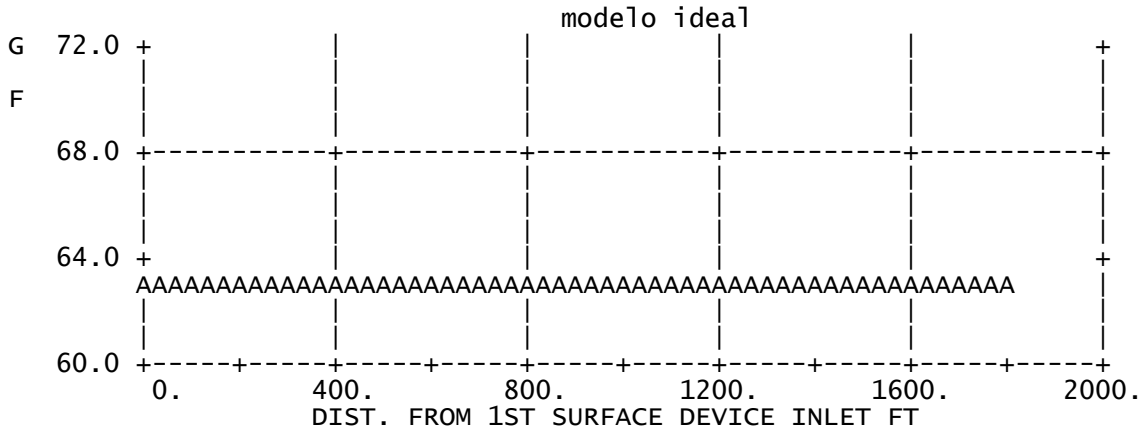
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SURFACE TEMPERATURE PLOT FOR LINK





KEY... T - T - FLUID TEMP. A - A - AMB. TEMP.  
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LINK "LIN3" DEVICE DETAIL REPORT

HOLDUP AND VELOCITY DETAIL REPORT

DEVICE NAME AND TYPE	SEG. NO.	---LIQUID HOLDUP---			SUPERFICIAL			MIX . VEL (FPS)	FLOW REGM	T-D FLOW REGM	SONIC VEL (FPS)
		NO SLIP	SLIP	TOTAL (ABBL)	LIQ VEL (FPS)	GAS VEL (FPS)					
P003 (PIPE)	0000										
	0001	0.00	0.00	0.0	0.00	6.74	6.74	----	1-PH	1252.33	
	0002	0.00	0.00	0.0	0.00	6.53	6.53	----	1-PH	1232.07	
	0003	0.00	0.00	0.0	0.00	6.37	6.37	----	1-PH	1216.76	
	0004	0.00	0.00	0.0	0.00	6.25	6.25	----	1-PH	1205.19	

PRESSURE GRADIENT DETAIL REPORT

DEVICE NAME AND TYPE	SEGM. NO:	--PRESSURE GRADIENT----			--PRESSURE CHANGE--	
		FRIC (PSIFT)	ELEV (PSIFT)	TOTAL (PSIFT)	FRIC (PSIG)	ELEV (PSIG)
P003 (PIPE)	0000					
	0001	-0.0008	0.0000	-0.0008	-0.4	0.0
	0002	-0.0008	0.0000	-0.0008	-0.4	0.0
	0003	-0.0008	0.0000	-0.0008	-0.3	0.0
	0004	-0.0008	0.0000	-0.0008	-0.3	0.0

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LINK "LIN3" PROPERTY DETAIL REPORT

VISCOSITY AND DENSITY RESULTS

DEVICE NAME AND TYPE		SEGM NO	VISCOSITY			DENSITY			
			OIL (CP)	LIQ (CP)	VAP (CP)	LIQ (LB/CF)	VAP (LB/CF)	SLIP (LB/CF)	NO-SLIP (LB/CF)
P003 (PIPE)	0000								
	0001		0.000	0.000	0.014	0.000	5.438	5.438	5.438
	0002		0.000	0.000	0.014	0.000	5.617	5.617	5.617
	0003		0.000	0.000	0.014	0.000	5.758	5.758	5.758
	0004		0.000	0.000	0.014	0.000	5.867	5.867	5.867

