Sample of output from The Control Simulator, Version 4

This is a very simple example of pressurizing a blocked steel line. The following table shows actual results from the test being simulated.

Time sec	Pressure psi
5.0	428
7.5	684
11.5	855
15.0	855

In the simulation below, the Pressure column above corresponds to the pressure at the blocked end of the line ("Dis End Pressure" in the sample below).

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{------------------------------------------------------------------------------
The Control Simulator - Version 4.11/1 - Simple line friction treatment
Data from file TEST855 - 14 JUL 1993  11:40                          PAGE   1
Simulation performed by InterLink Systems, Inc., Houston, TX.
------------------------------------------------------------------------------}

PROJECT AND SIMULATION DESCRIPTION:

     Client:   Interlink Systems
     Project:  Demonstration Data File
     Comments: Data used in the computed plot of Figure 2.

FLUID PARAMETERS: IDEAL FLUID

     Specific gravity of the fluid is 1
     Viscosity of the fluid is 1.25 CS
     Bulk modulus of the fluid is 311E3 PSI

SOURCE PARAMETERS: SOURCE IS A REGULATOR FOLLOWED BY AN ORIFICE

     Reservoir pressure is 855 PSI
     Cv of orifice is 0.5 GPM/PSI

LINE #1 PARAMETERS: LINE IS A SINGLE HARD LINE

     Length of the line is 12E3 FT
     Internal diameter of the line is 0.402 IN
     Roughness of internal wall is 1.8E-3 IN
     Pipe wall thickness is 0.049 IN
     Young's modulus of pipe wall is 30E6 PSI
     Poisson's ratio for pipe material is 0.3
     Wave speed in the line is 4639 FT/SEC
     Initially pressurize the line to 0 PSI

DISCHARGE #1 PARAMETERS: THE END OF LINE #1 IS PLUGGED

     End run when pressure goes above 1000 PSI
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TIMING AND PRINTING PARAMETERS

End run after 20 SEC
Divide lines into at least 30 segments
Normal printing interval is each 1 SEC
or when time increases by at least 0 %
(whichever is greater)
Fine print from 2.4 SEC to 2.8 SEC every 0.1 SEC

TIMING ADJUSTMENTS AND LINE SECTIONING

Time increment calculated to be 0.0862 SEC
Line #1 divided into 30 segments

Total time (SEC)	Orifice pres drop PSI	Src end pressure PSI	Source flow rate GPM	Src end totl flow GAL	Dis end pressure PSI	Reynolds number	Friction factor
0.00	855.00	0	0.000	0.000	0	599	0.10688
1.03	20.36	835	2.256	0.050	0	14520	0.03505
2.07	12.31	843	1.754	0.084	0	11166	0.03637
2.41	11.02	844	1.660	0.094	0	10550	0.03669
2.50	10.50	845	1.620	0.096	0	10446	0.03674
2.67	10.02	845	1.583	0.101	172	10192	0.03689
2.76	10.02	845	1.582	0.103	171	10046	0.03697
3.02	9.21	846	1.518	0.110	215	9746	0.03715
4.05	7.51	847	1.370	0.134	343	8751	0.03782
5.00	6.56	848	1.280	0.155	442	8098	0.03833
6.04	4.83	850	1.099	0.176	546	6988	0.03937
7.07	3.48	852	0.932	0.193	634	5942	0.04062
8.02	2.37	853	0.769	0.207	710	5010	0.04208
9.05	1.50	854	0.612	0.219	771	4014	0.04420
10.00	0.94	854	0.485	0.227	810	3125	0.04692
11.04	0.46	855	0.339	0.234	846	2201	0.05142
12.07	0.21	855	0.231	0.239	870	1523	0.04204
13.02	0.02	855	0.078	0.242	885	642	0.09962
14.05	-0.01	855	-0.048	0.242	887	248	0.25821
15.00	-0.05	855	-0.112	0.241	878	695	0.09207
16.04	-0.08	855	-0.141	0.238	864	886	0.07222
17.07	-0.05	855	-0.116	0.236	852	753	0.08496
18.02	-0.01	855	-0.059	0.235	844	424	0.15109
19.05	0.00	855	-0.000	0.234	841	40	1.58226
20.00	0.01	855	0.037	0.234	843	220	0.29093

SUMMARY FOR LINE #1
Totalized volume into the source end of the line was 0.234 GAL
Totalized volume out of the discharge end of the line was 0.000 GAL
Maximum pressure occurring on the line was 888 PSI
Maximum flow occurring on the line was 4.440 GPM

Date and time simulation ended - 14 JUL 1993 11:40
Total execution time - 0.036 min