FRICITION AND SURFACE TENSION RESULTS

DEVICE NAME AND TYPE		SEGM NUM.	FRICITION			FRIC. FACTOR	REYNOLDS NUMBER	LIQ SURFACE TENSION (DN/CM)	
			DENSITY (LB/CF)	VELO (FPS)	ID. (IN)	VISCOSITY (CP)			
P003 (PIPE)	0000								
	0001		5.438	6.74	6.000	0.014	0.0153	1.9316E6	0.00
	0002		5.617	6.53	6.000	0.014	0.0153	1.9339E6	0.00
	0003		5.758	6.37	6.000	0.014	0.0153	1.9346E6	0.00
	0004		5.867	6.25	6.000	0.014	0.0153	1.9346E6	0.00

HEAT TRANSFER CALCULATIONS

DEVICE NAME AND TYPE		SEGM NO	FLUID THERMAL CONDUCTIVITY (BTU/FT-F)	INSIDE FILM (HR-FT <sup>2</sup> -F/BTU)	PIPE THERMAL (HR-FT <sup>2</sup> -F/BTU)	RESISTANCE INSULATION (HR-FT <sup>2</sup> -F/BTU)	SURROUNDING (HR-FT <sup>2</sup> -F/BTU)
P003 (PIPE)	0000						
	0001		0.015	0.012	8.542E-4	0.000	0.232
	0002		0.015	0.012	8.542E-4	0.000	0.232
	0003		0.015	0.012	8.542E-4	0.000	0.232
	0004		0.015	0.012	8.542E-4	0.000	0.232

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LINK "LIN4" DEVICE DETAIL REPORT

PRESSURE AND TEMPERATURE REPORT

DEVICE NAME AND TYPE		SEGM NO	MWD OR LENGTH (FT)	I & O	TVD OR ELEV CHNG (FT)	CALC PRESS (PSIG)	CALC TEMP (F)	OVERALL U-FACT (BTU/	AMB TEMP (F)
			INSIDE DIAM. (IN)						

modelo ideal

HRFT2F)

P005	0000	4.000	0.0	I	0.0	1298.3	82.7		62.6
(PIPE)	0001		12.5		0.0	1298.3	82.6	4.929	62.6
	0002		25.0		0.0	1298.2	82.4	4.929	62.6
	0003		37.5		0.0	1298.2	82.2	4.929	62.6
	0004		50.0	O	0.0	1298.1	82.0	4.929	62.6

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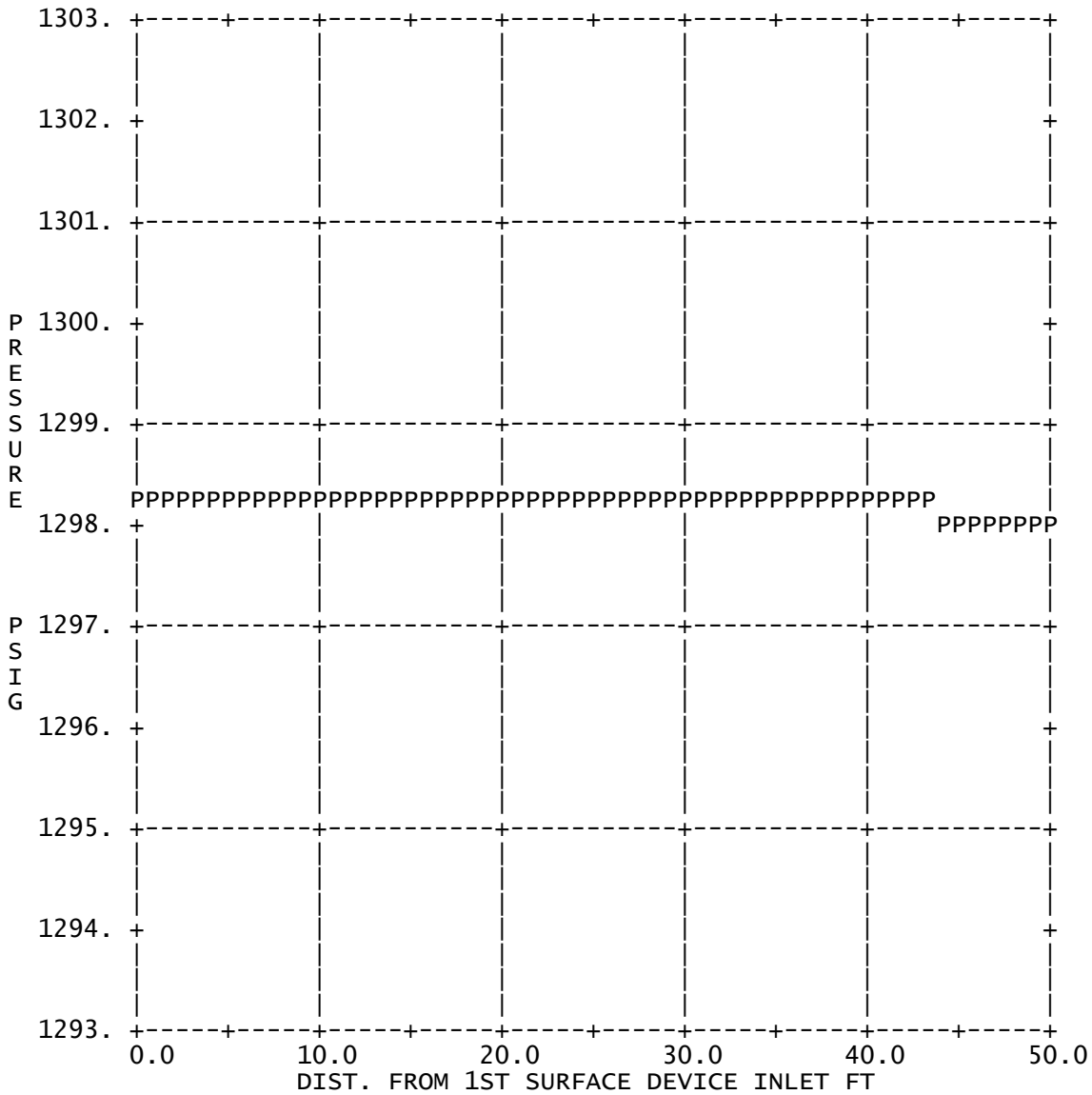
PROJECT  
PROBLEM

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OUTPUT  
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SURFACE PRESSURE PLOT FOR LINK



KEY... P - P - FLUID PRESS.

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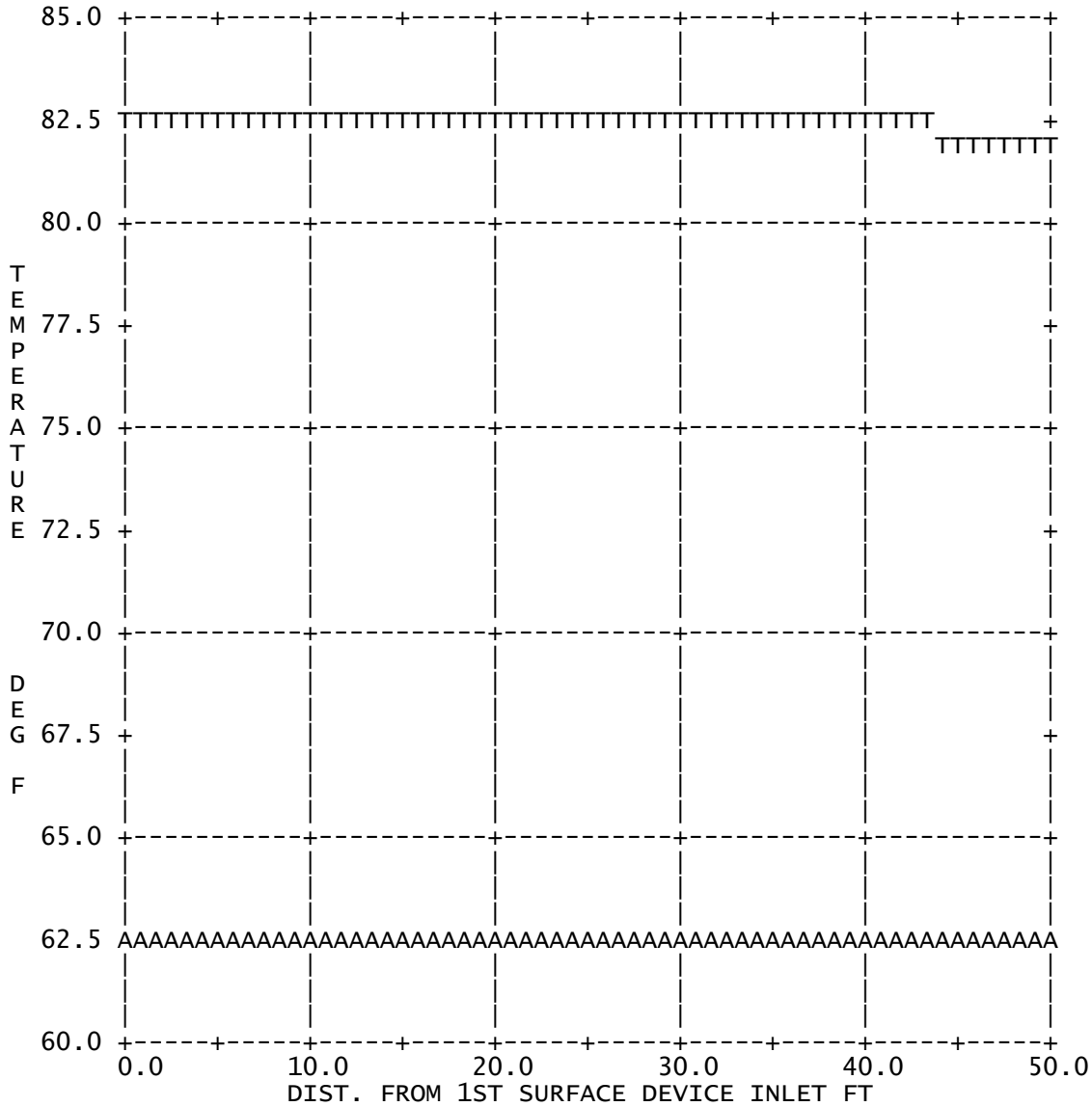
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SURFACE TEMPERATURE PLOT FOR LINK



KEY... T - T - FLUID TEMP. A - A - AMB. TEMP.  
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LINK "LIN4" DEVICE DETAIL REPORT

HOLDUP AND VELOCITY DETAIL REPORT

modelo ideal

DEVICE NAME AND TYPE	SEG. NO.	---LIQUID HOLDUP---			SUPERFICIAL			MIX .	FLOW REGM	T-D FLOW REGM	SONIC VEL
		NO SLIP	SLIP	TOTAL (ABBL)	LIQ VEL (FPS)	GAS VEL (FPS)	VEL (FPS)			VEL (FPS)	
P005 (PIPE)	0000										
	0001	0.00	0.00	0.0	0.00	10.83	10.83	----	1-PH	1221.33	
	0002	0.00	0.00	0.0	0.00	10.82	10.82	----	1-PH	1220.90	
	0003	0.00	0.00	0.0	0.00	10.81	10.81	----	1-PH	1220.47	
	0004	0.00	0.00	0.0	0.00	10.81	10.81	----	1-PH	1220.05	

PRESSURE GRADIENT DETAIL REPORT

DEVICE NAME AND TYPE	SEGM. NO:	--PRESSURE GRADIENT----			--PRESSURE CHANGE--	
		FRIC (PSIFT)	ELEV (PSIFT)	TOTAL (PSIFT)	FRIC (PSIG)	ELEV (PSIG)
P005 (PIPE)	0000					
	0001	-0.0036	0.0000	-0.0036	-4.49E-2	0.0
	0002	-0.0036	0.0000	-0.0036	-4.48E-2	0.0
	0003	-0.0036	0.0000	-0.0036	-4.48E-2	0.0
	0004	-0.0036	0.0000	-0.0036	-4.48E-2	0.0

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LINK "LIN4" PROPERTY DETAIL REPORT

VISCOSITY AND DENSITY RESULTS

DEVICE NAME AND TYPE	SEGM NO	-----VISCOSITY-----			-----DENSITY-----			
		OIL (CP)	LIQ (CP)	VAP (CP)	LIQ (LB/CF)	VAP (LB/CF)	SLIP (LB/CF)	NO-SLIP (LB/CF)
P005 (PIPE)	0000							
	0001	0.000	0.000	0.014	0.000	5.714	5.714	5.714
	0002	0.000	0.000	0.014	0.000	5.718	5.718	5.718
	0003	0.000	0.000	0.014	0.000	5.721	5.721	5.721
	0004	0.000	0.000	0.014	0.000	5.725	5.725	5.725

FRICITION AND SURFACE TENSION RESULTS

DEVICE NAME AND TYPE	SEGM NUM.	-----FRICITION-----				FRIC. FACTOR	REYNOLDS NUMBER	LIQ SURFACE TENSION
		DENSITY (LB/CF)	VELO (FPS)	ID. (IN)	VISCOSITY (CP)			(DN/CM)
P005 (PIPE)	0000							
	0001	5.714	10.83	4.000	0.014	0.0166	2.1766E6	0.00
	0002	5.718	10.82	4.000	0.014	0.0166	2.1766E6	0.00
	0003	5.721	10.81	4.000	0.014	0.0166	2.1767E6	0.00

modelo ideal

0004    5.725    10.81    4.000    0.014    0.0166 2.1767E6    0.00

HEAT TRANSFER CALCULATIONS

DEVICE NAME AND (TYPE)	SEGMENT NO:	FLUID THERMAL CONDUCT- IVITY (BTUFTF)	INSIDE FILM (HR-FT2- F/BTU)	PIPE (HR-FT2- F/BTU)	THERMAL RESISTANCE	INSULAT- ION (HR-FT2- F/BTU)	SURROUN- DING (HR-FT2- F/BTU)
P005 (PIPE)	0000						
	0001	0.015	0.007	8.344E-4	0.000	0.195	
	0002	0.015	0.007	8.344E-4	0.000	0.195	
	0003	0.015	0.007	8.344E-4	0.000	0.195	
	0004	0.015	0.007	8.344E-4	0.000	0.195	

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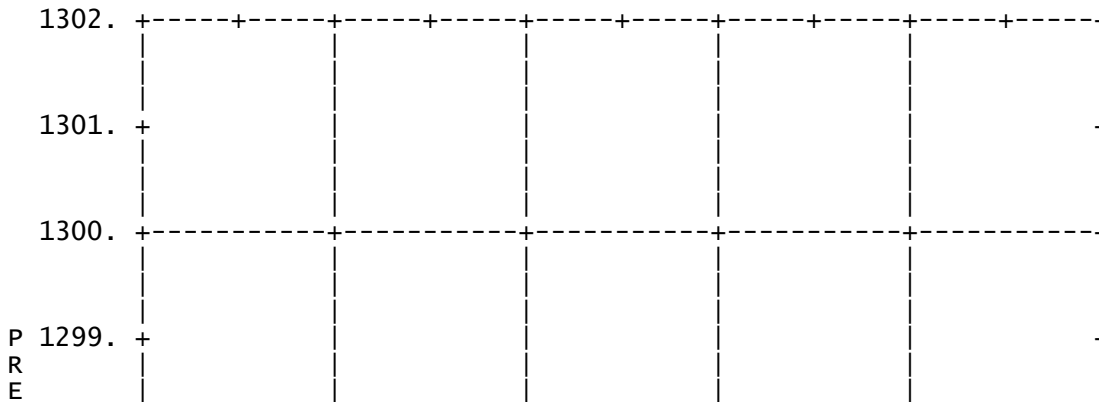
LINK "LIN5" DEVICE DETAIL REPORT

PRESSURE AND TEMPERATURE REPORT

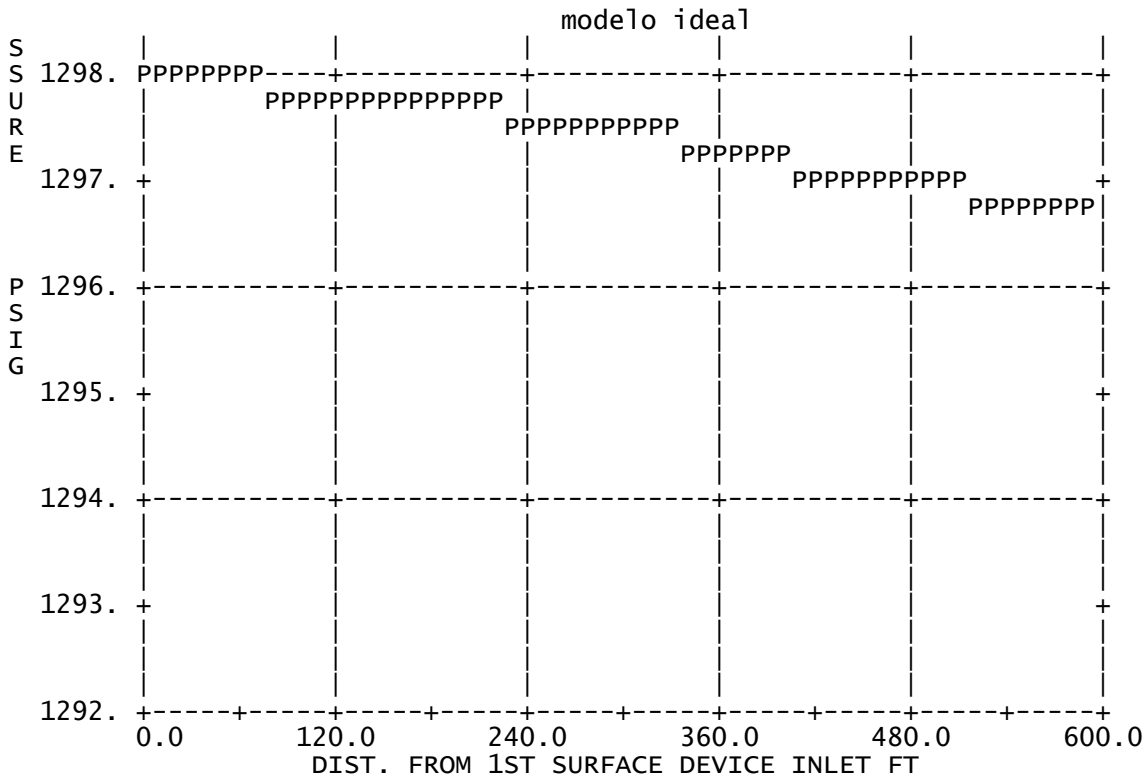
DEVICE NAME AND TYPE	SEGMENT NO	INSIDE DIAM. (IN)	MWD OR LENGTH FROM INLET (FT)	I & O	TVD OR ELEV CHNG (FT)	CALC PRESS (PSIG)	CALC TEMP (F)	OVERALL U-FACT (BTU/ HRFT2F)	AMB TEMP (F)
P004 (PIPE)	0000	6.000	0.0	I	0.0	1298.1	77.5		62.6
	0001		147.6		0.0	1297.8	76.7	4.160	62.6
	0002		295.3		0.0	1297.4	75.9	4.160	62.6
	0003		442.9		0.0	1297.1	75.2	4.160	62.6
	0004		590.5	O	0.0	1296.8	74.5	4.160	62.6

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SURFACE PRESSURE PLOT FOR LINK







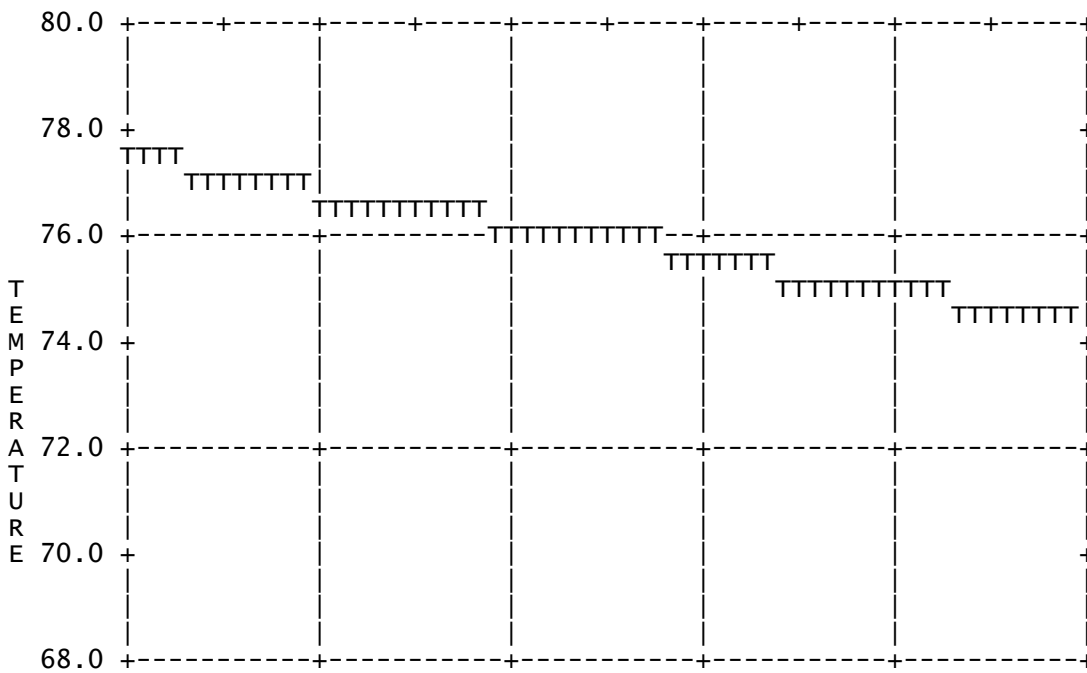
KEY... P - P - FLUID PRESS.  
R

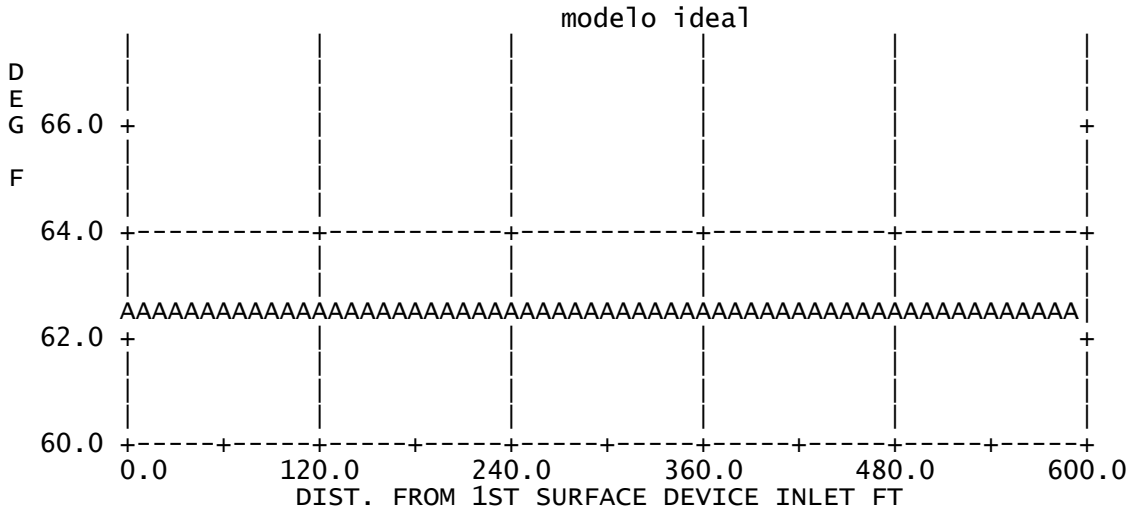
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SURFACE TEMPERATURE PLOT FOR LINK





KEY... T - T - FLUID TEMP. A - A - AMB. TEMP.  
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 PROJECT OUTPUT  
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LINK "LIN5" DEVICE DETAIL REPORT

HOLDUP AND VELOCITY DETAIL REPORT

DEVICE NAME AND TYPE	SEG. NO.	---LIQUID HOLDUP---			SUPERFICIAL			MIX . VEL (FPS)	FLOW REGM	T-D FLOW REGM	SONIC VEL (FPS)
		NO SLIP	SLIP	TOTAL (ABBL)	LIQ VEL (FPS)	GAS VEL (FPS)					
P004 (PIPE)	0000										
	0001	0.00	0.00	0.0	0.00	10.98	10.98	----	1-PH	1207.69	
	0002	0.00	0.00	0.0	0.00	10.95	10.95	----	1-PH	1205.71	
	0003	0.00	0.00	0.0	0.00	10.92	10.92	----	1-PH	1203.85	
	0004	0.00	0.00	0.0	0.00	10.89	10.89	----	1-PH	1202.09	

PRESSURE GRADIENT DETAIL REPORT

DEVICE NAME AND TYPE	SEGM. NO:	--PRESSURE GRADIENT----			--PRESSURE CHANGE--	
		FRIC (PSIFT)	ELEV (PSIFT)	TOTAL (PSIFT)	FRIC (PSIG)	ELEV (PSIG)
P004 (PIPE)	0000					
	0001	-0.0023	0.0000	-0.0023	-0.3	0.0
	0002	-0.0023	0.0000	-0.0023	-0.3	0.0
	0003	-0.0023	0.0000	-0.0023	-0.3	0.0
	0004	-0.0023	0.0000	-0.0023	-0.3	0.0

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LINK "LIN5" PROPERTY DETAIL REPORT

VISCOSITY AND DENSITY RESULTS

DEVICE

AND TYPE	SEGM NO	VISCOSITY			DENSITY			
		OIL (CP)	LIQ (CP)	VAP (CP)	LIQ (LB/CF)	VAP (LB/CF)	SLIP (LB/CF)	NO-SLIP (LB/CF)
P004 (PIPE)	0000							
	0001	0.000	0.000	0.014	0.000	5.842	5.842	5.842
	0002	0.000	0.000	0.014	0.000	5.859	5.859	5.859
	0003	0.000	0.000	0.014	0.000	5.876	5.876	5.876
	0004	0.000	0.000	0.014	0.000	5.891	5.891	5.891

FRICITION AND SURFACE TENSION RESULTS

DEVICE

AND TYPE	SEGM NUM.	FRICITION			FRIC. FACTOR	REYNOLDS NUMBER	LIQ SURFACE TENSION (DN/CM)
		DENSITY (LB/CF)	VELO (FPS)	ID. (IN)			
P004 (PIPE)	0000						
	0001	5.842	10.98	6.000	0.014	3.3861E6	0.00
	0002	5.859	10.95	6.000	0.014	3.3863E6	0.00
	0003	5.876	10.92	6.000	0.014	3.3865E6	0.00
	0004	5.891	10.89	6.000	0.014	3.3867E6	0.00

HEAT TRANSFER CALCULATIONS

DEVICE

AND (TYPE)	SEGM NO:	FLUID THERMAL CONDUCT- IVITY (BTUFTF)	THERMAL		RESISTANCE	
			INSIDE FILM (HR-FT2- F/BTU)	PIPE (HR-FT2- F/BTU)	INSULAT- ION (HR-FT2- F/BTU)	SURROUN- DING (HR-FT2- F/BTU)
P004 (PIPE)	0000					
	0001	0.015	0.007	8.542E-4	0.000	0.232
	0002	0.015	0.007	8.542E-4	0.000	0.232
	0003	0.015	0.007	8.542E-4	0.000	0.232
	0004	0.015	0.007	8.542E-4	0.000	0.232

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END OF NETWORK PROCESSING -- NO ERRORS  
-- 1 WARNING

CALCULATION STARTED 00:14:52 07/17/12  
CALCULATION FINISHED 00:14:53 07/17/12

modelo ideal  
CALCULATION RUN TIME 0 HR 0 MIN 0 SEC  
NETWORK SIMULATION SOLVED